Hornsea Project Four

G5.32 Endurance No Overlap EIA and HRA Review

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1 Introduction and Background

1.1.1.1 Orsted Hornsea Project Four Limited (hereafter the Applicant) has submitted a Development Consent Order (DCO) application to the Planning Inspectorate (PINS), supported by a range of plans and documents including an Environmental Statement (ES) which set out the results of the Environmental Impact Assessment (EIA) on the Hornsea Project Four Offshore Wind Farm (hereafter Hornsea Four) and its associated infrastructure.

1.1.1.2 bp in their Position Statement (see PDF page 142 of **REP1-057** (Appendix 2: bp's Position Statement of G1.29 Position Statement between Hornsea Project Four and BP Exploration Operating Company Limited (BP)) query the adequacy of Hornsea 4's Environmental Impact Assessment (see Point 16 PDF page 142 of **REP1-057**).

1.1.1.3 Specifically, bp state "NEP and Orsted disagree about the extent to which their projects can co-exist in the Overlap Zone. This presents a particular complexity in respect of the assessment of the cumulative impact of the two projects, which Orsted is required to carry out pursuant to the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Specifically, what footprint should be assumed for each project when carrying out that assessment: (i) the complete overlap which Orsted believes is possible through use of technical solutions not recognised by NEP; or (ii) no overlap, instead development of the two projects in mutually exclusive adjacent zones (which would be the effect if the Hornsea 4 DCO were granted with NEP's proposed protective provisions)".

1.1.1.4 In Point 16.11 (PDF page 145) of **REP1-057** "bp suggests that the ExA therefore requests that Orsted provides a supplemental assessment, setting out the environmental impacts of Hornsea 4 in the event that NEP's protective provisions are adopted (preventing any activities by Orsted in the Exclusion Area), and a revised assessment of the effects in the absence of those protective provisions, addressing the flaws identified above. This will enable the Secretary of State, if he so chooses, to grant the Hornsea 4 DCO mindful of the effects of those protective provisions".

1.1.1.5 Furthermore, in Point 16.12 (PDF page 145) bp state "We are also puzzled by the absence of reference to the Endurance reservoir from the cumulative chapter of Orsted's EIA. Again, bp suggests that the ExA asks Orsted to provide a supplement to that chapter which takes account of the NEP project".

1.1.1.6 The Applicant has prepared this submission to specifically address the perceived inadequacy of the EIA (Appendix A) and for completeness considers a review of the HRA (Appendix B) pertinent for inclusion considering the bp proposed alternative of no overlap with Hornsea Four and the Endurance project. For the avoidance of doubt, the Applicant: (i) is confident its EIA and HRA is adequate; (ii) does not support a "no overlap" scenario, for the detailed reasons already submitted into Examination; and (iii) strongly resists the inclusion of the

protective provisions provided by bp, which seek to exclude Hornsea Four from the overlap zone.

1.1.1.7 The cumulative assessment point has been addressed in the Applicant's response to Examining Authority's second written question ES 2.2 of document G5.2 Applicant's Responses to the ExA's Second Written Questions (REP5-074).

2 Endurance no overlap review

2.1.1.1 The Applicant's review of the no overlap scenario has been concluded by Competent Experts (see Environmental Impact Assessment Methodology amended by document A1.5.1: Environmental Impact Assessment Methodology Schedule of Change (ASS-007)).

2.1.1.2 The spatial consideration of the "no overlap scenario" is illustrated for indicative purposes in Figure 1.

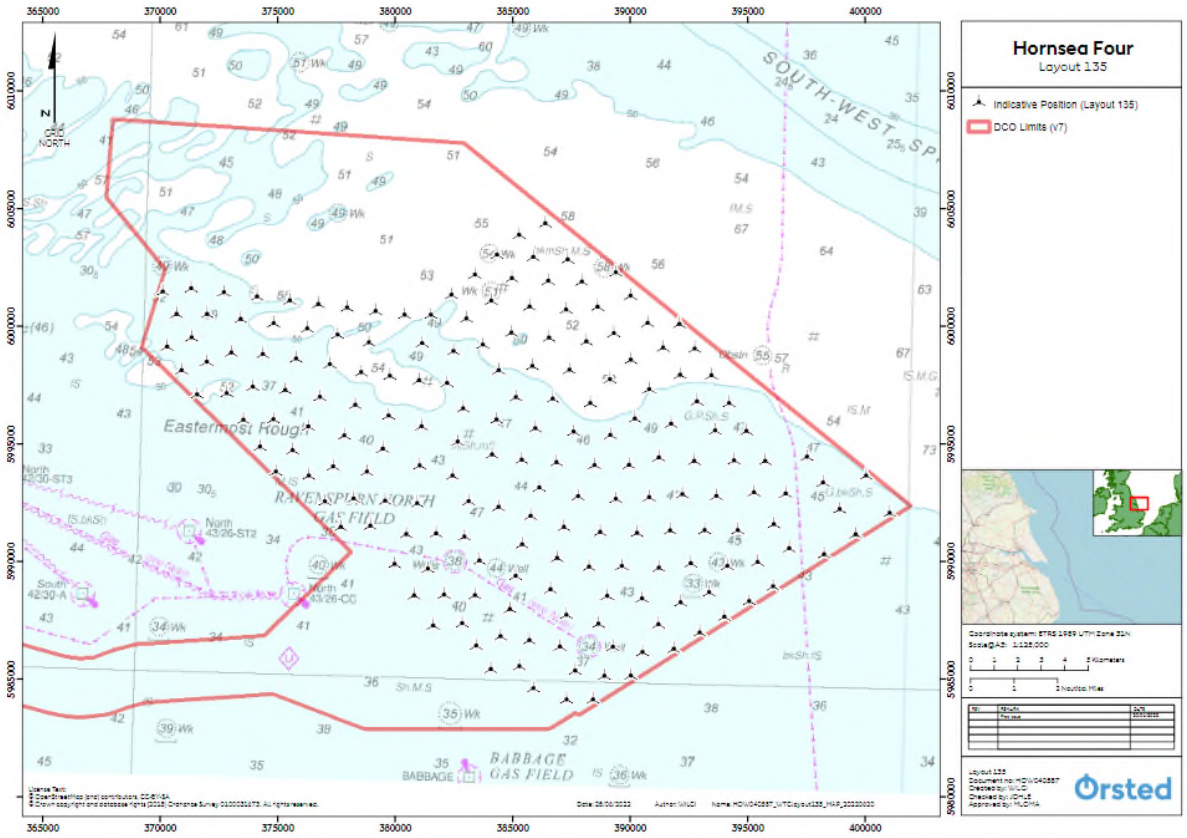

Figure 1: Hornsea Four turbine layout in consideration of "no overlap scenario".

2.2 EIA

2.2.1.1 The Applicant's process for review utilises and modifies the Hornsea Four Impacts Register with the addition of two further columns. Column One considers "Endurance No Overlap Scenario - Any Change to Significance Conclusion?" and Column Two presents "Justification for Position".

2.2.1.2 The results from the EIA review are presented in Appendix A.

2.3 HRA

2.3.1.1 The Applicant's process for review of the HRA uses the table "Summary of the Potential for Adverse Effect from Hornsea Four Alone" and table "Summary of the Potential for Adverse Effect from Hornsea Four in-combination" modified from the Report to Inform Appropriate Assessment (RIAA) with the addition of two further columns to each respective table. Column One considers "Endurance No Overlap Scenario - Any Change to Significance Conclusion?" and Column Two presents "Justification for conclusion/ Further Detail".

2.3.1.2 The results from the HRA review are presented in **Appendix B** with the additional columns shaded blue for ease of navigation.

3 Endurance no overlap review

3.1.1.1 The Applicant confirms no material change to the significance of assessment presented at the point of Application in respect of both EIA and HRA in the event of a "no overlap" scenario. The Applicant therefore considers the EIA and HRA presented at Application to be adequate and complete, having due consideration of the Endurance project.

Appendix A: Endurance No Overlap EIA Impacts Register

Hornsea Project Four

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G5.32 Endurance No Overlap EIA and HRA Review - Appendix A Offshore No Overlap Scenario Impacts Register

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Hornsea 4

Ørsted

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Hornsea 4

1. Impacts Register Explained

Description

Table 1.

Table 2.

Table 3.

Impact Background							EIA Scoping	Preliminary Environmental Information Report				Environmental Statement						
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
Unique ID for each impact which can be used to refer between those impacts in the ES and those in the Impact Register.	Identifies that part of the Hornsea Four development where the impact is anticipated to arise.	Identifies the phase of the Hornsea Four development. I.e when the impact is anticipated to arise.	The impact and the activity that the impact arises from.	The Maximum Design Scenario (MDS) as defined by the techncial consultant accounting for the Project Description at ES for the specific impact and activity.	The justification of why the MDS as defined is the MDS, providing reference to other developemnt scenarios or options.	Commitments that are relevant to reduce and/or eliminate Likely Significant Effects (LSE). Primary (Design) or Tertiary (Inherant) are commitments that are embedded within the assesment at the relevant point in the EIA (e.g. PEIR or ES). Secondary commitments ares incorportated to reduce LSE to acceotable levels following assessment.	Presents the findings of the EIA at Scoping. (See Table 1 for further details). The Scoping Report can be accessed using the link provided below in Table 1.	Identifies the approach taken to the Impact at PEIR. (See Table 2 for further details).	Details the justification for the projects appraoch taken to the Impact at PEIR.	Identifies the expected magnitude of the impact Considered at PEIR, derived from topic-specific criteria. For definitions of impact Magnitude, refer to the respective topic ES Chapter, provided in Volume A3. Methodology is retained in ES Chapters for all impacts assessed at PEIR or ES. PEIR documents can be accessed using the link provided below in Table 2.	Identifies the sensitivity of the receptor considered at PEIR, derived from topic-specific criteria. For definitions of impact Sensitivity, refer to the respective topic ES Chapter, provided in Volume A3. Methodology is retained in ES Chapters for all impacts assessed at PEIR or ES. PEIR documents can be accessed using the link provided below in Table 2.	Presents the findings of the EIA at PEIR. PEIR documents can be accessed using the link provided below in Table 2.	Identifies the approach taken to the Impact within the ES. (See Table 3 for further details).	Details the justification for the projects appraoch taken to the Impact at PEIR.	Identifies the expected magnitude of the impact considered within the ES, derived from topic-specific criteria.	Identifies the sensitivity of the receptor considered within the ES, derived from topic-specific criteria.	Presents the findings of the EIA within the ES.	Presents the findings of the EIA Audit which considers the implications on the ES conclusions in the event that there is no overlap with the Endurance CCS project.	Details the justiication for the conclusions drawn on the Endurance Overlap.
Example																		
BIE-O-9	*All-Offshore*	*Operation*	*Colonisation of the WTGs and scour/ cable protection may affect benthic ecology and biodiversity.*	*Array Area: - Total area of introduced hard substrate = 3,795,504 m2 (calculated from total of cell above).*	*The maximum adverse scenario is defined by the maximum area of structures, scour protection, cable protection and cable crossings introduced to the water column, including surface area of vertical structures.*	*None*	***No likely significant effect***	***Simple Assessment***	*Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID:X).*	*Minor*	*Medium*	***No Significant Effect (Minor Adverse or Beneficial)***	***Simple Assessment***	*Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.*	*Minor*	*Medium*	***No significant effect (Slight adverse)***	***No***	***No change to MDS and therefore ES conclusions remain valid.***

Table 1. Key to Hornsea Four position at EIA Scoping

	Likely significant effect without secondary mitigation - Simple assessment
	Likely significant effect without secondary mitigation - Detailed assessment
	No likely significant effect identified at Scoping

Link to Hornsea Four EIA Scoping Report

Table 2. Key to Hornsea Four position at PEIR

	Potential impact is assessed at PEIR - Simple assessment
	Potential impact is assessed at PEIR - Detailed Assessment
	Not considered in detail in the PEIR, no likely significant effect at Scoping. Agreement not reached between Hornsea Four and the Planning Inspectorate at Scoping
	Scoped out as greement reached between Hornsea Four and the Planning Inspectorate at Scoping
	N/A or impact not identified at Scoping or PEIR and to be assessed within the ES

Link to Hornsea Four PEIR documents

Table 3. Key to Hornsea Four position at ES

	Potential Impact is assessed at ES - Simple Assessment
	Potential Impact is assessed at ES - Detailed Assessment
	Scoped out as agreement reached between Hornsea Four and the Planning Inspectorate at Scoping
	Impact not considered in detail in the ES. No likely significant effect at PEIR

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
MP-C-1	All offshore	Construction	Seabed preparation activities. Seabed preparation activities (levelling, sandwave clearance, cable jointing pits, etc.) which may lead to a requirement for spoil disposal elsewhere creating elevated suspended sediment and potential smothering by deposition.	**<u>Landfall area:</u>** • Up to eight offshore HDD exit pits (noting up to three will be open at any time for a period of up to three months), each requiring excavation of 2,500 m^3 which will be side-cast onto the adjacent seabed. Backfilling of exit pits will recover a similar amount of material to be from the surrounding seabed, as required. **<u>Offshore ECC:</u>** • **Sandwave clearance -** Total sandwave clearance of 757,000 m^3 along a corridor of 99 km in length for six export cables. • **Cable jointing pits -** Up to four joints per export cable (maximum of 24 jointing pits for six export cables), each pit excavated to 5 m over an area of 3,500 m^2 and producing 17,500 m^3 of sediment for removal, a total of 420,000 m^3 for all pits, with a provision for 50% of losses to be made up. • **HVAC booster station foundations -** Seabed preparation for three six-legged Suction Bucket Jacket foundations requires removal of 171,735 m^3 for three HVAC booster station foundations. **Total spoil in offshore ECC area = 1,348,735 m^3** **<u>Offshore array area:</u>** • **Sandwave clearance -**Total sandwave clearance of 961,000 m^3 which includes 77,000 m^3 for 10 km of export cable within the offshore array area. • **180 WTG foundations -** Seabed preparation for WTG foundations requires removal of 1,045,221 m^3. • **Nine Offshore Substation (OSS) foundations -** Seabed preparation for six Suction Bucket Jacket (Small OSS) & three GBS (Large OSS) requires removal of 737,130 m^3 of spoil for nine OSS foundations. • **Offshore accommodation platform foundation -** Seabed preparation for Suction Bucket Jacket (Small OSS) requires removal of 57,245 m^3 of spoil for a single offshore accommodation platform foundation. **Total spoil in offshore array area = 2,800,596 m^3**	Seabed preparation (seabed levelling and sandwave clearance) assumes excavation using a trailer suction hopper dredger (TSHD) which collects a large volume of sediment and then releases this as spoil onto the seabed leading to the highest risk of smothering. These impact pathways are separated from seabed installation because they require disposal of spoil away from the point of excavation. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	<u>Primary:</u> Co2 Co44 Co45 Co201 <u>Secondary:</u> Co187 Co188 Co189	**Likely significant effect without secondary mitigation** Project description details to be developed post-Scoping.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Landfall works: Negligible Sandwave clearance and seabed levelling: Pathway	N/A	**Landfall works: No significant effect (not significant)** **Sandwave clearance and seabed levelling: Pathway**	**Detailed Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new detailed assessment, drawing on additional modelling.	Landfall works and sandwave clearance - Bridlington harbour, LSOs & HU015: Negligible Seabed levelling: Pathway	N/A	**Bridlington harbour, LSOs & HU015: No significant effect (not significant)** **Seabed levelling: Pathway**	No	No change to MDS and therefore ES conclusions remain valid.
MP-C-2	All offshore	Construction	Seabed installation activities. All direct sediment disturbance activities that may lead to locally raised suspended sediment concentrations at source (e.g. drilling, cable trenching, etc).	**<u>Landfall area:</u>** Depending on the configuration of the HDD Exit Pits, the use of cofferdams and the design of a drilling fluid management system there remains a residual risk for drilling muds (e.g. bentonite) to be discharged into the marine environment at break out. The maximum estimated spill volume is 265 m^3 per HDD Exit Pit and a total of 2,120 m^3 (eight pits). **<u>Offshore ECC:</u>** • **Cable trenching -** Cable installation along a length of 109 km for up to six cables releasing 3,903,000 m^3 into suspension by a Controlled Flow Excavator (CFE). Values include the 10 km of export cable falling within offshore array area. Total duration of 24 months with a maximum trenching rate of 300 m/hr in soft soils. • **HVAC booster station foundations -** Drilling for Piled Jacket (Small OSS) foundation option, releasing 4,618 m^3 for three foundations, representing 10% (of depth). **<u>Offshore array area:</u>** • **Cable trenching -** Cable installation along a length of 600 km for array cables and 90 km for interconnector cables releasing 4,140,000 m^3 into suspension by CFE. • Fastest excavation rate of 300 m/hr in soft soils. Single trenching vessel assumed for a sequential activity. • **Drilling of WTG foundations -** Drilling for monopile foundation option, 127,235 m^2 for 18 foundations, representing 10% (of all WTGs). Drilling activity considered to be sequential between sites. • **Drilling of nine OSS foundations -** Drilling for six Piled Jacket (Small OSS) & three Piled Jacket (Large OSS), 13,854 m^2 for nine foundations, representing 10% (of depth). • Drilling activity considered to be sequential between sites. • **Drilling of offshore accommodation platform foundation -** Drilling for Piled Jacket (Small OSS), 1,540 m^2 for one foundation, representing 10% (of depth). **Total drill cutting arisings in offshore array area = 142,629 m^3**	All direct sediment disturbance activities that may lead to locally raised suspended sediment concentrations at source (e.g. drilling, cable trenching, etc). Largest disturbed volume and highest trenching rate produces the greatest rate of sediment release at source. CFE is selected as the MDS option for trenching due to similarities with jetting releasing sediments into the water column, but involving larger volumes of sediment. For drilling, the greatest amount of arisings represents the MDS irrespective of the foundation type. These impact pathways are separated from seabed levelling and sandwave clearance because they occur at source. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	<u>Primary:</u> Co2 Co44 Co45 Co201 <u>Secondary:</u> Co187 Co188	**Likely significant effect without secondary mitigation** Project description details to be developed for excavation quantities and construction rates. Sediment material is likely to fall out of suspension relatively quickly.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Landfall works and cable trenching in ECC: Negligible Foundation drilling and cable trenching in array: Pathway	N/A	**Landfall works: No significant effect (negligible adverse)** **Foundation drilling and cable trenching in array: Pathway**	**Detailed Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new detailed assessment, drawing on additional modelling.	Cable trenching in ECC - Bridglington harbour: Minor Foundation drilling and cable trenching in array: Pathway	Cable trenching in ECC - Bridglington harbour: Medium Foundation drilling and cable trenching in array: Pathway	**Cable trenching in ECC - Bridglington harbour: No significant effect (slight)** **Foundation drilling and cable trenching in array: Pathway**	No	No change to MDS and therefore ES conclusions remain valid.
MP-C-3	All offshore	Construction	Scouring around foundations	**<u>Offshore ECC:</u>** • HVAC booster station foundations - Risk for scouring in pre-scour protection period around three 7.5 m wide GBS (Box-type) foundations. A minimum separation distance between foundations of 1.00 m may lead to group scour between adjacent structures for any areas without scour protection. **<u>Offshore array area:</u>** • 180 WTG foundations - up to 110 GBS foundations. • Nine OSS foundations - Three 15.0 m wide GBS (Large OSS) and six 7.5 m wide GBS (Box-type). • Offshore accommodation platform foundation - 7.5 m wide GBS (Box-type).	Installed foundations may lead to local scouring around their base if scour protection has not already pre-armoured the seabed. Depending on the seabed material, the scouring process may erode material into bedload and/or suspended load transport until an equilibrium condition is reached. In general, the largest foundation with the greatest solidity ratio will have the largest blockage effect on flows and will develop the most amount of scour, rather than the greatest depth of scour. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	<u>Primary:</u> Co2 Co201 <u>Tertiary:</u> Co82	**Impact not identified at Scoping (for construction phase)**	**Simple Assessment**	Impact not identified at Scoping (for construction phase), Scoped in for assessment at PEIR (for operation phase - PEIR reference: MP-O-3).	Pathway	N/A	**No significant effect (pathway)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES.	Pathway	N/A	**No significant effect (pathway)**	No	No change to MDS and therefore ES conclusions remain valid.
MP-C-4	Landfall	Construction	Turbulent wakes around cofferdams	**<u>Landfall:</u>** Inshore temporary cofferdams 18 m wide (long-shore) and 50 m long (cross-shore) to enclose HDD exit pits (up to 900 m^3), separated by a minimum of 50 m in a shore parallel configuration. Up to three cofferdams in place at any time for up to three months for up to eight cofferdams in total (HVDC option). Groups of up to three cofferdams have the potential to form wakes in their lee over the period of installation.	Cofferdams may lead to local blockage effects in the nearshore landfall area interrupting local flows and waves which may also lead to local scouring around their base, subject to the erodibility of the seabed. Closely spaced cofferdams may also lead interaction of wakes and lead to group scour.	<u>Primary:</u> Co2 <u>Secondary:</u> Co187	**Impact not identified at Scoping**	**Simple Assessment**	Impact not identified at Scoping. Scoped in for assessment at PEIR (for operation phase - PEIR reference: MP-O-4).	Fraisthorpe Sands (and cliffs): Minor	Fraisthorpe Sands (and cliffs): Low	**No significant effect (minor adverse)**	**Simple Assessment**	Project details further refined and assessment included for ES.	Fraisthorpe Sands (and cliffs): Negligible	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
MP-O-1	All offshore	Operation	Scouring around rock berms	**<u>Offshore ECC:</u>** • **Rock berms at nearshore cable crossing along ECC -** Up to six export cables (HVAC option) from Hornsea Four will cross the export cables (up to two pairs of cables) of Dogger Bank A and B (12 crossings) at a location seaward of Smithic Bank to form the largest overall crossing. • **Rock berms at offshore cable crossings along ECC -** Seven additional locations with up to 42 crossings (excluding locations within offshore array area)within offshore array area). • Total of 54 crossings at eight locations along ECC (excluding locations within offshore array area) with rock berm volume of 372,000 m^3. **<u>Offshore array area:</u>** • **Rock berms at cable crossings -** up to 32 array cable crossings (total rock berm area of 221,000 m^2) plus two further locations for sections of offshore ECC within the offshore array area. • All cable crossings up to 3 m in height (0.3m pre-lay plus 2.7 m rock berm) where protection is required from anchors using rock up to 0.5 m in diameter. **Total volume for all rock berms 593,000 m^3 -** with provisions for 25 % replenishment during operation period, if required. **Cable protection** • A provision to use cable protection for up to 10 % of the length of all cables for locations which do not achieve full burial depths (excluding inshore area). Offshore ECC: 849,000 m^3 Offshore Array: 600,000 m^3 **Total volume: 1,449,000 m^3**	Sub-sea structures proud of the seabed (e.g. rock berms), may lead to local scouring around their base. Depending on the seabed material, the scouring process may erode material into bedload and/or suspended load transport until an equilibrium condition is reached.	<u>Tertiary:</u> Co81 Co82 Co83 <u>Secondary:</u> Co188 Co189	**Impact not identified at Scoping**	**Simple Assessment**	Impact not identified at Scoping. Scoped in for assessment at PEIR (PEIR reference: MP-O-3).	Pathway	Negligible	**No significant effect (pathway)**	**Detailed Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new detailed assessment, drawing on additional modelling.	Offshore ECC: Negligible Offshore array area: Pathway	N/A	**No significant effect (pathway)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
MP-O-2	All offshore	Operation	Turbulent wakes from foundations interfering with remote receptors, e.g. Flamborough Front	**Offshore ECC:** • **HVAC booster station foundations -** Largest solid structure in the vertical plane (for blockage-type effects) is the 75 m width GBS (Box-type). The wake formation may depend on the orientation of this structure to incident flows and waves as well as the minimum spacing between structures and the layout of all three structures. A minimum separation distance of 100 m between foundations is likely to result in wake-wake interactions and a larger cumulative effect between all three structures. • **Rock berms -** Minimal vertical profile with all in water depths between 40 to 50 m below LAT. No likely wake effects. **Offshore array area:** • **180 WTG foundations -** The foundation considered to have the greatest blockage effect for MDS is the 53 m diameter base conical shaped GBS (WTG-type), limit of up to 110 units. The next largest MDS foundation for blockage is the mono-suction bucket which has a base diameter of up to 40 m with a height of up to 10 m above the seabed (70 units or more). • **Nine OSS foundations -** For the six small OSS, the 75 m GBS (Box-type) foundation has the greatest blockage effect. For the three large OSS foundations, the large 150 m GBS (Box -type) foundation has the largest blockage. • **Offshore accommodation platform foundation -** 75 m GBS (Box-type) foundation has the greatest blockage effect. The total blockage effect for the whole offshore array is also a function of the spacing and layout of all 190 foundations. The principles for the array layout are based on a minimum WTG separation of 810 m from foundation centres.	Typically, greatest amounts of turbulence will occur from the largest foundation width with the highest solidity ratio which blocks the passage of incident flows and waves (as well as sediment transport moved by these processes). Rock berms in deeper water are unlikely to have sufficient vertical profile to develop wakes, however, if there were equivalent structures in shallower water, they may have a proportionally larger influence and develop partial wakes. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co201 Tertiary: Co81	**Likely significant effect without secondary mitigation** Flamborough Front is relatively close but also limited in position by deeper water to the north. The scale of any wake reaching the front needs to consider further details of the project description such as array layout and foundation spacing.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Landfall area - Fraisthorpe Sands (and cliffs): Minor HVAC booster area: Pathway Offshore array area - Flamborough Front: Minor	Landfall area - Fraisthorpe Sands (and cliffs): Low HVAC booster area: Pathway (N/A) Offshore array area - Flamborough Front: Medium	**Landfall area - Fraisthorpe Sands (and cliffs): No significant effect (Minor Adverse)** **HVAC booster area: Pathway (N/A)** **Offshore array area Flamborough Front: No significant effect (Minor Adverse)**	**Detailed Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new detailed assessment, drawing on additional modelling.	HVAC booster area: Pathway Offshore array area - Flamborough Front: Minor	HVAC booster area: Pathway (N/A) Offshore array area - Flamborough Front: Medium	**HVAC booster area: Pathway (N/A)** **Offshore array area - Flamborough Front: No significant effect (Slight Adverse)**	HVAC booster area: Pathway (N/A) Offshore array area - Flamborough Front: No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area. Minimum separation of 810 m maintained. Based on professional judgment and experience, there can be confidence in a conclusion of no significant effect on the Flamborough Front.
MP-O-3	All offshore	Operation	Changes to waves affecting coastal morphology	**Offshore ECC:** • **Rock berms at nearshore cable crossings -** Dogger Bank A and B cable crossing at a location > 20 m below LAT with a berm height of up to 3 m. • **HVAC booster station foundations -** Largest solid structure in the vertical plane is the 75 m width GBS (Box-type). These structures have the potential to block, reflect and scatter incident waves. A minimum separation distance of 100 m is likely to result in some wave interactions and a larger cumulative effect between structures. • **Rock berms at offshore cable crossings -** Seven crossings further offshore in water depths between 40 to 50 m below LAT. **Offshore array area:** • **180 WTG foundations -** The foundation considered to have the greatest blockage effect for MDS is the 53 m diameter base conical shaped GBS (WTG-type), limit of up to 110 units. The next largest MDS foundation for blockage is the mono-suction bucket which has a base diameter of up to 40 m with a height of up to 10 m above the seabed (70 units or more). • **Nine OSS foundations -** For the six small OSS, the 75 m GBS (Bbox-type) foundation has the greatest blockage effect. For the three large OSS foundations, the large 150 m wide GBS (Box -type) foundation has the largest blockage effect. • **Offshore accommodation platform foundation -** 75 m wide GBS (Box-type) foundation has the greatest blockage effect.	This is a specific impact related to blockage of waves on the coastline as a receptor prone to high cliff erosion rates and strong longshore transport. The previous selection of MDS for largest blockage related effects apply. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co201 Secondary: Co188 Co189 Tertiary: Co81	**Likely significant effect without secondary mitigation** Distance from Hornsea Four array area is expected to be sufficient so that any wave attenuation is fully dissipated before reaching the coastline.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible	N/A	**No significant effect (negligible adverse)**	**Detailed Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new detailed assessment, drawing on additional modelling.	Negligible	Holderness Coast and cliffs: High Smithic Bank: Medium	**No significant effect (not significant)**	No	The Endurance Overlap Scenario MDS for the offshore array area has the same number of foundations in the array, but within a smaller area. Minimum separation of 810 m maintained. Based on professional judgment and experience, there can be confidence in a conclusion of no significant effect on either Smithic Bank or the coastline.
MP-O-4	Offshore ECC	Operation	Changes to nearshore sediment pathways	• **Rock berms at cable crossings -** Hornsea Four will cross the Dogger Bank A and B export cables seaward of Smithic Bank. Maximum berm height of 2.7 m, plus a pre-lay berm of 0.3 m (total hright of up to 3 m), placed seaward of 20 m below LAT isobath. • Remedial rock protection also assumed for 10% of offshore ECC cable length in addition to any cable crossings. • **HVAC booster station foundations -** Three GBS (Box-type) foundations closely spaced at 100 m may moderate nearshore waves and longshore sediment transport.	This issue relates to the consequence of changes to nearshore flows and waves that drive nearshore sediment pathways.	Secondary: Co188 Co189 Tertiary: Co81	**No likely significant effect** Previous assessments for Hornsea projects have shown that impacts on sediment pathways are likely to be of minor adverse significance. Given the anticipated localised nature of the changes in tidal currents and waves for Hornsea Four, there is anticipated to be no local or regional changes in the sediment transport regime. Furthermore Hornsea Four is situated updrift in the sediment pathway that is related to the Norfolk Banks SAC.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Full assessment to be undertaken once project details have been further refined and will be provided within the final DCO application.			**Simple Assessment**	Project details further refined and additional baseline data acquired and reassessed in ES.	Negligible to Minor	Medium	**No significant effect (slight adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
MP-O-5	All offshore	Operation	Cable reburial and repair	**Export Cable Activities:** • Re-burial of up to 2 km in length for any single event (equivalent to 12,000 m^3 of disturbed sediment for a seabed release by CFE) to a total of 14 km over the lifetime of the project (equivalent to a total volume of 84,000 m^3 of disturbed sediment). • For cable repairs, the MDS option is based on full de-burial and re-burial of the relevant section of cable using jetting equipment (i.e. CFE or similar) with a provision for up to 23 repairs over the operational phase. **Array Cable Activities:** • Re-burial of up to 2 km in length for any single event (equivalent to 12,000 m^3 of disturbed sediment for a seabed release by CFE) to a total of 42 km over the lifetime of the project (equivalent to a total volume of 252,000 m^3 of disturbed sediment). • For cable repairs, the MDS option is based on full de-burial and re-burial of the relevant section of cable using jetting equipment (i.e. CFE or similar) with a provision for up to 10 repairs over the operational phase. **Interconnector Cable Activities:** • Re-burial of up to 2 km in length for any single event (equivalent to 12,000 m^3 of disturbed sediment for a seabed release by CFE) to a total of 7 km over the lifetime of the project (equivalent to a total volume of 42,000 m^3 of disturbed sediment). • For cable repairs, the MDS option is based on full de-burial and re-burial of the relevant section of cable using jetting equipment (i.e. CFE or similar) with a provision for up to three repairs over the operational phase.	Largest disturbed volume and highest trenching rate per event by CFE produces the greatest rate of sediment release at source. These effects are considered to be comparable to cable installation (MP-C-2), but are moderated by the limits on the maximum amount of cable per event.	Primary: Co44 Co45 Secondary: Co188	**Impact not identified at Scoping**	**Impact not identified at PEIR**	Impact not identified at PEIR	N/A	N/A	**N/A**	**Simple Assessment**	Impact identified after PEIR and added to ES assessment.	Cable trenching in ECC - Bridglington harbour: Minor Foundation drilling and cable trenching in array: Pathway	Cable trenching in ECC - Bridglington harbour: Medium Foundation drilling and cable trenching in array: Pathway	**Cable trenching in ECC - Bridglington harbour: No LSE (Slight)** **Foundation drilling and cable trenching in array: Pathway**	No	No change to MDS and therefore ES conclusions remain valid.
MP-O-7	All offshore	Operation	Changes to offshore sediment pathways	N/A as scoped out.	N/A as impact scoped out	N/A	**No likely significant effect** Given the anticipated localised nature of the changes in tidal currents and waves for Hornsea Four, there is anticipated to be no local or regional changes in the sediment transport regime. Furthermore Hornsea Four is situated updrift in the sediment pathway that is related to the Norfolk Banks SAC. On the basis of a proportionate approach, this issue is therefore scoped out.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.1.2). Given the anticipated localised nature of the changes in tidal currents and waves for Hornsea Four, there is expected to be no local or regional changes in the sediment transport regime. Furthermore, Hornsea Four is situated updrift of the net sediment pathway related to the Norfolk Banks SAC.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.

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MP-O-1	All offshore	Decommissioning	Sediment disturbance All direct sediment disturbance activities during decommissioning that may lead to locally raised SSC at source.	• The assumption is for comparable (or lesser) rates of sediment disturbance to those described for installation of foundations. • Cables are expected to remain *in situ* . • Scour protection and rock berms at cable crossings are planned to remain *in situ* .	Foundation removal is likely to involve cutting off any piles and lift of the main structure and would involve a smaller footprint than any seabed preparation activity.	N/A	**Likely significant effect without secondary mitigation** Project description details to be developed for excavation quantities and construction rates. Sediment material is likely to fall out of suspension relatively quickly.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Pathway	N/A	**No significant effect (pathway)**	**Simple Assessment**	Project details further refined and additional baseline data acquired and reassessed in ES.	Pathway	N/A	**No significant effect (pathway)**	No	No change to MDS and therefore ES conclusions remain valid.
MP-O-2	All offshore	Decommissioning	Changes to tidal and wave regimes associated with the removal of foundations	Removal of the following foundations and cessation of associated blockage effects: **Offshore ECC:** **• HVAC booster station foundations -** largest solid structure in the vertical plane is the 75 m width GBS (Box-type). **Offshore array area:** **• 180 WTG foundations -** The reversal of MP-O-2 and MP-O-3 foundation options. **• Nine OSS foundations -** For the six small OSS, the 75 m GBS (Box-type) foundation has the greatest blockage effect. For the three large OSS foundations, the large 150 m GBS (Box -type) foundation has the largest blockage effect. **• Offshore accommodation platform foundation -** 75 m GBS (Box-type) foundation has the greatest blockage effect. The total blockage effect for the whole offshore array is also a function of the spacing and layout of all 190 foundations. The principles for the array layout are based on a minimum WTG separation of 810 m from centres.	Removal of the greatest number of turbines with the minimum spacing between turbines, combined with the largest proposed foundation option presents the maximum blockage, and hence the greatest influence on wave and tidal regimes once removed. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	N/A	**Impact not identified at Scoping**	**Impact not identified at PEIR**	Impact not identified at PEIR	N/A	N/A	**N/A**	**Simple Assessment**	Impact identified after PEIR to added to ES assessment.	Negligible	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report				Environmental Statement					
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
BIE-C-1	All-Offshore	Construction	Temporary habitat disturbance in the Hornsea Four array area and offshore ECC from construction activities.	**Temporary habitat disturbance of 75,895,509 m²** **Array Area:** **Foundation seabed preparation = 779,106 m²** • 110 GBS (WTG) type) foundations for WTGs = 411,321 m²; • 70 suction caisson jacket (WTG type) foundations for WTGs = 198,870 m². • Six small Offshore Substations (OSS) on suction caisson jacket (small OSS) foundations and three large OSS on GBS (large OSS) foundations = 156,594 m²; and • One accommodation platform on a suction caisson jacket (small OSS) foundation = 12,321 m². **Jack up and anchoring operations = 1,063,200 m²** • WTG installation jack up vessel (JUV) footprint (six legs, 170 m² per foot, four jack-up operations per turbine) = 734,400 m²; • WTG installation vessel anchor footprints (100 m² per anchor, eight anchors per vessel, two anchored vessels per turbine) = 288,000 m²; and • OSS and accommodation platform installation JUV footprint (six legs, 170 m² per foot, four jack-up operations per structure) = 40,800 m². **Cable seabed preparation and installation in the array area = 37,950,000 m²** • Boulder and sandwave clearance in array area (690 km length, 40 m width) = 27,600,000 m²; • Burial of array cables (600 km length, 15 m width) = 9,000,000 m²; and • Burial of inter-connector cables (90 km length, 15 m width) = 1,350,000 m². Note the 15 m cable width is located within the boulder and sandwave clearance 40 m width. **Offshore ECC:** • Foundation seabed preparation for three suction caisson jacket (small OSS) foundations = 36,963 m²; and • OSS installation JUV footprint (six legs, 170 m² per foot, four jack-up operations per structure) = 12,240 m². **Export cable seabed preparation and installation = 36,054,000 m²** • Boulder and sandwave clearance in offshore ECC (654 km length, 40 m width) = 26,160,000 m²; • Burial of export cables (654 km length, 15 m width) = 9,810,000 m²; and • Cable jointing (four joints per cable, six cables, 3,500 m² per joint) = 84,000 m². • Note the 15 m cable width is located within the boulder and sandwave clearance 40 m width.	The temporary disturbance relates to seabed preparation for foundations and cables, jack up and anchoring operations, and cable installation. It should be noted that the seabed preparation area for foundations is less than the footprint of the foundation scour protection and the footprint of infrastructure is assessed as a permanent impact in O&M (BIE-O-8). It should be noted that the MDS presents a precautionary approach to temporary habitat disturbance because it counts both the total footprint of seabed clearance as well as cable burial across both the array and offshore ECC. This approach effectively counts the footprint of seabed habitat to be impacted by construction in the same area twice. However, this precautionary approach has been taken because there is some potential for recovery of habitats between the activities due to project timescales. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co2 Co44 Co45 Co48 Co84 Co86 Co201 Secondary: Co188 Co189	**No likely significant effect** No likely significant effect with embedded mitigation. The biotopes present generally have a low sensitivity to this impact. Furthermore, the impact will be spatially restricted to a small proportion of the seabed within the Hornsea Four array area and ECC, anticipated to be less than 5% of the total array area and ECC based on area of temporary disturbance reported in project ES's of similar sized developments within the region.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.1.).	Negligible to Minor	Medium to Very High	**No significant effect (Not Significant to Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Slight)**	No	No change to MDS and therefore ES conclusions remain valid.
BIE-C-2	Landfall	Construction	Temporary habitat disturbance in the intertidal area from export cable installation.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Primary: Co44 Co84 Co86 Secondary: Co187	**No likely significant effect** Biotopes present at the landfall area are not sensitive to physical disturbance and have a high recoverability.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.2.).	Minor	Low	**No significant effect (Not Significant)**	**Not considered in detail in the ES**	Simple assessment at PEIR. Project description refined, with commitment made for Horizontal Directional Drilling (HDD) or other trenchless method underneath the intertidal area (Co187); no temporary habitat disturbance will occur within the intertidal as the two HDD works exit pits will be located within the subtidal area (below MHWS) and will be discrete in nature. Not considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
BIE-C-3	All-Offshore	Construction	Temporary increase in SSC and sediment deposition in the Hornsea Four array area and offshore ECC.	**Total volume 12,192,331 m³** **WTG Foundations:** • 110 turbines on GBS (WTG type) foundations requiring seabed preparation, resulting in the suspension of 685,794 m³ of sediment; and • 70 Suction Caisson Jacket (WTG type) foundations requiring seabed preparation, resulting in the suspension of 359,427 m³ of sediment. **OSS Foundations (array):** • Six OSS on suction caisson jacket (small OSS) foundations and three OSS on GBS (large OSS) foundations requiring seabed preparation, resulting in the suspension of 737,130 m³ of sediment. **Offshore Accommodation Platform Foundations:** • One suction caisson jacket (small OSS) foundation requiring seabed preparation, resulting in the suspension of 57,245 m³ of sediment. **High Voltage Alternating Current (HVAC) Booster Station Foundations:** • Three suction caisson jacket (small OSS) foundations requiring seabed preparation, resulting in the suspension of 171,735 m³ of sediment. **Sandwave Clearance:** • Sandwave clearance for 600 km of array cables resulting in the suspension of 769,000 m³ of sediment; • Sandwave clearance for 90 km of interconnector cables resulting in the suspension of 115,000 m³ of sediment; and • Sandwave clearance for 654 km of export cables resulting in the suspension of 834,000 m³ of sediment. **Cable Trenching:** • Installation of 600 km of array cables by Controlled Flow Excavation (CFE) resulting in the suspension of 3,600,000 m³ of sediment; • Installation of 90 km of interconnector cables resulting in the suspension of 540,000 m³ of sediment; • Installation of six export cables by CFE resulting in the suspension of 3,903,000 m³ of sediment (excluding the part of the export cable within the array); and • Up to 420,000 m³ of sediment from up to four cable joints per export cable in the ECC.	The MDS for foundation installation results from the largest volume suspended from seabed preparation (GBS and suction caisson jacket foundations). For cable installation, the MDS results from the greatest volume from sandwave clearance and installation using energetic means (CFE). This also assumes the largest number of cables and the greatest burial depth. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co2 Co44 Co45 Co84 Co86 Co201 Secondary: Co188 Co189	**No likely significant effect** The biotopes present within the array area and offshore ECC have a limited sensitivity to increased SSC which will occur over a limited period/area.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.3.).	Minor	Low to High	**No significant effect (Not Significant to Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Minor	Not Sensitive to Medium	**No significant effect (Slight)**	No	No change to MDS and therefore ES conclusions remain valid.
BIE-C-4	Landfall	Construction	Temporary increase in SSC and sediment deposition in the intertidal area.	Eight offshore cofferdam HDD exit pits require excavation of 20,000 m³ (8 x 2,500 m³) which will be side-cast onto the adjacent seabed. Backfilling of exit pits will recover a similar amount from the surrounding seabed, as required. HDD exit pits will come out below MLWS, so will not directly impact the intertidal. HDD Bentonite drilling fluid loss per cable 265 m³.	The MDS for temporary habitat disturbance in the intertidal area from the HDD works is included. It is important to note that HDD exit pits will be located below MLWS. The maximum volume of bentonite which could be released as part of the landfall activities is considered. For this assessment, it is considered that the bentonite would not be captured and is released into the marine environment.	Primary: Co2 Co44 Co45 Co84 Co86	**No likely significant effect** Biotopes present at the landfall area are not sensitive to this impact.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.4).	Minor	Low	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.
BIE-C-5	Array Area	Construction	Construction phase: Impacts on benthic ecology from noise arising from foundation installation.	N/A as impact scoped out.	N/A as impact scoped out	None	**No likely significant effect** No likely significant effect with embedded mitigation. The magnitude of effect will be spatially and temporally restricted and benthic species have a low sensitivity to noise impacts.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.1.4). It is generally accepted that the particle motion component of noise is most relevant to benthic species. While there are few studies looking at reactions of benthic invertebrates and in particular polychaetes and infaunal bivalves it is likely that particle motion will dissipate in close proximity to the noise source. In addition, the noise will be temporary in nature and conditions will return to baseline following cessation of piling. The Marine Evidence based Sensitivity Assessment (MarESA) suggest that the potential effects associated with the construction of a wind farm is 'not relevant' for the biotopes present. Therefore, this impact has been scoped out of the assessment.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
BIE-C-6	All-Offshore	Construction	Direct and indirect seabed disturbances leading to the release of sediment contaminants.	The MDS for seabed disturbance are presented in BIE-C-3.	This scenario represents the maximum total seabed disturbance and therefore the maximum amount of contaminated sediment that may be released into the water column during construction activities.	None	**No likely significant effect** Low levels of contaminants in the offshore area and fast settlement of coarse sediments.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.5).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
BIE-C-7	All-Offshore	Construction	Accidental release of pollutants (e.g. from accidental spillage/leakage) may affect benthic ecology.	N/A as impact scoped out.	N/A as impact scoped out	Tertiary: Co111	**No likely significant effect** No likely significant effect with embedded mitigation. Mitigation will effectively reduce risk of impact to negligible.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.16). The magnitude of an accidental spill incident will be limited by the size of chemical or oil inventory on construction vessels. In addition, released hydrocarbons would be subject to rapid dilution, weathering and dispersion and would be unlikely to persist in the marine environment. The likelihood of an incident will be reduced by implementation of a project CPEMMP, undertaken in accordance with Co111. Furthermore, the biotopes present within the array area and ECC are considered to be tolerant of chemical pressures, as presented within the MarESA assessment. This impact has therefore been scoped out of the assessment.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
BIE-C-19	Onshore ECC	Construction	Construction phase: Nitrogen Oxides (NOx) and Nutrient Nitrogen (NN) deposition may affect intertidal habitats and ecology	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Primary: Co134 Co135 Tertiary: Co64 Co114 Co124	**Impact not identified at Scoping**	**Impact not identified at PEIR**	Impact not identified at PEIR	N/A	N/A	**N/A**	**Scoped Out**	Air quality modelling (Volume A3, Chapter 9: Air Quality) predicts that the project acting alone does not contribute to more than a 1% change to the critical load of NOx and NN. Notwithstanding the project's minimal contributions, the 1% threshold was marginally exceeded when considered in-combination. As detailed within B2.2: Report to Inform Appropriate Assessment, it was concluded, with reference to the small area of supporting intertidal habitat affected, the small, temporary contributions to the critical load the project would not result in Adverse Effects on Site Integrity (AEoI) of the Humber Estuary SAC, SPA and Ramsar. The same conclusion can be drawn in relation to the Humber Estuary SSSI. This impact was not identified during Scoping but was highlighted through the HRA process. After full assessment and conclusion of no AEoI, there was no evidence to trigger the need for inclusion of this impact within the ES. Furthermore, it should be noted that the intertidal area within the Hornsea Four Order Limits is characterised by the biotope A2.221, 'barren littoral coarse sand'. As this biotope is characterised by the lack of species, exposure to contaminants will not result in significant impacts to ecology, as there are no sensitive receptors. This impact has therefore not been considered further in this assessment.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
BIE-O-8	All-Offshore	Operation	Long-term habitat loss/ change from the presence of foundations, scour protection and cable protection.	**Habitat change of 3,730,671 m².** **Array Area:** • Turbine footprint with scour protection, based on 110 GBS (WTG-type) foundations = 504,540 m²; • Turbine footprint with scour protection, based on 70 suction caisson Jacket (WTG type) foundations = 296,881 m². • OSS foundations footprint and scour protection, based on six small (GBS (Box-type)) and three large OSS (GBS (Large OSS)) = 371,250 m²; • Accommodation platform foundation footprint and scour protection, based on one small OSS foundation (GBS (Box-type)) = 30,625 m²; • Maximum rock protection area for array cable = 624,000 m²; • 25% replenishment of scour protection during operation and maintenance phase = 156,000 m²; • Maximum rock protection area for interconnector cable = 94,000 m²; • 25% replenishment of scour protection during operation and maintenance phase = 23,500 m²; and • Pre and post-lay rock berm area within array area (32 cable crossings) = 204,000 m². **Offshore ECC:** • HVAC booster station foundations footprint and scour protection, based on three small OSS foundations (GBS (Box-type)) = 91,875 m²; • Maximum rock protection area for the export cable = 792,000 m²; • 25% replenishment of scour protection during operation and maintenance phase = 198,000 m²;and • Pre- and post-lay rock berm area, based on 54 cable crossings within the export ECC area = 344,000 m².	The MDS is defined by the maximum area of seabed lost as a result of the placement of structures, scour protection, cable protection and cable crossings. Habitat loss from drilling and drill arisings is of a smaller magnitude than presence of project infrastructure. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co2 Co44 Co45 Co83 Co84 Co86 Co201 Secondary: Co188 Co189 Tertiary: Co82 Co176	**No likely significant effect** No likely significant effect with embedded mitigation. This impact will be spatially restricted to the direct footprint of the installed structures and accounting for a small proportion of the overall Hornsea Four array area and ECC.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.6).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Minor	High	**No significant effect (Slight adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
BIE-O-9	All-Offshore	Operation	Colonisation of the WTGs and scour/cable protection may affect benthic ecology and biodiversity.	**Total surface area of introduced hard substrate in the water column = 4,759,171 m².** **Total area of introduced hard substrate at seabed level = 3,730,671 m² (see BIE-O-8).** **Total surface area of subsea portions of foundations in contact with the water column: 1,028,500 m².** • 110 WTGs on GBS (WTG-type) foundations, assuming 15m diameter cylinder atop a conical/frustum base which tapers at 35m above seabed level, with a base diameter of 53 m. Average water depth of 47.5m, giving a per-foundation surface area of 5,650 m², with a total area of 621,500 m²; • 70 WTGs on suction bucket jacket (WTG type) foundations, which has a base diameter of up to 40 m (extending 10 m above the seabed). Average water depth of 47.5 m, giving a per foundation surface area of 2,512 m², with a total area of 175,850 m²; • Six small OSS on GBS (Box-type) foundations, each with a length and width of 75 m at seabed level and at Lowest Astronomical Tide (LAT). Average water depth of 47.5 m, giving a per- foundation surface area of 14,250 m², with a total area of 85,500 m²; • Three large OSS on GBS (Box-type) foundations, each with a length and width of 150 m at seabed level and at LAT. Average water depth of 47.5 m, giving a per-foundation surface area of 28,500 m², with a total area of 85,500 m²; • One accommodation platform on a GBS (Box-type) foundation (small OSS), with a length and width of 75 m at seabed level and at LAT. Average water depth of 47.5 m, giving a total surface area of 14,250 m²; and • Three HVAC booster stations on GBS (Box-type) foundations (small OSS), each with a length and width of 75 m at seabed level and at LAT. Average water depth of 51 m in the HVAC Booster Station Search Area, giving a per-foundation surface area of 15,300 m², with a total area of 45,900 m².	The MDS is defined by the maximum area of structures, scour protection, cable protection and cable crossings introduced to the water column, including surface area of vertical structures. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	None	**No likely significant effect** Small area of hard substrata within predominately sedimentary habitats.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.7).	Minor	Medium	**No significant effect (Minor Adverse or Beneficial)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Minor	High	**No significant effect (Slight adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
BIE-O-10	All-Offshore	Operation	Increased risk of introduction or spread of Marine Invasive Non-Native Species (MINNS) due to presence of subsea infrastructure and vessel movements (e.g. ballast water) may affect benthic ecology and biodiversity.	**Total surface area of introduced hard substrate in the water column = 4,759,171 m² (see BIE- O-9).** **Total of 1,693 vessel return trips per year:** • 206 crew shift transfer visits; • 124 JUV visits; • 1,205 crew vessels wind turbine visits; and • 104 supply vessel accommodation platform visits.	Defined by the maximum surface area introduced into the water column as described in BIE-O-9. MDS with regards to maximum number of vessel movements during O&M activities.	Tertiary: Co111	**No likely significant effect** No likely significant effect with embedded mitigation which will mitigate risk of MINNS to negligible.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.8).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.
BIE-O-11	All-Offshore	Operation	Direct disturbance to seabed from jack-up vessels and cable maintenance activities.	**Direct disturbance to seabed from jack-up vessels and cable maintenance activities = 8,579,812 m².** **WTG O&M activities:** • Component replacement = 378,000 m²; • Access ladder replacement = 378,000 m²; • Foundation anode replacement = 378,000 m²; and • J-Tube repair/ replacement = 108,000 m². **Array cable activities:** • Remedial burial of array cables (42 km total length reburied) = 4,200,000 m²; • Array cable repairs = 363,736 m²; and • Cable protection replacement = 156,000 m2. **Offshore substations and accommodation platform activities:** • Offshore substation component replacement = 6,000 m²; • Access ladder replacement = 90,000 m²; • Foundation anode replacement = 21,000 m²; and • J-Tube repair/ replacement = 6,000 m².	Defined by the maximum number of jack-up vessel operations and maintenance activities that could have an interaction with the seabed anticipated during operation.	None	**No likely significant effect** No likely significant effect with embedded mitigation and as a result of the small spatial and temporal scale of any disturbance.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.9).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
				ECC activities: • Remedial burial of export cables (1.4 km total length reburied) = 1,400,000 m^2; • Export cable repairs = 153,548 m^2; and • Cable protection replacement = 198,000 m^2. **Interconnector cable activities:** • Remedial burial of interconnector cables (7 km total length reburied) = 700,000 m^2; • Interconnector cable repairs = 20,028 m^2; and • Cable protection replacement = 23,500 m^2.															
BIE-O-12	All-Offshore	Operation	Operation phase: Indirect disturbance to benthic species from Electromagnetic Fields (EMF) generated by inter-array and export cables.	N/A as impact scoped out.	N/A as impact scoped out	Primary: Co83	**No likely significant effect** No likely significant effect with embedded mitigation and due to the small spatial scale of the impact.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.1.5). EMFs are likely to increase above background levels in close proximity to the cables only. As the cable will be buried (Co83) or protected across the majority of the array area and ECC, any behavioural responses would be further mitigated. Furthermore, monitoring to date has not recorded any changes in invertebrate behaviour resulting from EMF exposure. However, it is acknowledged that there are limited studies in this field. It is considered that benthic communities are not sensitive to EMF around subsea cables. This impact has therefore been scoped out.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
BIE-O-13	All-Offshore	Operation	Changes to seabed habitats arising from effects on physical processes, including scour effects and changes in the sediment transport and wave regimes resulting in potential effects on benthic communities.	See MDS presented in **Chapter 1: Marine Geology, Oceanography and Physical Processes.**	This impact is defined by any anticipated changes to physical processes as defined in **Chapter 1: Marine Geology, Oceanography and Physical Processes.**	Primary: Co201 Secondary: Co189	**No likely significant effect** No likely significant effect due to modelling of physical processes at adjacent projects predicting only small local effects and the tolerance of local benthic communities.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.1.10).	Negligible	N/A	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Negligible	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
BIE-O-14	All-Offshore	Operation	Accidental release of pollutants (e.g. from accidental spillage/leakage) may affect benthic ecology.	N/A as impact scoped out.	N/A as impact scoped out	Tertiary: Co111	**No likely significant effect** No likely significant effect with embedded mitigation. Mitigation will effectively reduce risk of impact to negligible.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.1.7). The magnitude of an accidental spill incident will be limited by the size of chemical or oil inventory on vessels. In addition, released hydrocarbons would be subject to rapid dilution, weathering and dispersion and would be unlikely to persist in the marine environment. Furthermore, the biotopes present within the array area and ECC are considered to be tolerant of chemical pressures, as presented within the MarESA assessment. This impact has therefore been scoped out of the assessment.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
BIE-D-15	All-Offshore	Decomissioning	Temporary habitat disturbance from decommissioning of foundations, cables and rock protection.	Removal of all foundations, cables and rock protection leading to a temporary loss/change of 3,730,671 m^2.	MDS is assumed to be similar to the construction phase, with all infrastructure removed in reverse-construction order. The removal of cables and rock protection is considered the MDS, however the necessity to remove cables and rock protection will be reviewed at the time of decommissioning.	Tertiary: Co181	**No likely significant effect** No likely significant effect due to small spatial scale of impact and the tolerance of benthic biotopes.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.1.11).	Minor	High	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Minor	Medium	**No significant effect (Slight adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
BIE- D-16	All-Offshore	Decomissioning	Increased SSC and sediment deposition from removal of foundations, cables and rock protection.	This impact is a subset of MP-C-2 for structures that are removed from the seabed. The impacts are expected to be equivalent to MP-C-2 apart from the structures that may remain (e.g. cables to be removed but not cable protection measures). See MDS presented in **Chapter 1: Marine Geology, Oceanography and Physical Processes.**	MDS is assumed to be as per the construction phase, with all infrastructure removed in reverse-construction order. The removal of cables is considered the MDS, however the necessity to remove cables will be reviewed at the time of decommissioning.	None	**No likely significant effect** No likely significant effect due to no biotopes of sensitivity to increased SSC being present within the array area or offshore ECC.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.1.12).	Minor	Medium	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Minor	Medium	**No significant effect (Slight adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
BIE-D-17	All-Offshore	Decomissioning	Loss of introduced habitat from the removal of foundations and rock protection.	Total area of introduced hard substrate to be lost = 4,759,171 m^2.	Defined by the maximum surface area introduced as above. Some materials may be left *in situ* and this will be reviewed closer to the time of decommissioning. As such, the MDS assumes the removal of all infrastructure.	None	**No likely significant effect** No likely significant effect as removal of structures will return the seabed to habitats similar to those present prior to construction.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.1.13).	Minor	High	**No significant effect (Minor Adverse or Beneficial)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Additional baseline data acquired and reassessed in ES as new simple assessment.	Minor	Medium	**No significant effect (Slight adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
BIE-D-18	All-Offshore	Decomissioning	Accidental release of pollutants (e.g. from accidental spillage/leakage) may affect benthic ecology.	N/A as impact scoped out.	N/A as impact scoped out	Tertiary: Co111	**No likely significant effect** No likely significant effect with embedded mitigation. Mitigation will effectively reduce risk of impact to negligible.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.3.1.8). The magnitude of an accidental spill incident will be limited by the size of chemical or oil inventory on vessels. In addition, released hydrocarbons would be subject to rapid dilution, weathering and dispersion and would be unlikely to persist in the marine environment. Furthermore, the biotopes present within the array area and ECC are considered to be tolerant of chemical pressures, as presented within the MarESA assessment. This impact has therefore been scoped out of the assessment.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.

Impact Background							EIA Scoping	Preliminary Environmental Information Report				Environmental Statement					
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
FSE-C-1	All-offshore	Construction	Direct damage (e.g. crushing) and disturbance to mobile demersal and pelagic fish and shellfish species arising from construction activities.	**Total area of direct disturbance = 75,895,509 m²** **Array Area = 39,792,306 m²** **Foundation seabed preparation = 779,106 m²** • 110 gravity-based structure (GBS) (wind turbine generator (WTG)-type) foundations for WTGs = 411,321 m²; • 70 suction caisson jacket (WTG type) foundations for WTGs = 198,870 m²; • Six small offshore substations (OSS) on suction caisson jacket (small OSS) foundations and three large OSS on GBS (large OSS) foundations = 156,594 m²; and • One accommodation platform on a suction caisson jacket foundation (small OSS) = 12,321 m². **Jack up and anchoring operations = 1,063,200 m²** • WTG installation jack up vessel (JUV) footprint (six legs, 170 m² per foot, four jack-up operations per turbine) = 734,400 m²; • WTG installation vessel anchor footprints (100 m² per anchor, eight anchors per vessel, two anchored vessels per turbine) = 288,000 m²; and • OSS and accommodation platform installation JUV footprint (six legs, 170 m² per foot, four jack-up operations per structure) = 40,800 m². **Cable seabed preparation and installation = 37,950,000 m²** • Boulder and sandwave clearance for array and interconnector cables in the array area - (690 km length, 40 m width) = 27,600,000 m²; and • Burial of array and inter-connector cables (690 km length, 15 m width) = 10,350,000 m². **Offshore ECC = 36,103,203 m²** • Three suction caisson foundations (small OSS) for up to three HVAC booster stations = 36,963 m²; • OSS installation JUV footprint (six legs, 170 m² per foot, four jack-up operations per structure) = 12,240 m²; • Boulder and sandwave clearance for export cables in offshore ECC (654 km length, 40 m width) = 26,160,000 m²; • Burial of export cables (654 km length, 15 m width) = 9,810,000 m²; and • Cable jointing (four joints per cable, six cables, 3,500 m² per joint) = 84,000 m².	Direct damage and disturbance relates to seabed preparation and cable installation. The footprint of infrastructure is assessed as a temporary impact in constriction, and as a permanent impact in operation and maintenance (O&M). It should be noted that for GBS foundations, the seabed preparation area is less than the footprint of the foundation scour protection. The MDS presents a precautionary approach to temporary habitat disturbance because it counts both the total footprint of seabed clearance as well as cable burial across both the array and offshore ECC. This approach effectively counts the footprint of seabed habitat to be impacted by construction in the same area twice. However, this precautionary approach has been taken because there is some potential for recovery of habitats between the activities due to project timescales. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co2 Co44 Co45 Co48 Co84 Co86 Co201 Secondary: Co188 Co189 Tertiary: Co111	**No likely significant effect** No likely significant effect is predicted due to the impact being spatially restricted to a small proportion of the seabed within the Hornsea Four array area and ECC; anticipated to be less than 5% of the total development area.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.11)	N/A	N/A	**No significant effect**	**Simple Assessment**	Scoped back into assessment at request of consultees.	Negligible to Minor	Low to High	**No significant effect (Not Significant to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
FSE-C-2	All-offshore	Construction	Temporary localised increases in Suspended Sediment Concentrations (SSC) and smothering.	**Total volume 12,213,921 m³** **WTG Foundations:** • 110 turbines on GBS foundations (WTG-type) requiring seabed preparation, resulting in the suspension of 685,794 m³ of sediment; and • 70 Suction Caisson Jacket (WTG type) foundations requiring seabed preparation, resulting in the suspension of 359,427 m³ of sediment. **OSS Foundations:** • Six small OSS on suction caisson jacket (small OSS) foundations and three large OSS on GBS (large OSS) foundations requiring seabed preparation, resulting in the suspension of 737,130 m³ of sediment. **Offshore Accommodation Platform Foundations:** • One suction caisson jacket (small OSS) foundation requiring seabed preparation, resulting in the suspension of 57,245 m³ of sediment. **HVAC Booster Station Foundations:** • Three suction caisson jacket (small OSS) foundations requiring seabed preparation, resulting in the suspension of 171,735 m³ of sediment. **Sandwave Clearance:** • Sandwave clearance for 600 km of array cables resulting in the suspension of 769,000 m³ of sediment; • Sandwave clearance for 90 km of interconnector cables resulting in the suspension of 115,000 m³ of sediment; and • Sandwave clearance for 654 km of export cables resulting in the suspension of 834,000 m³ of sediment. **Cable Trenching:** • Installation of 600 km of array cables by Controlled Flow Excavation (CFE) resulting in the suspension of 3,600,000 m³ of sediment; • Installation of 90 km of interconnector cables resulting in the suspension of 540,000 m³ of sediment; • Installation of 654 km of export cables resulting in the suspension of 3,903,000 m³ of sediment (excluding the part of the export cable within the array); and • Up to 420,000 m³ of sediment from up to four cable joints per export cable (six) in the ECC. **Landfall Area:** • Eight offshore cofferdam Horizontal Directional Drilling (HDD) exit pits require excavation of 2,500 m³ each which will be side-cast onto the adjacent seabed. Backfilling of exit pits will recover a similar amount to be from the surrounding seabed, as required. Total excavated = 20,000 m³. • HDD Bentonite drilling fluid loss per cable 265 m³. Total drilling fluid loss = 1,590 m³.	The MDS for foundation installation results from the largest volume suspended from seabed preparation (GBS foundations and suction caisson foundations) with the maximum number of foundations (180) and associated offshore platform infrastructure. For cable installation, the MDS results from the greatest volume from sandwave clearance and installation using energetic means (CFE). This also assumes the largest number of cables and the greatest burial depth. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary. The maximum volume of bentonite which could be released as part of the landfall activities is considered. For this assessment, it is considered that the bentonite would not be captured and is released into the marine environment.	Primary: Co2 Co44 Co45 Co201 Tertiary: Co111	**No likely significant effect** No likely significant effect predicted on the basis that the species within the array area and offshore ECC have a limited sensitivity to increased SSC which will in any case occur over a limited period/area.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.2).	Minor	Medium to High	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in baseline data/assessment methodology and/or Project description. Assessment rerun and included in ES.	Minor	Low to High	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
FSE-C-3	All-offshore	Construction	Direct and indirect seabed disturbances leading to the release of sediment contaminants.	The MDS for seabed disturbance are presented in the rows above (FSE-C-2).	As above.	Primary: Co2 Co44 Co45 Co201 Tertiary: Co111	**No likely significant effect** No likely significant effect is predicted on the basis that there are low levels of contaminants in the offshore area and the fast settlement of coarse sediments.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.3).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessmemt**	Simple assessment at PEIR concluded No LSE. Change in baseline data/assessment methodology and/or Project description. Assessment rerun and included in ES.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.
FSE-C-4	All-offshore	Construction	Mortality, injury, behavioural changes and auditory masking arising from noise and vibration.	**Array Area (spatial MDS):** • 180 monopile WTG foundations (1.5 m diameter) with a maximum of two foundations installed concurrently; • Six small OSS (1.5 m diameter monopiles); • Three large OSS (1.5 m diameter monopiles); • One offshore accommodation platform (1.5 m diameter monopiles); • Maximum hammer energy 5,000 kJ; • Four-hour piling duration; • 1.2 days per monopile; • 216 piling days (single vessel); • 108 piling days (two vessels); and • Maximum separation distance between piling events will be the maximum extent of the array area. **Array Area (temporal MDS):** • 180 WTGs on piled jacket (WTG-type) foundations (three 4 m diameter pin piles per jacket) – 540 pin piles; • Six OSS on piled jacket (small OSS) foundations (six legs per jacket and four 3.5 m pin piles per leg) – 144 pin piles; • Three OSS on piled jacket (large OSS) foundations (eight legs per jacket and two piles per leg) – 48 pin piles; • One offshore accommodation platform on a piled jacket (small OSS) foundation (six legs and four 3.5 m pin piles per leg – 24 pin piles; • Total of 756 pin piles in the array; • Maximum hammer energy 3,000 kJ; • 1.5 days per foundation; • 270 piling days (single vessel); and • 135 days (two vessels). **HVAC Booster Area of Search (spatial MDS):** • Three HVAC booster stations on 1.5 m diameter monopile foundations; • Maximum hammer energy 5,000 kJ; • Four-hour piling duration; and	Piling: For the array area, the spatial MDS results from the concurrent installation of monopile foundations for 180 WTGs in the NW and E corners of the array, and the sequential installation of monopile foundations for nine OSS and an offshore accommodation platform using 5,000 kJ hammer energy. This would result in the largest spatial noise impact at any given time. The temporal MDS for the array area would be associated with the installation of the maximum number of piles; the MDS would be the installation of 180 WTGs using piled jacket (WTG-type) foundations, and seven structures (OSS and an accommodation platform) on piled jackets (small OSS) and three OSS on piled jackets (large OSS). For HVAC booster stations, the spatial MDS is based on three OSS monopiles, and the temporal MDS is based on three OSS on piled jacket (small OSS) foundations. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary. UXO clearance: Estimated MDS based on the recent internal analysis report for Hornsea Three, the number of	Primary: Co2 Co85 Secondary: Co190 Tertiary: Co110	**Likely significant effect without secondary mitigation** On the basis of potential subsea noise arising from piling activity and the presence of sensitive species (such as herring and sandeels within the Hornsea Four study area.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Minor	Medium to High	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in baseline data/assessment methodology and/or Project description. Assessment rerun and included in ES.	Minor	Medium to High	**No significant effect (Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid. No change to piling parameters used in the modelling so predictions of impact range remain valid. Northwest modelling location will no longer be part of the array layout. This was the worst case modelled location and as such removing piling at this specific location will not result in any increase to predicted impact ranges. The largest seperation distance for concurrent piling modelled at ES was between the NW location and the E location. By removing piling from the NW corner, the maximum seperation distance will reduce and thus the overall disturbance impact footprint from concurrent piling is expected to reduce (minimally).

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				• 1.2 days per monopile. **<u>HVAC Booster Area of Search (temporal MDS):</u>** • Three HVAC booster stations on piled jacket (small OSS) foundations (six legs per jacket and four 3.5 m diameter pin piles per leg) – 72 pin piles. **UXO Clearance:** • Estimated 2,263 targets; • 86 UXOs may require clearance; • One UXO will be cleared every 24 hours; and • 86 detonations in 86 days.	UXO requiring inspection and detonation has been scaled for Hornsea Four. A detailed UXO survey will be completed prior to construction. The type, size and number of possible detonations and duration of UXO clearance operations is therefore not known at this stage. Seabed clearance and installation activities such as cable laying, dredging and vessel movements may introduce an effect-receptor pathway for underwater noise, however these activities are established as producing low levels of noise, in the case of vessel movement no greater than the existing baseline of regional vessel noise, affecting a relatively small area in the immediate vicinity of activities. These general activities are therefore considered to fall within the impacts associated with piling and as such are not considered separately.												
FSE-C-5	All-offshore	Construction	Accidental pollution events during the construction phase resulting in potential effects on fish and shellfish receptors.	N/A as impact scoped out.	N/A as impact scoped out	N/A	**No likely significant effect** No likely significant effect with embedded mitigation which will act to prevent or control pollution events.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.4). Accidental release of pollutants will be managed and mitigated through implementation of a CPEMMP (Co1.1.1), which will include details of a Marine Pollution Contingency Plan (MPCP) to address the risks, methods and procedures to deal with any spills and collision incidents of the authorised project in relation to all activities carried out below MHWS.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
FSE-O-18	All-offshore	Operation	Temporary localised increases in SSC and smothering.	**Total volume: 692,916 m^3** **Array Cable Activities:** • Remedial burial of array cable (42 km total length reburied) by CFE – 252,000 m^3; and • Array cable repairs = 218,258 m^3. **Interconnector Cable Activities:** • Remedial burial of interconnector cables (7 km total length reburied) by CFE = 42,000 m^3; and • Interconnector cable repairs = 11,153 m^3. **Export Cable Activities:** • Remedial burial of export cables (14 km total length reburied) by CFE = 84,000 m^3; and • Export cable repairs = 85,505 m^3.	The maximum impacts from remedial cable burial and cable repairs of array, interconnector and export cables result from the use of CFE. This assumes the largest number of cables, repair events, the greatest burial depth and greatest length/area of maintenance. This results in the maximum sediment volume disturbance.	<u>Primary:</u> Co2 Co44 Co45	**Impact not identified at Scoping**	**Simple Assessment**	Impact not identified at Scoping but agreed to be assessed at PEIR following consultation with the Marine Ecology and Processes Technical Panel.	Minor	Medium to High	**No significant effect (Minor Adverse)**	**Simple Assessmemt**	Simple assessment at PEIR concluded No LSE. Change in baseline data/assessment methodology and/or Project description. Assessment rerun and included in ES.	Minor	Low to High	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
FSE-O-6	All-offshore	Operation	Long-term loss of habitat due to the presence of turbine foundations, scour protection and cable protection.	**Total Habitat Loss/Change: 3,730,671 m^2** **WTGs:** • Turbine footprint with scour protection, based on 110 GBS (WTG-type) foundations = 504,540 m^2. • Turbine footprint with scour protection, based on 70 suction caisson Jacket (WTG type) foundations = 296,881 m^2. **OSS foundations:** • Offshore OSS foundation footprint and scour protection based on six small OSS on GBS (Box-type) foundations and three large OSS (on GBS (large OSS) foundations = 371,250 m^2. **HVAC Booster Station Foundations:** • Offshore HVAC booster substations and associated scour protection based on three GBS (Box-type) foundation = 91,875 m^2. **Offshore Accommodation Platform Foundations:** • Offshore accommodation platform and associated scour protection based on one GBS (Box-type) foundation = 30,625 m^2. **Array Cables:** • Maximum rock protection area = 624,000 m^2; • Pre- and post-lay rock berm area, based on 32 cable crossings = 204,000 m^2; and • 25% replenishment of scour protection during operation and maintenance phase = 156,000 m^2. **Interconnector Cable Protection:** • Maximum rock protection area = 94,000 m^2; and • 25% replenishment of scour protection during operation and maintenance phase = 23,500 m^2. **Offshore ECC:** • Maximum rock protection area = 792,000 m^2; • Pre- and post-lay rock berm area, based on 54 cable crossings = 344,000 m^2; and • 25% replenishment of scour protection during operation and maintenance phase = 198,000 m^2.	The maximum design scenario is defined by the maximum area of seabed lost by the footprint of structures on the seabed, scour protection, cable protection and cable crossings. Habitat loss from drilling and drill arisings is of a smaller magnitude than presence of project infrastructure. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	<u>Primary:</u> Co2 Co44 Co45 Co83 Co201	**No likely significant effect** No likely significant effect predicted since this impact will be spitially restricted to the direct footprint of the installed structures and accounting for a small proportion of the overall Hornsea Four array area and ECC; anticipated to be around 1%	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.5).	Minor	High	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in baseline data/assessment methodology and/or Project description. Assessment rerun and included in ES.	Minor	Low to High	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
FSE-O-7	All-offshore	Operation	Increased hard substrate and structural complexity as a result of the introduction of turbine foundations, scour protection and cable protection.	**Total surface area of introduced hard substrate in the water column = 4,759,171 m^2.** **Total area of introduced hard substrate at seabed level = 3,730,671 m^2 (see FSE-O-6).** **Total surface area of subsea portions of foundations in contact with the water column: 1,028,500 m^2.** • 110 WTGs on GBS (WTG-type) foundations, assuming 15 m diameter cylinder atop a conical/frustum base which tapers at 35 m above seabed level, with a base diameter of 53 m. Average water depth of 47.5 m, giving a per-foundation surface area of 5,650 m^2, with a total area of 621,500 m^2; • 70 WTGs on suction caisson jacket (WTG type) foundations, which has a base diameter of up to 40 m (extending 10 m above the seabed). Average water depth of 47.5 m, giving a per foundation surface area of 2,512 m^2, with a total area of 175,850 m^2; • Six small OSS on GBS (Box-type) foundations, each with a length and width of 75 m at seabed level and at Lowest Astronomical Tide (LAT). Average water depth of 47.5 m, giving a per-foundation surface area of 14,250 m^2, with a total area of 85,500 m^2; • Three large OSS on GBS (Box-type) foundations, each with a length and width of 150 m at seabed level and at LAT. Average water depth of 47.5 m, giving a per-foundation surface area of 28,500 m^2, with a total area of 85,500 m^2; • One accommodation platform on a GBS (Box-type) foundation (small OSS), with a length and width of 75 m at seabed level and at LAT. Average water depth of 47.5 m, giving a total surface area of 14,250 m^2; and • Three HVAC booster stations on GBS (Box-type) foundations (small OSS), each with a length and width of 75 m at seabed level and at LAT. Average water depth of 51 m in the HVAC Booster Station Search Area, giving a per-foundation surface area of 15,300 m^2, with a total area of 45,900 m^2.	Defined by the maximum area of structures, scour protection, cable protection and cable crossings introduced to the water column, including surface area of vertical structures. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	<u>Primary:</u> Co2 Co83 Co201	**No likely significant effect** No likely significant effect predicted on the basis that any effects will be limited to the immediate vicinity of the turbine locations and will not result in significant change to the local or regional fish and shellfish populations.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.6).	Minor	High	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in baseline data/assessment methodology and/or Project description. Assessment rerun and included in ES.	Negligible to Minor	Low to High	**No significant effect (Not Significant to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
FSE-O-8	Array area	Operation	Underwater noise as a result of operational turbines.	N/A as not considered in detail in the ES.	This results in the maximum potential for noise disturbance on fish and shellfish receptors during the operation and maintenance phase.	N/A	**No likely significant effect** No likely significant effect predicted on the basis that noise levels will only be detected in very close proximity to the operational turbines (as evidenced by monitoring) and the routine presence of fish and shellfish in close proximity to operational turbines.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.7).	Negligible	N/A	**No significant effect (Not Significant)**	**Not considered in detail in the ES**	Assessed at PEIR as no Likely Significant Effect (LSE) and confirmed no change to either magnitude or sensitivity of the species and therefore not considered further in the EIA. Noise levels will only be detected in very close proximity to the operational turbines (as evidenced by monitoring (Volume A4, Annex 4.4: Subsea Noise Technical Report) and the routine presence of fish and shellfish in close proximity to operational turbines.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.

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FSE-O-9	All-offshore	Operation	EMF effects arising from cables.	N/A as impact scoped out.	N/A as impact scoped out.	N/A	**No likely significant effect** No likely significant effect predicted on the basis that EMFs will only be detectable in close proximity to the cable infrastructure and will therefore have a restricted spatial extent and the adoption of embedded mitigation compliant with the relevant mitigation set out in NPS EN-3).	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.8). The spatial extent of EMFs will be limited to the immediate vicinity of the cable, and where possible cable burial will be the preferred option for cable protection (Co83).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect#**	No	N/A as scoped out.
FSE-O-10	All-offshore	Operation	Direct disturbance resulting from maintenance during operation.	**Direct disturbance to seabed from jack-up vessels and cable maintenance activities = 8,579,812 m^2.** **WTG O&M activities – jack up operations:** • Component replacement = 378,000 m^2; • Access ladder replacement = 378,000 m^2; • Foundation anode replacement = 378,000 m^2; and • J-Tube repair/ replacement = 108,000 m^2. **Array cable activities:** • Remedial burial of array cables (42 km total length reburied) = 4,200,000 m^2; • Array cable repairs = 363,736 m^2; and • Cable protection replacement = 1.56,000 m^2. **OSS and accommodation platform activities:** • OSS component replacement = 6,000 m^2; • Access ladder replacement = 90,000 m^2; • Foundation anode replacement = 21,000 m^2; and • J-Tube repair/ replacement = 6,000 m^2. **Offshore export cable activities:** • Remedial burial of export cables (1.4 km total length reburied) = 1,400,000 m^2; • Export cable repairs = 1.53,548 m^2; and • Cable protection replacement = 198,000 m^2. **Interconnector cable activities:** • Remedial burial of interconnector cables (7 km total length reburied) = 700,000 m^2; • Interconnector cable repairs = 20,028 m^2; and • Cable protection replacement = 23,500 m^2.	Defined by the maximum number of jack-up vessel operations and maintenance activities that could have an interaction with the seabed anticipated during operation.	Primary: Co2 Co44 Co45 Co83	**No likely significant effect** No likely significant effect predicted on the basis that any impacts will be of limited spatial extent and will be short term in nature.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.9).	N/A	N/A	**No significant effect**	**Simple Assessment**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.9). Impact re-considered in the ES following the addition of gravity base foundations and responses to Section 42 consultation.	Negligible to Minor	Low to High	**No significant effect (Not Significant to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
FSE-O-11	All-offshore	Operation	Indirect disturbance resulting from the accidental release of pollutants.	N/A as impact scoped out.	N/A as impact scoped out.	N/A	**No likely significant effect** No likely significant effect with embedded mitigation which will act to prevent or control pollution events.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.10). Accidental release of pollutants will be managed and mitigated through implementation of a CPEMMP (Co111), which will include details of a Marine Pollution Contingency Plan to address the risks, methods and procedures to deal with any spills and collision incidents of the authorised project in relation to all activities carried out below MHWS.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
FSE-O-12	All-offshore	Operation	Potentially reduced fishing pressure within the Hornsea Four array area an increased fishing pressure outside the array area due to displacement.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	N/A	**No likely significant effect** No likely significant effect predicted on the basis that exclusion of fishing activity will be spatially restricted to safety zones in the immediate vicinity of the turbine infrastructure. In addition, effects resulting from this impact are likely to be positive for local fish and shellfish populations.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.11).	Negligible	N/A	**No significant effect (Not Significant)**	**Not considered in detail in the ES**	Assessed at PEIR as no Likely Significant Effect (LSE) and confirmed no change to either magnitude or sensitivity of the species and therefore not considered further in the EIA. The exclusion of fishing activity will be spatially restricted to safety zones in the immediate vicinity of the turbine infrastructure, and therefore any potential for fishing pressure displacement will be minimal.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
FSE-D-13	All-offshore	Decommissioning	Direct damage (e.g. crushing) and disturbance to mobile demersal and pelagic fish and shellfish species arising from decommissioning activities.	MDS is identical (or less) to that of the construction phase (FSE-C-1). **Total area of direct disturbance = 75,895,509 m^2**	MDS is assumed to be similar to the construction phase, with all infrastructure removed in reverse-construction order. The removal of cables and rock protection is considered the MDS, however the necessity to remove cables and rock protection will be reviewed at the time of decommissioning.	Primary: Co2 Co44 Co45 Co84 Co86 Secondary: Co188 Co189 Tertiary: Co181	**No likely significant effect** No likely significant effect predicted on the basis that the impact will be spatially restricted to a small proportion of the seabed within the Hornsea Four array area and ECC.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.12).	N/A	N/A	**No significant effect**	**Simple Assessment**	Scoped back into assessment at request of consultees.	Negligible to Minor	Low to High	**No significant effect (Not Significant to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
FSE-D-14	All-offshore	Decommissioning	Temporary localised increases in SSC and smothering.	MDS is identical (or less) to that of the construction phase (FSE-C-2). **Total volume = 12,213,921 m^3**	MDS is assumed to be as per the construction phase, with all infrastructure removed in reverse-construction order. The removal of cables is considered the MDS, however the necessity to remove cables will be reviewed at the time of decommissioning.	Primary: Co2 Co44 Co45 Tertiary: Co181	**No likely significant effect** No likely significant effect predicted on the basis that the species within the array area and offshore ECC have a limited sensitivity to increased SSC which will occur over a limited period/area.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.13).	Minor	High	**No significant effect (Minor Adverse)**	**Simple Assessmemt**	Simple assessment at PEIR concluded No LSE. Change in baseline data/assessment methodology and/or Project description. Assessment rerun and included in ES.	Minor	Low to High	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
FSE-D-15	All-offshore	Decommissioning	Direct and indirect seabed disturbances leading to the release of sediment contaminants.	MDS is identical (or less) to that of the construction phase (FSE-C-3). **Total volume = 12,213,921 m^3**	MDS is assumed to be as per the construction phase, with all infrastructure removed in reverse-construction order. The removal of cables is considered the MDS, however the necessity to remove cables will be reviewed at the time of decommissioning.	Primary: Co2 Co44 Co45 Tertiary: Co181	**No likely significant effect** No likely significant effect predicted on the basis that the species within the array area and offshore ECC have a limited sensitivity to increased SSC which will occur over a limited period/area.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.14).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in baseline data/assessment methodology and/or Project description. Assessment rerun and included in ES.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report				Environmental Statement					
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
FSE-D-16	All-offshore	Decommissioning	Mortality, injury, behavioural changes and auditory masking arising from noise and vibration.	Maximum levels of underwater noise during decommissioning would be from underwater cutting required to remove structures. This is much less than pile driving and therefore impacts would be less than as assessed during the construction phase/ piled foundations would likely be cut approximately 1 m below the seabed.	This would result in the maximum potential disturbance associated with noise associated with decommissioning activities including foundation decommissioning.	Tertiary: Co2 Co113 Co181	**No likely significant effect** No likely significant effect predicted on the basis that noise from decommissioning activities will be limited temporally and will not propagate over a large spatial footprint.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.15).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessmemt**	Simple assessment at PEIR concluded No LSE. Change in baseline data/assessment methodology and/or Project description. Assessment rerun and included in ES.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.
FSE-D-17	All-offshore	Decomissioning	Accidental pollution events during the decommissioning phase resulting in potential effects on fish and shellfish receptors.	N/A as impact scoped out.	N/A as impact scoped out.	N/A	**No likely significant effect** No likely significant effect with embedded mitigation which will act to prevent or control pollution events.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.4.16). Accidental release of pollutants will be managed and mitigated through implementation of a CPEMMP (Co111), which will include details of a Marine Pollution Contingency Plan to address the risks, methods and procedures to deal with any spills and collision incidents of the authorised project in relation to all activities carried out below MHWS.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as impact scoped out.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
MM-C-1	Array Area	Construction	PTS (auditory injury) from piling noise.	**Spatial MDS:** • 180 Wind Turbine Generators (WTGs) on monopile foundations; • Six small and three large Offshore Substations (OSS) on monopile foundations; • One accommodation platform on a monopile foundation; • 3 High Voltage Alternating Current (HVAC) Booster Stations (small OSS) on monopile foundations; • Maximum design: 5,000 kJ hammer energy, 4.4 hours piling duration including a 30 min soft start and 22.5 min ramp up; • Most likely: 4,000 kJ hammer energy, 2.1 hours piling duration including a 30 min soft start and 22.5 min ramp up; • Total WTG piling days: 216 assuming 1.2 days per monopile over a 12 month piling period; • Total non-WTG piling days: 16 assuming 1.2 days per monopile over a 12 month piling period; and • Simultaneous piling: only two piles will be piled simultaneously within the Hornsea Four array area. **Temporal MDS:** • 180 WTGs on piled jacket (WTG-type) foundations, 3 piles per jacket (540 total); • Six small OSS on piled jacket (small OSS) foundations and three large OSS on piled jacket (large OSS) foundations (1.44 total piles); • One accommodation platform on a piled jacket (small OSS) foundation (16 total piles); • Three HVAC Booster Stations on piled jacket (small OSS) foundations (48 total piles); • Maximum design: 3,000 kJ hammer energy, 4.4 hours piling duration including a 30 min soft start and 22.5 min ramp up; • Most likely: 1,750 kJ hammer energy, 2.1 hours piling duration including a 30 min soft start and 22.5 min ramp up; • Total WTG piling days: 270 assuming 1.5 days per jacket foundation over a 12 month piling period; • Total non-WTG piling days: 39 assuming 3 days per jacket foundation over a 12 month piling period; and • Simultaneous piling: only two piles will be piled simultaneously within the Hornsea Four array area.	The piling scenario with the largest PTS impact ranges represent the maximum design scenario. This differs between species depending on the frequency characteristics emitted during installation of each pile type and the hearing of the species (e.g. for high frequency cetaceans such as harbour porpoise, pin piles have a larger PTS impact range whereas for low frequency cetaceans, monopiles have a larger PTS impact range). The maximum number of piled foundations would represent the temporal maximum design scenario for disturbance. The maximum predicted impact range for underwater noise for piled foundations would represent the spatial maximum design scenario for disturbance. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co85 Tertiary: Co110	**Likely significant effect without secondary mitigation** Recent expert elicitation for PTS as a result of pile driving resulted in agreement between experts that the predicted PTS effects from exposure to piling noise (defined as 6 dB PTS in the 2-10 kHz band) was unlikely to have a large effect on the survival or reproduction of the species of interest.	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID:4.5.9).	Negligible	N/A	**No significant effect (Not significant to minor adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as detailed assessment.	Negligible	N/A	**No significant effect (Not significant to slight adverse)**	No	No change to MDS and therefore ES conclusions remain valid. No change to piling parameters used in the modelling so predictions of impact range remain valid. Northwest modelling location will no longer be part of the array layout. This was the worst case modelled location and as such removing piling at this specific location will not result in any increase to predicted impact ranges. Irrespective of where the WTG foundations are within the array area, a piling MMMP will be implimented (embedded mitigation) to reduce the magnitude of PTS from pile driving to negligible levels.
MM-C-2	Array Area	Construction	Disturbance from piling noise.	As per MDS for MM-C-1.	As per MDS for MM-C-1.	Primary: Co85 Tertiary: Co110	**Likely significant effect without secondary mitigation** Evidence from telemetry and acoustic detection data at previous offshore wind farms show animals are displaced during piling but return after piling ceases.	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.9).	Harbour porpoise: Minor Grey seal: Minor Minke whale, white-beaked dolphin, harbour seal: Negligible	Harbour porpoise: Medium Grey seal: Low Minke whale, white-beaked dolphin, harbour seal: N/A	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as detailed assessment.	Harbour porpoise: Minor Grey seal: Minor Minke whale, white-beaked dolphin, bottlenose dolphin, harbour seal: Negligible	Harbour porpoise: Medium Grey seal: Low Minke whale, white-beaked dolphin, bottlenose dolphin, harbour seal: N/A	**No significant effect (Not Significant to Slight)**	No	No change to MDS and therefore ES conclusions remain valid. No change to piling parameters used in the modelling so predictions of impact range remain valid. Northwest modelling location will no longer be part of the array layout. This was the worst case modelled location and as such removing piling at this specific location will not result in any increase to predictions. The largest seperation distance for concurrent piling modelled at ES was between the NW location and the E location. By removing piling from the NW corner, the maximum seperation distance will reduce and thus the overall disturbance impact footprint from concurrent piling is expected to reduce (minimally).
MM-C-3	Array Area	Construction	TTS from piling noise.	As per MDS for MM-C-1.	As per MDS for MM-C-1.	Primary: Co85 Tertiary: Co110	**No Likely Significant Effect** Since there are no thresholds to determine a biologically significant effect from TTS and given that disturbance will be included in a detailed quantitative assessment, the impact of TTS on marine mammals was scoped out of assessment.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.1). There are no thresholds to determine a biologically significant effect from TTS, therefore no assessment of the number of animals, magnitude, sensitivity or significance of effect is given.	Not Assessed	Not Assessed	**No significant effect**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment. Full details of the underwater noise modelling and the resulting TTS impact areas and ranges are detailed in Volume 4, Annex 4.5: Subsea Noise Technical Report, and the table of ranges has now also been included within the Marine Mammals chapter. There are no thresholds to determine a biologically significant effect from TTS, therefore no assessment of the number of animals, magnitude, sensitivity or significance of effect is given. This approach was agreed with Consultees at Evidence Plan Technical Meeting 4 (30 April 2019).	Not Assessed	Not Assessed	**No significant effect**	No	No change to MDS and therefore ES conclusions remain valid. No change to piling parameters used in the modelling so predictions of impact range remain valid. Northwest modelling location will no longer be part of the array layout. This was the worst case modelled location and as such removing piling at this specific location will not result in any increase to predicted impact ranges.
MM-C-4	Array Area	Construction	Vessel collision risk.	**Wind Turbine Foundation Installation:** • Up to 2,880 return trips over a 12-month period. **Wind Turbine Installation:** • Up to 900 return trips over a 24-month period. **OSS Installation (all OSSs and the accommodation platform):** • Up to 270 return trips over a two-month period. **OSS Foundation Installation (all OSSs and the accommodation platform):** • Up to 180 return trips over a two-month period. **Inter-Array and Interconnector Cable Installation:** • Up to 1,488 return trips over a 24-month period. **Offshore Export Cable Installation:** • Up to 408 return trips over a 24-month period. **Total:** • Up to 8 vessels in any given 5 km^2 at any one time.	The maximum numbers of vessels and associated vessel movements represents the maximum potential for collision risk and disturbance.	Tertiary: Co108 Co111	**Likely significant effect without secondary mitigation** It is not expected that there will be a significant increase in vessel activity over the baseline levels.	**Simple Assessment**	Scoped into assessment based on the Applicant's position at scoping and no comments received in Scoping Opinion (PINS Scoping Opinion, November 2018).	Minor	Medium	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Minor	High	**No significant effect (Slight)**	No	No change to MDS and therefore ES conclusions remain valid.
MM-C-5	Array Area	Construction	Disturbance from vessels.	The MDS for maximum number of vessels is presented in MM-C-4.	As per MDS for MM-C-4.	Tertiary: Co108 Co111	**Likely significant effect without secondary mitigation** It is not expected that there will be a significant increase in vessel activity over the baseline levels.	**Simple Assessment**	Scoped into assessment based on the Applicant's position at scoping and no comments received in Scoping Opinion (PINS Scoping Opinion, November 2018).	Minor	Low	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Minor	Low	**No significant effect (Slight)**	No	No change to MDS and therefore ES conclusions remain valid.
MM-C-6	Array Area	Construction	Reduction in prey availability.	Maximum effect on fish prey species as detailed in the assessment in Volume A2, Chapter 3: Fish and Shellfish Ecology.	Assessment based on the MDS presented in Volume A2, Chapter 3: Fish and Shellfish Ecology.	None	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.3).	Negligible	N/A	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Negligible	N/A	**No significant effect (not significant)**	No	No change to Fish and Shellfish Ecology MDS' and therefore no change to MM-C-6 MDS. As such, ES conclusions remain valid.
MM-C-7	Array Area	Construction	Reduction in foraging ability.	**Total volume 12,192,331 m^3** **WTG Foundations:** • 110 turbines on Gravity Base Structure (GBS) (WTG type) foundations requiring seabed preparation, resulting in the suspension of 685,794 m^3 of sediment; and • 70 Suction Caisson Jacket (WTG type) foundations requiring seabed preparation, resulting in the suspension of 359,427 m^3 of sediment. **OSS Foundations (array):** • Six OSS on suction caisson jacket (small OSS) foundations and three OSS on GBS (large OSS) foundations requiring seabed preparation, resulting in the suspension of 737,130 m^3 of sediment. **Offshore Accommodation Platform Foundations:** • One suction caisson jacket (small OSS) foundation requiring seabed preparation, resulting in the suspension of 57,245 m^3 of sediment. **High Voltage Alternating Current (HVAC) Booster Station Foundations:** • Three suction caisson jacket (small OSS) foundations requiring seabed preparation, resulting in the suspension of 171,735 m^3 of sediment.	The MDS for foundation installation results from the largest volume suspended from seabed preparation (GBS and suction caisson jacket foundations). For cable installation, the MDS results from the greatest volume from sandwave clearance and installation using energetic means (CFE). This also assumes the largest number of cables and the greatest burial depth. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten a=F12nd three, respectively). As a result, the outcome of the assessment is therefore	Primary: Co201	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.4).	Negligible	N/A	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Negligible	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
				Sandwave Clearance: • Sandwave clearance for 600 km of array cables resulting in the suspension of 769,000 m^3 of sediment; • Sandwave clearance for 90 km of interconnector cables resulting in the suspension of 115,000 m^3 of sediment; and • Sandwave clearance for 654 km of export cables resulting in the suspension of 834,000 m^3 of sediment. **Cable Trenching:** • Installation of 600 km of array cables by Controlled Flow Excavation (CFE) resulting in the suspension of 3,600,000 m^3 of sediment; • Installation of 90 km of interconnector cables resulting in the suspension of 540,000 m^3 of sediment; • Installation of six export cables by CFE resulting in the suspension of 3,903,000 m^3 of sediment (excluding the part of the export cable within the array); and • Up to 420,000 m^3 of sediment from up to four cable joints per export cable in the ECC.	Inherently precautionary.														
MM-C-8	Array Area	Construction	Toxic contamination.	N/A as scoped out.	N/A as scoped out.	Tertiary: Co111	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.5). A commitment has been made to a Marine Pollution Contingency Plan (MPCP) which will include measures to be adopted for the prevention of pollution events and outline an emergency plan to be implemented in the unlikely event of any pollution events (see Co111 of Volume A4, Annex 5.2 Commitments Register).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
MM-C-9	All-offshore	Construction	Non-piling noise (e.g. cable laying, dredging).	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	N/A	**Likely significant effect without secondary mitigation** It is unlikely that these activities will impact marine mammal receptors at anything other than the immediate proximity.	**Simple Assessment**	Scoped into assessment based on the Applicant's position at scoping and no comments received in Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible	N/A	**No significant effect (not significant)**	**Not considered further in the EIA**	Simple assessment at PEIR with conclusion of no likely significant effect (LSE) and confirmed no change to either magnitude or sensitivity of the species. The underwater noise impacts from non-piling noise will be significantly less than that of impact piling and will be very local and short term. Any potential displacement will be temporary and therefore unlikely to significantly affect marine mammal vital rates.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
MM-C-10	Landfall	Construction	Disturbance to seal haul-outs.	N/A as scoped out.	N/A as scoped out.	Tertiary: cO111	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Scoped Out**	Impact not identified at EIA Scoping. Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID:4.5.7). There are no grey or harbour seal haul-outs sites in the vicinity of the land-fall site based on the SMRU August haul-out count surveys, and there is no evidence from the at-sea and total usage maps or the available telemetry data that harbour seals use the landfall area in any significant numbers (see Volume A5, Annex 4.1: Marine Mammal Technical Report).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
MM-C-11	All-offshore	Construction	PTS from UXO clearance.	**UXO Clearance:** • Estimated 2,263 targets; • 86 UXOs may require clearance; and • Up to five UXO could be detonated per day.	Estimated maximum design based on data from other projects in the Hornsea Zone. A detailed UXO survey would be completed prior to construction. The type, size (net explosive quantities (NEQ)) and number of possible detonations and duration of UXO clearance operations is therefore not known at this stage.	None	**Likely significant effect without secondary mitigation** Magnitude depends on charge size which is currently unknown. Hornsea Three predicted Negligible-Low magnitude impacts of PTS for charge sizes up to 260 kg.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.9).	Negligible	N/A	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Negligible	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid. UXO locations (if any) are currently unknown, and thus the reduction in the area of the array layout makes no difference to the assessment.
MM-C-12	All-offshore	Construction	Disturbance from UXO clearance.	The MDS for maximum UXO disturbance is presented in MM-C-11.	As per MDS for MM-C-11.	None	**Likely significant effect without secondary mitigation** In the absence of empirical data on the likelihood of response to explosives the assessment will involve the application of a 26 km buffer around a UXO source location to determine the number of animals predicted to be disturbed.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.9).	Negligible	N/A	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Harbour porpoise, bottlenose dolphin, Harbour seal: Minor Grey seal: Moderate Minke whale, white-beaked dolphin : Negligible	Harbour porpoise, bottlenose dolphin, Harbour seal: Medium Grey seal: Low Minke whale, white-beaked dolphin : N/A	**No significant effect (Not Significant to Slight)**	No	No change to MDS and therefore ES conclusions remain valid. UXO locations (if any) are currently unknown, and thus the reduction in the area of the array layout makes no difference to the assessment.
MM-C-13	Array Area	Construction	TTS from UXO clearance.	As per MDS for MM-C-11.	As per MDS for MM-C-11.	None	**No Likely Significant Effect** Since there are no thresholds to determine a biologically significant effect from TTS and given that disturbance will be included in a detailed quantitative assessment, the impact of TTS on marine mammals was scoped out of assessment.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID:4.5.1). There are no thresholds to determine a biologically significant effect from TTS, therefore no assessment of the number of animals, magnitude, sensitivity or significance of effect is given.	Not Assessed	Not Assessed	**No significant effect**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment. There are no thresholds to determine a biologically significant effect from TTS, therefore no assessment of the number of animals, magnitude, sensitivity or significance of effect is given. This approach was agreed with Consultees at Evidence Plan Technical Meeting 4 (30 April 2019).	Not Assessed	Not Assessed	**No significant effect**	No	No change to MDS and therefore ES conclusions remain valid. UXO locations (if any) are currently unknown, and thus the reduction in the area of the array layout makes no difference to the assessment.
MM-O-14	Array Area	Operation	Operational noise.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	N/A	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.2).	Minor	Low	**No significant effect (Not Significant)**	**Not considered further in the EIA**	Simple assessment at PEIR with conclusion of no LSE and confirmed no change to either magnitude or sensitivity of the species. Using the non-impulsive weighted SELcum PTS and TTS thresholds from Southall et al. (2019) resulted in estimated PTS and TTS impact ranges of <100 m for all marine mammal species. Given the evidence of their presence in and around existing operational offshore wind farms, marine mammals are deemed to be of low vulnerability and have high recoverability to the impact of operational noise. The EP Technical Panel agreed that there is no need for the operational noise assessment to consider anything other than noise related to vessel traffic (OFS-MM-2.2).	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
MM-O-28	Array Area	Operation	Vessel collision risk.	• Up to 1,205 crew vessel return trips per year • Up to 124 jack-up vessel return trips per year • Up to 104 supply vessel return trips per year **Total Trips:** • Up to 1,433 return trips per year	The maximum numbers of vessels and associated vessel movements represents the maximum potential for collision risk.	Tertiary: Co108 cO111	**Likely significant effect without secondary mitigation** It is not expected that there will be a significant increase in vessel activity over the baseline levels.	**Simple Assessment**	Scoped into assessment based on the Applicant's position at scoping and no comments received in Scoping Opinion (PINS Scoping Opinion, November 2018).	Minor	Medium	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Minor	High	**No significant effect (Slight)**	No	No change to MDS and therefore ES conclusions remain valid.
MM-O-15	Array Area	Operation	Disturbance from vessels	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	N/A	**Likely significant effect without secondary mitigation** It is not expected that there will be a significant increase in vessel activity over the baseline levels.	**Simple Assessment**	Scoped into assessment based on the Applicant's position at scoping and no comments received in Scoping Opinion (PINS Scoping Opinion, November 2018).	Minor	Low	**No significant effect (Minor Adverse)**	**Not considered further in the EIA**	Simple assessment at PEIR with conclusion of no LSE and confirmed no change to either magnitude or sensitivity of the species. It is not expected that the level of vessel activity during the O&M of Hornsea Four would cause a significant increase in the risk of disturbance by vessels. The adoption of a Vessel Management Plan (VMP) (Co108 of Volume A4, Annex 5.2 Commitments Register) that includes preferred transit routes and guidance for vessel operations in the vicinity of marine mammals and around seal haul-outs will minimise the potential for any impact.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
MM-O-16	Array Area	Operation	Reduction in prey availability.	Maximum effect on fish prey species as detailed in the assessment in Volume A2, Chapter 3: Fish and Shellfish Ecology.	Assessment based on the MDS presented in Volume A2, Chapter 3: Fish and Shellfish Ecology.	None	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.3).	Negligible	N/A	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as detailed assessment.	Negligible	N/A	**No significant effect (not significant)**	No	No change to Fish and Shellfish Ecology MDS' and therefore no change to MM-O-16 MDS. As such, ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
MM-O-17	Array Area	Operation	Reduction in foraging ability.	**Array Cable Activities:** • Remedial burial of array cable (42 km total length reburied) by CFE – 252,000 m^3; and • Array cable repairs = 218,258 m^3. **Interconnector Cable Activities:** • Remedial burial of interconnector cables (7 km total length reburied) by CFE = 42,000 m^3; and • Interconnector cable repairs = 11,153 m^3. **Export Cable Activities:** • Remedial burial of export cables (14 km total length reburied) by CFE = 84,000 m^3; and • Export cable repairs = 85,505 m^3. **Total volume: 692,916 m^3**	The maximum impacts from remedial cable burial and cable repairs of array, interconnector and export cables result from the use of CFE. This assumes the largest number of cables, repair events, the greatest burial depth and greatest length/area of maintenance. This results in the maximum sediment volume disturbance.	None	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.4).	Negligible	N/A	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as detailed assessment.	Negligible	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
MM-O-18	Array Area	Operation	Toxic contamination.	N/A as scoped out.	N/A as scoped out.	Tertiary: Co111	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Scoped Out**	Impact not identified at EIA Scoping. Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.5). A commitment has been made to a MPCP which will include measures to be adopted for the prevention of pollution events and outline an emergency plan to be implemented in the unlikely event of any pollution events (see Co.111 of Volume A4, Annex 5.2 Commitments Register).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
MM-O-19	Array Area	Operation	EMF.	N/A as scoped out.	N/A as scoped out.	N/A	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Scoped Out**	Impact not identified at EIA Scoping. Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.6). Based on the data available to date, there is no evidence of EMF related to marine renewable devices having any impact (either positive or negative) on marine mammals (Copping 2018).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
MM-D-20	Array Area	Decomissioning	PTS from underwater noise.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Tertiary: Co113	**Likely significant effect without secondary mitigation** Depends on the method used to remove structures. Methods such as hot cutting (Brocotorch), diamond wire cutting and abrasive water jet cutting are all expected to have negligible impact due to low noise levels and the temporary nature of the impact.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.9).	Harbour porpoise: Minor Minke whale, white-beaked dolphin, Harbour seal, Grey seal: Negligible	Harbour porpoise: Medium Minke whale, white-beaked dolphin, Harbour seal, Grey seal: N/A	**No significant effect (Not Significant to Minor Adverse)**	**Not considered further in the EIA**	Simple assessment at PEIR with conclusion of no LSE and confirmed no change to either magnitude or sensitivity of the species. The approach and methodologies employed at decommissioning will be compliant with the legislation and policy requirements at the time of decommissioning. It is assumed that the MDS is to be as per construction (with no pile driving), thus the impact is assumed to be similar to the construction phase (or less). A commitment has been made to a Decommissioning MMMP which will include measures to ensure the risk of permanent threshold shift (PTS) to marine mammals is negligible and will be in line with the latest relevant available guidance (see Co.113 of Volume A4, Annex 5.2 Commitments Register).	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
MM-D-21	Array Area	Decomissioning	Disturbance from underwater noise.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Tertiary: Co113	**Likely significant effect without secondary mitigation** Depends on the method used to remove structures. Methods such as hot cutting (Brocotorch), diamond wire cutting and abrasive water jet cutting are all expected to have negligible impact due to low noise levels and the temporary nature of the impact.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.9).	Harbour porpoise: Minor Grey seal: Minor Minke whale, white-beaked dolphin, Harbour seal: Negligible	Harbour porpoise: Medium Grey seal: Low Minke whale, white-beaked dolphin, Harbour seal: N/A	**No significant effect (Not Significant to Minor Adverse)**	**Not considered further in the EIA**	Simple assessment at PEIR with conclusion of no LSE and confirmed no change to either magnitude or sensitivity of the species. The approach and methodologies employed at decommissioning will be compliant with the legislation and policy requirements at the time of decommissioning. It is assumed that the MDS is to be as per construction (with no pile driving), thus the impact is assumed to be similar to the construction phase (or less). A commitment has been made to a Decommissioning MMMP which will include measures to ensure the risk of permanent threshold shift (PTS) to marine mammals is negligible and will be in line with the latest relevant available guidance (see Co.113 of Volume A4, Annex 5.2 Commitments Register).	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
MM-D-22	Array Area	Decomissioning	TTS from underwater noise.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Tertiary: Co113	**No Likely Significant Effect** Since there are no thresholds to determine a biologically significant effect from TTS and given that disturbance will be included in a detailed quantitative assessment, the impact of TTS on marine mammals was scoped out of assessment.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID:4.5.1). There are no thresholds to determine a biologically significant effect from TTS, therefore no assessment of the number of animals, magnitude, sensitivity or significance of effect is given.	Not Assessed	Not Assessed	**No significant effect**	**Not considered further in the EIA**	Simple assessment at PEIR with conclusion of no LSE and confirmed no change to either magnitude or sensitivity of the species. The approach and methodologies employed at decommissioning will be compliant with the legislation and policy requirements at the time of decommissioning (see Co.113 of Volume A4, Annex 5.2 Commitments Register). Impact assumed to be similar to the construction phase (or less). No assessment of the significance of TTS is provided.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
MM-D-23	Array Area	Decomissioning	Vessel collision risk.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Tertiary: Co111	**Likely significant effect without secondary mitigation** It is not expected that there will be a significant increase in vessel activity over the baseline levels.	**Simple Assessment**	Scoped into assessment based on the Applicant's position at scoping and no comments received in Scoping Opinion (PINS Scoping Opinion, November 2018).	Minor	Medium	**No significant effect (Minor Adverse)**	**Not considered further in the EIA**	Simple assessment at PEIR with conclusion of no LSE and confirmed no change to either magnitude or sensitivity of the species. The level of vessel activity during the decommissioning phase are predicted to be the same as for the construction period. Therefore, the impact is assumed to be similar to construction phase (or less). The adoption of a VMP (Commitment Co.108 of Volume A4, Annex 5.2 Commitments Register) will minimise the potential for any impact.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
MM-D-24	All-offshore	Decomissioning	Disturbance from vessels.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Tertiary: Co111	**Likely significant effect without secondary mitigation** It is not expected that there will be a significant increase in vessel activity over the baseline levels.	**Simple Assessment**	Scoped into assessment based on the Applicant's position at scoping and no comments received in Scoping Opinion (PINS Scoping Opinion, November 2018).	Minor	Low	**No significant effect (Minor Adverse)**	**Not considered further in the EIA**	Simple assessment at PEIR with conclusion of no LSE and confirmed no change to either magnitude or sensitivity of the species. The level of vessel activity during the decommissioning phase are predicted to be the same as for the construction period. Therefore, the impact is assumed to be similar to construction phase (or less). The adoption of a VMP (Commitment Co.108 of Volume A4, Annex 5.2 Commitments Register) will minimise the potential for any impact.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
MM-D-25	Landfall	Decomissioning	Reduction in prey availability.	Maximum effect on fish prey species as detailed in the assessment in Volume A2, Chapter 3: Fish and Shellfish Ecology.	Assessment based on the MDS presented in Volume A2, Chapter 3: Fish and Shellfish Ecology.	Tertiary: Co.181	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.3).	Negligible	N/A	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as detailed assessment.	Negligible	N/A	**No significant effect (not significant)**	No	No change to Fish and Shellfish Ecology MDS' and therefore no change to MM-D-25 MDS. As such, ES conclusions remain valid.
MM-D-26	All-offshore	Decomissioning	Reduction in foraging ability.	MDS is identical (or less) to that of the construction phase (MM-C-7). **Total volume = 12,192,331 m^3**	MDS is assumed to be as per the construction phase, with all infrastructure removed in reverse-construction order. The removal of cables is considered the MDS, however the necessity to remove cables will be reviewed at the time of decommissioning.	Tertiary: Co.181	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.4).	Negligible	N/A	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as detailed assessment.	Negligible	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
MM-D-27	Array Area	Decomissioning	Toxic contamination.	N/A as scoped out.	N/A as scoped out.	Tertiary: Co111	**No Likely Significant Effect** No adverse impact was expected and so this impact was scoped out of further assessment.	**Scoped Out**	Impact not identified at EIA Scoping. Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.5.5). A commitment has been made to a MPCP which will include measures to be adopted for the prevention of pollution events and outline an emergency plan to be implemented in the unlikely event of any pollution events (see Co.111 of Volume A4, Annex 5.2 Commitments Register).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement					
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
ORN-C-1	Array Area	Construction	Construction activities within the array area associated with foundations and WTGs may lead to disturbance and displacement of species within the array and different degrees of buffers surrounding it.	**Construction Vessels / Helicopters within Array Area:** • Up to eight construction vessels in a given 5 km^2 area with approximately three or four 5 km2 areas at any one time. • Single phase of offshore construction over approximately 3 years. **WTG Installation:** • Up to two installation vessels (Jack Up Vessels (JUV) or anchored) (90 return trips); • Up to 12 support vessels (270 return trips); • Up to 24 transport vessels (540 return trips); and • Up to 135 helicopter return trips. **WTG Foundation Installation:** • 6 installation vessels (2 anchored or 4DP2 or 6 x Tugs) (90 return trips if anchored or DP2. 540 return trips if Tugs); • 19 support vessels (900 return trips); • 40 transport/feeder vessels (including tugs) (720 return trips); • 12 dredging vessels (720 return trips); and • 180 helicopter return trips. **OSS and Accommodation Platform Installation:** • 2 installation vessels (36 return trips); • 12 support vessels (162 return trips); • 4 transport/feeder vessels (72 return trips); and • 63 helicopter return trips. **OSS and Accommodation Platform Foundation Installation:** • 2 installation vessels (24 return trips); • 12 support vessels (108 return trips); • 4 transport/feeder vessels (48 return trips); and • 42 helicopter return trips. **Array and Interconnector Cable Installation:** • 3 main cable laying vessels (204 return trips); • 3 main cable burial vessels (204 return trips); • 12 support vessels (1,080 return trips); and • 396 helicopter return trips.	The maximum estimated number of development areas within the array area with vessels operating concurrently would cause the greatest disturbance to birds on site.	Primary: Co2 Co87 Tertiary: Co88	**Likely significant effect without secondary mitigation** LSE likely to be not significant to minor depending on species assessed. This is due to any potential impacts being minimised spatially to a small number of foundations and / or WTGs at any one time and temporally due to the construction phase being limited in time.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Negligible	N/A	**No significant effect (Not Significant)**	No	Reduction in MDS as well as reduced abundances for gannet and auk species (guillemot, razorbill and puffin) within the smaller area of array layout and therefore effects will be of no greater significance than ES conclusions. Based on the above and professional experience and judgement, no change to EIA significance is therefore anticipated.
ORN-C-2	All-offshore	Construction	Indirect impacts during the construction phase within the array area through effects on habitats and prey species	See MDS for Fish and Shellfish Ecology assessment (Volume A2, Chapter 3: Fish and Shellfish Ecology) and for the Benthic and Intertidal Ecology assessment (Volume A2, Chapter 2: Benthic and Intertidal Ecology).	Indirect effects on birds could occur through changes to any of the species and habitats considered within the Fish and Shellfish Ecology or Benthic and Intertidal Ecology assessments. The maximum indirect impact on birds would result from the maximum direct impact on fish, shellfish and benthic species and habitats. The maximum design scenario is therefore as per justifications in Volume A2, Chapter 3: Fish and Shellfish Ecology and Volume A2, Chapter 2: Benthic and Intertidal Ecology.	N/A	**No likely significant effect** Although the importance of a species linked to a designated site would infer a high score, no DWP EIA submitted to date has predicted a significant impact from this source on birds.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.6.1.).	Not Applicable	Not Applicable	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in baseline data of Fish & Shellfish Ecology hence reassessed in ES.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.
ORN-C-3	ECC	Construction	Construction activities associated with export cable laying may lead to disturbance and displacement of species within the export cable corridor and different degrees of buffers surrounding it.	**Construction vessels within ECC:** • 3 cable laying vessels (96 return trips) • 3 cable jointing vessels (72 return trips) • 3 cable burial vessels (96 return tips) • 15 support vessels (1.44 return trips) • 800 helicopter return trips	The assumption is that the vessel would be in situ from start to finish, so any disturbance events would be throughout entire period.	Primary: Co2 Co86 Tertiary: Co88	**Likely significant effect without secondary mitigation** LSE likely to be not significant to minor depending on species assessed. This is due to any potential impacts being minimised spatially to a single cable laying vessel and temporally due to the construction phase being limited in time. Also, the most sensitive species (divers) are not found in high densities within study area.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as detailed assessment.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.
ORN-C-4	Landfall	Construction	Construction activities associated with trenching, laying and reburial of the export cable through the intertidal zone may lead to disturbance and displacement of waterbird species in close proximity to the works.	**Horizontal Directional Drilling (HDD) Installation:** • Eight offshore HDD exits pits; • Minimum 6 m entry pit and 5m exit pit depth; • Small 4x4 vehicles related to emergency response on the beach; and • Small 4x4 on beach to monitor the drill head using handheld equipment. **Cable Laying:** • Maximum duration of cable laying via HDD is 24 months within a 32 month period.	The assumption is that the process would be undertaken by HDD methods, so no open trenching, cable laying and burial of the export cable would be required. Therefore, MDS activities to be assessed are limited, though they are to take place over a maximum of 24 months within a 32 month period (allowing for up to six months of weather-related downtime).	Primary: Co2 Co86 Co187	**Likely significant effect without secondary mitigation** LSE is not significant, as very few waterbirds reside within the intertidal area and most species are tolerant of disturbance activities that are limited spatially and temporally	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible/Minor	Low	**No significant effect (Not Significant to Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.
ORN-O-5	Array Area	Operation	Operational activities associated with moving turbines and maintenance vessels may lead to disturbance and displacement of species within the array area and different degrees of buffers surrounding it.	**Array Area:** • WTG deployment across the full array area (468 km^2). **Wind Turbine Generators:** • Up to 180 WTGs; • Minimum height of lowest blade tip above MSL: 40 m; and • Maximum rotor blade radius: 152.5 m. **Operation and Maintenance:** • 2,580 return visits to wind turbines per year; • 780 return visits to wind turbine foundations per year; • 65 return visits to offshore platforms (structural scope) per year; • 100 return visits to offshore platforms (electrical scope) per year; • A total of 3,525 total trips per year completed by helicopter and / or vessels; and • Vessels include: CTVs, service operation vessels, supply vessels, cable and remedial protection vessels, and JUVs.	Displacement would be assumed from the entire array area that contains WTGs and other associated structures, which maximises the potential for disturbance and displacement. Assessment of extent / varying displacement from array area and a buffer is species specific due to their sensitivity levels.	Primary: Co2 Co87 Co138 Tertiary: Co88	**Likely significant effect without secondary mitigation** LSE likely to be not significant to minor/moderate depending on species assessed.	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible	Medium to High	**No significant effect (not significant to Minor Adverse)**	**Detailed Assessment**	Full assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as detailed assessment.	Negligible	N/A	**No LSE (Not Significant)**	No	Reduction in MDS. Gannet - Reduction in the size of the array layout leads to densities and abundances for each bio-season being less than those assessed in ES and therefore effects will be of no greater significance than ES conclusions for gannet. Auks - Reduction in the size of the array layout. Densities of all auk species and their abundances within the revised layout and 2 km buffer reduced in comparison to those used in assessments in the ES. Therefore, the effects are reduced from those presented in the ES for all auk species (by approx 20-30% for guillemot and approx 8-40% for razorbill, depending on bio-season). Based on the above and professional experience and judgement, no change to EIA significance is therefore anticipated.
ORN-O-6	Array Area	Operation	Seabirds flying through the array area during the operational phase are at risk of collision with WTG rotors and associated infrastructure.	**Array Area:** • WTG deployment across the full array area (468 km^2). **Wind Turbine Generators:** • Up to 180 WTGs; • Minimum height of lowest blade tip above MSL: 40 m; and • Maximum rotor blade radius: 152.5 m.	This represents the maximum number of the largest WTGs, which represents the greatest total swept area to be considered for collision risk.	Primary: Co2 Co87 Co138	**Likely significant effect without secondary mitigation** LSE likely to be between not significant and moderate / major, as initial consideration of collision risk highlighted as key consideration for the Hornsea Four project. Risk resulting from in-combination effects with other OWFs is greatest.	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to minor	N/A	**No significant effect (Not Significant)**	**Detailed Assessment**	Full assessment at PEIR concluded No LSE. Change in Project Description and reassessed in ES as detailed assessment.	Negligible	N/A	**No significant effect (Not Significant)**	No	Reduction in MDS with regards to a reduction to the size of the array layout, but no changes to number or design of WTGs. Monthly densities of gannet and kittiwakes marginally increased with minor increases to estimated collision risk mortality rates predicted. However, inceases would be of limited change to those assessed and presented in the ES. It is anticipated that only minor changes in predicted mortality rates would occur for great-black-backed gull, lesser black-backed gull and herring gull. Based on the above and professional experience and judgement, no change to EIA significance is therefore anticipated.

Impact Background							EIA Scoping	Preliminary Environmental Information Report				Environmental Statement					
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
ORN-O-7	Array Area	Operation	Migrant non-seabirds flying through the array area during the operational phase are at risk of collision with WTG rotors and associated infrastructure.	**Array Area:** • WTG deployment across the full array area (468 km^2). **Wind Turbine Generators:** • Up to 180 WTGs; • Minimum height of lowest blade tip above MSL: 40 m; and • Maximum rotor blade radius: 152.5 m.	This represents the maximum number of the largest WTGs, which represents the greatest total swept area to be considered for collision risk.	Primary: Co2 Co87 Co138	**Likely significant effect without secondary mitigation** LSE likely to be not significant or minor as previous impact assessments conducted for OWFs in the North Sea have concluded negligible or minor. There are no reasons why this project would be deemed any different.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible	N/A	**No significant effect (Not Significant)**	**Detailed Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and modelling exercise undertaken for reassessment in ES as detailed assessment.	Negligible	N/A	**No significant effect (Not Significant)**	No	Reduction in MDS and therefore effects will be of less than and of no greater significance than ES conclusions.
ORN-O-8	Array Area	Operation	Indirect impacts within the array area during the operational phase through effects on habitats and prey species.	See MDS for Fish and Shellfish Ecology assessment (**Volume A2, Chapter 3: Fish and Shellfish Ecology**) and for the Benthic and Intertidal Ecology assessment (**Volume A2, Chapter 2: Benthic and Intertidal Ecology**).	Indirect effects on birds could occur through changes to any of the species and habitats considered within the Fish and Shellfish Ecology or Benthic and Intertidal Ecology assessments. The maximum indirect impact on birds would result from the maximum direct impact on fish, shellfish and benthic species and habitats. The maximum design scenario is therefore as per justifications in **Volume A2, Chapter 3: Fish and Shellfish Ecology** and **Volume A2, Chapter 2: Benthic and Intertidal Ecology**.	N/A	**No likely significant effect** Although the importance of a species linked to a designated site would infer a high score, no OWF EIA submitted to date has predicted a significant impact from this source on birds.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.6.2).	Not Applicable	Not Applicable	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Negligible	N/A	**No LSE (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.
ORN-O-9	Array Area	Operation	The presence of WTGs could create a barrier to the migratory or regular foraging movements of seabirds.	**Array Area:** • WTG deployment across the full array area (468 km^2) area; and • Up to 25.6 km north-south extent between the northernmost point of the array area and the southernmost point. **WTGs:** • Up to 180 WTGs.	The measurement would be North to South to define the additional effort required for birds to fly around the array area to the North or South from FFC colony during the breeding if assumed to be commuting to foraging areas beyond array area to the East.	Primary: Co87	**Likely significant effect without secondary mitigation** LSE likely to be not significant to minor. This impact is not widely assessed as being significant and displacement impacts are considered to be the more important focus.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible	N/A	**No LSE (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Negligible	N/A	**No LSE (Not Significant)**	No	Reduction in MDS and therefore effects will be of less than and of no greater significance than ES conclusions.
ORN-O-14	Array Area	Operation	The impact of attraction to lit structures by migrating birds in particular.	**WTGs:** • Up to 180 WTGs; • Minimum height of lowest blade tip above MSL: 40 m; • Maximum rotor blade radius: 152.5 m; • Total array area of 468 km^2; and • Minimum 810 m spacing. **OSS and Accommodation Platforms:** • Up to six offshore transformer substations in the array area; • Up to three offshore High Voltage Direct Current (HVDC) converter substations in the array area; • Up to one offshore accommodation platform in the array area; and • Up to three HVAC booster stations (in the HVAC booster station search area). Lighting outward and not directional on all structures, maximised intensity and range to provide best visibility for aviation and shipping purposes.	Provides the maximum number of structures in the wind farm, with maximum intensity and extent of red and white light sources to increase likelihood that birds will be attracted to structures and become disoriented or more susceptible to collision risk. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co87	**Impact not identified at Scoping**	**Simple Assessment**	Impact not identified at Scoping stage but assessed at PEIR following consultation with the Evidence Plan Offshore Ornithology Technical Panel.	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Project Description and hence reassessed in ES as simple assessment.	Negligible	N/A	**No significant effect (Not Significant)**	No	Reduction in MDS and therefore effects will be of less than and of no greater significance than ES conclusions.
ORN-O-10	ECC	Operation	Potential for ad-hoc maintenance of export cable throughout operational phase may lead to disturbance and displacement of species within the export cable corridor and different degrees of buffers surrounding it.	N/A as scoped out.	N/A as scoped out	N/A	**No likely significant effect** This is unlikely to occur in the first instance. Should it occur then the LSE would be not significant on species assessed, as it would be limited both spatially and temporally.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.6.4).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
ORN-O-11	Landfall	Operation	Potential for ad-hoc maintenance of export cable through the intertidal zone during the operational phase may lead to disturbance and displacement of waterbird species in close proximity to the works.	N/A as scoped out.	N/A as scoped out	N/A	**No likely significant effect** This is unlikely to occur in the first instance. Should it occur then the LSE would be not significant on species assessed, as it would be limited both spatially and temporally.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.6.5).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
ORN-D-12	ECC	Decomissioning	Demolition activities associated with foundations and WTGs may lead to disturbance and displacement of species within the array area and different degrees of buffers surrounding it.	N/A as scoped out.	N/A as not considered in detail in the ES.	Tertiary: Co181	**Likely significant effect without secondary mitigation** LSE likely to be not significant to minor as species are less sensitive to lower scale activities associated with decommissioning	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible	N/A	**No significant effect (Not Significant)**	**Not considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple assessment at PEIR with conclusion of no significant adverse effect. Not considered in the ES. A degree of temporary disturbance and displacement is likely to occur throughout the decommissioning phase. The long-term effect of this would be to return the area to its former state and the impact on regional or national populations of concern would be not significant over the long term.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
ORN-D-13	ECC/Landfall	Decomissioning	Indirect impacts during the decommissioning phase within the offshore ECC and landfall through effects on habitats and prey species.	See MDS for Fish and Shellfish Ecology assessment (**Volume A2, Chapter 3: Fish and Shellfish Ecology**) and for the Benthic and Intertidal Ecology assessment (**Volume A2, Chapter 2: Benthic and Intertidal Ecology**).	Indirect effects on birds could occur through changes to any of the species and habitats considered within the Fish and Shellfish Ecology or Benthic and Intertidal Ecology assessments. The maximum indirect impact on birds would result from the maximum direct impact on fish, shellfish and benthic species and habitats. The maximum design scenario is therefore as per justifications in **Volume A2, Chapter 3: Fish and Shellfish Ecology** and **Volume A2, Chapter 2: Benthic and Intertidal Ecology**.	Tertiary: Co181	**Likely significant effect without secondary mitigation**	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Not Applicable	Not Applicable	**No significant effect (not significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in baseline data of Fish & Shellfish Ecology hence reassessed in ES.	Negligible	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
CF-C-1	Array Area	Construction	Hornsea Four array area construction activities and physical presence of constructed wind farm infrastructure leading to reduction in access to, or exclusion from established fishing grounds.	**Total temporary reduction** **Wind Turbine Generators (WTGs) and platforms:** • Seabed preparation for 110 GBS (Wind Turbine Generator (WTG) type) foundations for WTGs = 411,321 m^2; • Seabed preparation for 70 suction caisson jacket (WTG type) foundations for WTGs = 198,870 m^2. • Seabed preparation for one accommodation platform on a suction caisson jacket (small OSS) foundation = 12,321 m^2; • 500 m exclusion zones around construction activities = 790,000 m^2 per structure under construction at any one time; and • 50 m exclusion zones around incomplete structures = 7,854 m^2 per partially constructed structure at any one time. **Offshore cables:** • Boulder and sandwave clearance for array cables (600 km length, 40 m width) = 24,000,000 m^2; • Burial of array cables (600 km length, 1.5 m width) = 9,000,000 m^2; • Boulder and sandwave clearance for interconnector cables (90 km length, 40 m width) = 3,600,000 m^2; • Burial of interconnector cables (90 km length, 1.5 m width) = 1,350,000 m^2; and • Roaming 500 m safe passing distance for mobile installation vessels, which may, in exceptional circumstances, be increased to 1,000 m dependant on the nature of the installation works. **Construction Duration:** • Offshore construction over approximately a three-year period. **Total permanent reduction** **WTGs and platforms:** • Turbine footprint with scour protection, based on 110 GBS (WTG-type) foundations = 504,540 m^2; • Turbine footprint with scour protection, based on 70 suction caisson jacket (WTG type) foundations = 296,861 m^2. **Offshore platforms:** • Total seabed area for OSS in the array (three large OSS on GBS (large OSS) foundations and six small OSS on GBS (Box-type) foundations, including associated scour protection = 371,250 m^2; and • Total seabed area for one offshore accommodation platform within the array on a small OSS foundation (GBS (Box-type)), including associated scour protection = 30,625 m^2. **Offshore cables:** • Cable protection for array cables = 624,000 m^2; • Cable protection for interconnector cables = 94,000 m^2; and • Pre- and post-lay rock berm area for 32 cables crossings within the array area = 204,000 m^2.	This represents the maximum duration and extent of fishing exclusion throughout the construction phase and hence the greatest potential to restrict access to fishing grounds. The construction footprint comprises the full permanent seabed area of structures, scour protection, cable crossings and cable protection (also assessed in CF-O-8) plus the temporary footprint of preparatory works including seabed preparation, sandwave clearance and boulder clearance. The impact also incorporates exclusion zones around major activities. It is important to note that the temporal aspect of temporary works will not apply in full throughout the approximately three-year construction phase, as activities will be completed sequentially. As described in **Volume A4, Annex 4.8: Pro-Rata Annex**, maximum parameters will be delivered on a pro rata basis. For example, the maximum seabed preparation area for WTGs is described for 180 structures, but this would be scaled down to an equivalent value should only 100 structures be built out. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by **C1.1 Draft DCO including Draft DML**, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co2 Co83 Co85 Co201 Secondary: Co139 Tertiary: Co81 Co89 Co90 Co93 Co95 Co99 Co180	**Likely significant effect without secondary mitigation** Effect likely to be of negligible to minor adverse significance, depending on fleet assessed. Potential for some loss of fishing opportunities over construction period, though effect is short-term and localised, and the operational range of fleets is typically not limited to the array area.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Moderate	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Moderate	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
CF-C-2	Offshore Export Cable	Construction	Hornsea Four offshore ECC construction activities leading to reduction in access to, or exclusion from established fishing grounds.	**Total temporary reduction** **Offshore platforms:** • Seabed preparation for three HVAC booster stations on suction caisson jacket (small OSS) foundations within the HVAC Booster Station Search Area = 36,963 m^2; • 500 m exclusion zones around construction activities = 790,000 m^2 per structure under construction at any one time; and • 50 m exclusion zones around incomplete structures = 7,854 m^2 per partially constructed structure at any one time. **Offshore cables:** • Boulder and sandwave clearance for export cables (654 km length, 40 m width) = 26,160,000 m^2; • Burial of export cables (654 km length, 1.5 m width) = 9,810,000 m^2; Cable jointing (four joints per cables, six cables and 3,500 m2 per joint) = 84,000 m^2; and • Roaming 500 m safe passing distance for mobile installation vessels, which may, in exceptional circumstances, be increased to 1,000 m dependant on the nature of the installation works. **Construction Duration:** • Construction over approximately a 4.5 year period, including: • Site preparation works = 28 months; • Platform installation = two months per platform; and • Cable installation = 24 months. **Total permanent reduction** **Offshore platforms:** • Total seabed area for three HVAC booster stations on small OSS GBS (Box-type) foundations within the HVAC Booster Station Search Area, including associated scour protection = 91,875 m^2. **Offshore cables:** • Cable protection for export cables = 792,000 m^2; • Pre- and post-lay rock berm area for 54 cable crossings within the offshore ECC = 344,000 m^2.	This represents the maximum duration and extent of fishing exclusion throughout the construction phase and hence the greatest potential to restrict access to fishing grounds. The construction footprint comprises the full permanent seabed area of structures, scour protection, cable crossings and cable protection (also assessed in CF-O-9) plus the temporary footprint of preparatory works including seabed preparation, sandwave clearance and boulder clearance. The impact also incorporates exclusion zones around major activities. It is important to note that the temporal aspect of temporary works will not apply in full throughout the approximately 4.5-year construction phase, as activities will be completed sequentially. As described in **Volume A4, Annex 4.8: Pro-Rata Annex**, maximum parameters will be delivered on a pro rata basis. For example, the maximum seabed preparation area for WTGs is described for 180 structures, but this would be scaled down to an equivalent value should only 100 structures be built out. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by **C1.1 Draft DCO including Draft DML**, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co2 Co83 Secondary: Co139 Tertiary: Co89 Co90 Co93 Co94 Co95 Co99 Co180	**Likely significant effect without secondary mitigation** Effect likely to be of negligible to minor adverse significance, depending on fleet assessed. Potential for some loss of fishing opportunities over construction period, though effect is short-term and localised, and the operational range of fleets is typically not limited to the offshore ECC.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Minor to Moderate	Low to Medium	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Minor to Moderate	Low to Medium	**No significant effect (Slight Adverse)**	No	Project activity and impact relate to offshore ECC only; no change to MDS and therefore ES conclusions remain valid.
CF-C-3	Array Area	Construction	Displacement from Hornsea Four array area leading to gear conflict and increased fishing pressure on adjacent grounds.	As per MDS for "Hornsea Four array area construction activities and physical presence of wind farm infrastructure leading to reduction in access to, or exclusion from established fishing grounds (CF-C-1)".	This represents the maximum duration and extent of fishing exclusion throughout the construction phase and hence the greatest potential for displacement.	Primary: Co2 Co83 Co85 Co201 Secondary: Co139 Tertiary: Co89 Co90 Co93 Co94 Co95 Co99	**Likely significant effect without secondary mitigation** Effect likely to be of negligible to minor adverse significance, depending on fleet assessed. Potential for displacement of fishing activity, though effect will be short-term and localised, and the operational range of fleets is typically not limited to the array area.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement					
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
CF-C-4	Offshore Export Cable	Construction	Displacement from the Hornsea Four offshore ECC leading to gear conflict and increased fishing pressure on adjacent grounds.	As per MDS for "Hornsea Four offshore cable corridor construction activities leading to reduction in access to, or exclusion from established fishing grounds (CF-C-2)".	This represents the maximum duration and extent of fishing exclusion throughout the construction phase and hence the greatest potential for displacement.	Primary: Co2 Co83 Secondary: Co139 Tertiary: Co89 Co90 Co93 Co94 Co95 Co99	**Likely significant effect without secondary mitigation** Effect likely to be of negligible to minor adverse significance, depending on fleet assessed. Potential for displacement of fishing activity, though effect will be short-term and localised, and the operational range of fleets is typically not limited to the offshore ECC.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	Project activity and impact relate to offshore ECC only; no change to MDS and therefore ES conclusions remain valid.
CF-C-5	All-Offshore	Construction	Hornsea Four array area and offshore ECC construction activities leading to displacement or disruption of commercially important fish and shellfish resources.	See Fish and Shellfish Ecology MDS' presented in Section 3.9 of **Chapter 3: Fish and Shellfish Ecology** (FSE-C-1, FSE-C-2, FSE-C-3, and FSE-C-4).	The scenarios presented in **Chapter 3: Fish and Shellfish Ecology** provide for the greatest disturbance to fish and shellfish species and therefore the greatest knock-on effect to commercial fisheries. Importantly, this considers the impacts as a whole on commercially important species as considered in the MDS' in **Chapter 3: Fish and Shellfish Ecology**, rather than any one impact in particular.	Primary: Co2 Secondary: Co139	**No likely significant effects** Effects of Hornsea Four on species of commercial importance are not expected to be significant in EIA terms and scoped out of further fish and shellfish ecology assessment.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.8.1.).	Minor	Low to Medium	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Minor	Low to Medium	**No significant effect (Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
CF-C-6	All-Offshore	Construction	Hornsea Four array area and Hornsea Four offshore ECC construction activities leading to additional steaming to alternative fishing grounds for vessels that would otherwise be fishing within the array and offshore ECC areas.	N/A as impact scoped out.	N/A as impact scoped out	Primary: Co2 Secondary: Co139	**No likely significant effects** This effect will be localised and limited deviations to steaming routes are expected. Given adequate notification it is expected that vessels, which typically have an operational range beyond that the Hornsea Four development area, will be in a position to avoid temporary construction/decommissioning areas and installed infrastructure with no or minimal impact on their steaming times.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.8.2). Effects are expected to be highly localised and temporary during construction; limited deviations to existing steaming routes are expected. Given adequate notification it is expected that these vessels, which have an operational range beyond that of the development, will be in a position to avoid construction areas with no or minimal effect upon steaming times.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
CF-C-7	All-Offshore	Construction	Increased vessel traffic within fishing grounds as a result of changes to shipping routes and transiting construction vessel traffic from Hornsea Four array area and Hornsea Four offshore ECC leading to interference with fishing activity.	**Wind Turbine Foundation Installation:** • Up to 2,880 return trips over a 12-month period. **Wind Turbine Installation:** • Up to 900 return trips over a 24-month period. **OSS Installation (all OSSs and the accommodation platform):** • Up to 270 return trips over a two-month period. **OSS Foundation Installation (all OSSs and the accommodation platform):** • Up to 180 return trips over a two-month period. **Inter-Array and Interconnector Cable Installation:** • Up to 1,488 return trips over a 24-month period. **Offshore Export Cable Installation:** • Up to 408 return trips over a 24-month period. **Total:** • Up to 8 vessels in any given 5 km^2 at any one time.	The maximum number of turbines and associated infrastructure will lead to the highest level of construction activities and therefore highest level of construction vessel round trips. The maximum number of vessels transits and the maximum duration of the construction would result in the greatest potential for interference.	Tertiary: Co89 Co90 Co93 Co94 Co95 Co99 Co180	**No likely significant effects** Vessel movements associated with Hornsea Four construction, operation and maintenance, and decommissioning, will add to the existing volume of traffic in the area. However, the effect will be localised and given adequate notification, fleets will be able to avoid Hornsea Four vessel traffic.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.8.3).	Minor	Low to Medium	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Minor	Low to Medium	**No significant effect (Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
CF-O-8	Array Area	Operation & Maintenance	Physical presence of Hornsea Four array area infrastructure and maintenance activities leading to reduction in access to, or exclusion from established fishing grounds.	**Total permanent reduction** **WTGs and platforms:** • Total seabed area for 1110 GBS (WTG-type) foundations = 504,540 m^2; • Total seabed area for 70 suction caisson jacket (WTG type) foundations = 296,881 m^2; and • Minimum turbine spacing of 810 m. **Offshore platforms:** • Total seabed area for OSS in the array (three large OSS on GBS (large OSS) foundations and six small OSS on GBS (Box-type) foundations, including associated scour protection = 371,250 m^2; and • Total seabed area for one offshore accommodation platform within the array on a small OSS foundation (GBS (Box-type)), including associated scour protection = 30,625 m^2. **Offshore cables:** • Cable protection for array cables = 624,000 m^2; • Cable protection for interconnector cables = 94,000 m^2; and • Pre- and post-lay rock berm area for 32 cables crossings within the array area = 204,000 m^2. **Temporary reduction from maintenance activities** **WTG O&M Activities:** • Component replacement = 378,000 m^2; • Access ladder replacement = 378,000 m^2; • Foundation anode replacement = 378,000 m^2; and • J-Tube repair/ replacement = 108,000 m^2.	This represents the maximum duration and extent of fishing exclusion throughout the operation and maintenance phase and hence the greatest potential to restrict access to fishing grounds. It comprises the maximum footprint of infrastructure on the seabed plus maintenance activities throughout the O&M phase and associated temporary safety zones. The smaller the spacing between turbines the greatest the potential for vessels to have restricted access to the site. The assessment assumes that fishing will resume around and between infrastructure within the Hornsea Four array area where possible, with the exception of an assumed 50 m operating distance from infrastructure, areas of cable protection, and safety zones around infrastructure undergoing major maintenance or replacement. Furthermore, the individual decisions made by skippers with their own perception of risk will determine the likelihood of whether their fishing will resume within the Hornsea Four array area. Inclement weather will be a significant contributor to this risk perception. In addition, certain gear types including pelagic trawl, twin rigged trawls and demersal seine / fly shooting will not be	Primary: Co2 Co83 Co201 Tertiary: Co81 Co89 Co90 Co93 Co94 Co95 Co99 Co180	**Likely significant effect without secondary mitigation** Effect likely to be of not significant to minor adverse significance, depending on fleet assessed. Assumes fishing can resume to a degree within the array area. Effect will be long-term but highly localised and operational range of most fishing vessels is not limited to the array area	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
				Offshore substation and accommodation activities: • Offshore substation component replacement = 6,000 m^2; • Access ladder replacement = 21,000 m^2; • Foundation anode replacement = 21,000 m^2; and • J-Tube repair/ replacement = 6,000 m^2. **Array cable activities:** • Remedial burial of array cables (42 km total length reburied) = 4,200,000 m^2; • Array cable repairs = 363,736 m^2; • Cable protection replacement = 156,000 m^2; • Ten array cable repair events over lifetime; and • Duration of each cable repair event: approximately three months. **Interconnector cable activities:** • Remedial burial of interconnector cables (7 km total length reburied) = 700,000 m^2; • Interconnector cable repairs = 20,028 m^2; • Cable protection replacement = 23,500 m^2; • Three interconnector cable repair events over lifetime; and • Duration of each cable repair event approximately three months. **Safety Zones:** • 500 m safety zones around manned offshore platforms and temporary 500 m safety zones around turbines and offshore platforms undergoing major maintenance. **Duration: Operational design life of 35 years.**	practically deployed within the operational array. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.													
CF-O-9	Offshore Export Cable	Operation & Maintenance	Physical presence of offshore export cable and infrastructure and maintenance activities within the Hornsea Four offshore ECC leading to reduction in access to, or exclusion from established fishing grounds.	**Total permanent reduction** **Offshore platforms:** • HVAC booster station foundations footprint and scour protection, based on three small OSS foundations (GBS (Box-type)) = 91,875 m^2; and • Minimum spacing of 100 m. **Offshore cables:** • Cable protection for export cables = 792,000 m^2; • Pre- and post-lay rock berm area for 54 cable crossings within the offshore ECC = 344,000 m^2. **Total temporary reduction from maintenance activities** **ECC activities:** • Remedial burial of export cables (14 km total length reburied) = 1,400,000 m^2; • Export cable repairs = 153,548 m^2; • Cable protection replacement = 198,000 m^2; and • Duration of each cable repair event: approximately three months. **HVAC booster station activities:** • Offshore substation component replacement = 1,800 m^2; • Access ladder replacement = 6,300 m^2; • Foundation anode replacement = 6,300 m^2; and • J-Tube repair/ replacement = 1,800 m^2. **Safety Zones:** • 500 m safety zones around manned offshore platforms; and • Temporary 500 m safety zones around offshore platforms undergoing major maintenance. **Duration: Operational design life of 35 years.**	This represents the maximum duration and extent of fishing exclusion throughout the operation and maintenance phase and hence the greatest potential to restrict access to fishing grounds. It comprises the maximum footprint of infrastructure on the seabed plus maintenance activities throughout the O&M phase and associated temporary safety zones. The smaller the spacing between turbines the greatest the potential for vessels to have restricted access to the site. The assessment assumes that fishing will resume along the Hornsea Four offshore cable corridor, with the exception of an assumed 50 m operating distance from infrastructure (i.e. three HVAC booster stations), areas of cable protection and safety zones around infrastructure undergoing major maintenance. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1.1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co2 Co83 Tertiary: Co81 Co89 Co90 Co93 Co94 Co95 Co99 Co180	**Likely significant effect without secondary mitigation** Effect likely to be of not significant to minor adverse significance, depending on fleet assessed. Assumes fishing can resume to a degree within the array area. Effect will be long-term but highly localised and operational range of most fishing vessels is not limited to the offshore ECC	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	Project activity and impact relate to offshore ECC only; no change to MDS and therefore ES conclusions remain valid.
CF-O-10	All-Offshore	Operation & Maintenance	Displacement from Hornsea Four array area and Hornsea Four offshore ECC leading to gear conflict and increased fishing pressure on adjacent grounds.	As per MDS for "Physical presence of Hornsea Four array area infrastructure leading to reduction in access to, or exclusion from established fishing grounds (CF-O-8)" and "Physical presence of offshore export cable and infrastructure within the Hornsea Four offshore cable corridor leading to reduction in access to, or exclusion from established fishing grounds (CF-O-9)".	As per the justification for "Physical presence of Hornsea Four array area infrastructure leading to reduction in access to, or exclusion from established fishing grounds" and "Physical presence of offshore export cable and infrastructure within the Hornsea Four offshore cable corridor leading to reduction in access to, or exclusion from established fishing grounds".	Primary: Co2 Co83 Co201 Secondary: Co139 Tertiary: Co81 Co89 Co90 Co93 Co94 Co95 Co99 Co180	**Likely significant effect without secondary mitigation** Effect likely to be of of not significant to minor adverse significance, depending on fleet assessed. Assumes fishing can resume to a degree in array area and in vicinity of export cables. Effect will be highly localised and operational range of most fishing vessels is not limited to the array area or offshore ECC.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
CF-O-11	Array Area	Operation & Maintenance	Physical presence of Hornsea Four array area and potential exposure of that infrastructure leading to gear snagging.	As per MDS for "Physical presence of Hornsea Four array area infrastructure leading to reduction in access to, or exclusion from established fishing grounds (CF-O-8)".	This represents the maximum potential for interactions between infrastructure and fishing gear. Assessment assumes that fishing will resume around and between infrastructure within the Hornsea Four array area, with the exception of an assumed 50 m operating distance from infrastructure, areas of cable protection, and safety zones around infrastructure undergoing major maintenance.	Primary: Co2 Co83 Co201 Tertiary: Co81 Co89 Co90 Co93 Co94 Co95 Co99	**Likely significant effect without secondary mitigation** Effect likely to be of of not significant to minor adverse significance, depending on fleet assessed. Standard industry practice and protocol (i.e., seabed infrastructure will be buried and/or marked on charts) minimise this risk, but it remains likely to be an area of industry concern.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
CF-O-12	Offshore Export Cable	Operation & Maintenance	Physical presence of the export cable and associated infrastructure and potential exposure of that infrastructure leading to gear snagging.	As per MDS for "Physical presence of offshore export cable and infrastructure within the Hornsea Four offshore cable corridor leading to reduction in access to, or exclusion from established fishing grounds (CF-O-9)".	This represents the maximum potential for interactions between infrastructure and fishing gear. Assessment assumes that fishing will resume along the Hornsea Four offshore cable corridor, with the exception of an assumed 50 m operating distance from infrastructure, areas of cable protection and safety zones around infrastructure undergoing major maintenance.	Primary: Co2 Co83 Tertiary: Co81 Co89 Co90 Co93 Co94 Co95 Co99	**Effect likely to be of not significant to minor adverse significance, depending on fleet assessed** Standard industry practice and protocol (i.e., seabed infrastructure will be buried and/or marked on charts) minimise this risk, but it remains likely to be an area of industry concern.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	Project activity and impact relate to offshore ECC only; no change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
CF-O-13	All-Offshore	Operation & Maintenance	Hornsea Four operation and maintenance activities leading to displacement or disruption of commercially important fish and shellfish resources.	See Fish and Shellfish Ecology MDS presented in Section 3.9 of Chapter 3: Fish and Shellfish Ecology (FSE-O-1-8, FSE-O-6, FSE-O-7, FSE-O-10, FSE-O-8).	The scenarios presented in Chapter 3: Fish and Shellfish Ecology provide for the greatest disturbance to fish and shellfish species and therefore the greatest knock on effect to Commercial Fisheries. Importantly, this considers the impacts as a whole on commercially important species as considered in the MDS' in Chapter 3: Fish and Shellfish Ecology, rather than any one impact in particular.	Primary: Co2 Co83 Secondary: Co139 Tertiary: Co81 Co94 Co180	**No likely significant effects** Effects of Hornsea Four on species of commercial importance are not expected to be significant in EIA terms and scoped out of further fish and shellfish ecology assessment.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.8.1.).	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Minor	Low to Medium	**No significant effect (Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
CF-O-14	All-Offshore	Operation & Maintenance	Physical presence of the Hornsea Four array area and export cable leading to additional steaming to alternative fishing grounds for vessels that would otherwise be fishing within the Hornsea Four array area and offshore cable corridor.	N/A as impact scoped out.	N/A as impact scoped out	Secondary: Co139	**No likely significant effects** This effect will be localised and limited deviations to steaming routes are expected. Given adequate notification, it is expected that vessels, which typically have an operational range beyond that the Hornsea Four development area, will be in a position to avoid temporary construction/decommissioning areas and installed infrastructure with no or minimal impact on their steaming times.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.8.2). No additional steaming is expected to be required. Fleets can transit through the development area; magnitude and sensitivity is negligible/low for all fleets.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
CF-O-15	All-Offshore	Operation & Maintenance	Increased vessel traffic within fishing grounds as a result of changes to shipping routes and maintenance vessel traffic from Hornsea Four array area and Hornsea Four offshore ECC infrastructure leading to interference with fishing activity.	**Total of 1,433 return vessel trips per year:** • 124 jack-up vessel return trips; • 1,205 crew vessel return trips; and • 104 supply vessel return trips. **Duration:** • Anticipated design life for Hornsea Four of 35 years.	The maximum number of turbines and associated infrastructure will lead to the highest level of operation and maintenance activities and therefore highest level of operation and maintenance vessel round trips.	Secondary: Co139 Tertiary: Co89 Co90 Co93 Co95 Co99 Co180	**No likely significant effects** Vessel movements associated with Hornsea Four construction, operation and maintenance, and decommissioning, will add to the existing volume of traffic in the area. However, the effect will be localised and given adequate notification, fleets will be able to avoid Hornsea Four vessel traffic.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.8.3).	Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
CF-D-16	Array Area	Decommissioning	Hornsea Four array area decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds.	In the absence of detailed methodologies and schedules, decommissioning works and associated implications for commercial fisheries are considered analogous with those assessed for the construction phase.	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned. Decommissioning is likely to include removal of all of the wind turbine components and part of the foundations (those above seabed level) and removal of all other surface infrastructure. Some or all of the array cables, interconnector cables, and offshore export cables may be removed. Scour and cable protection would likely be left in situ. The removal of cables and rock protection is considered the MDS, however the necessity to remove cables and rock protection will be reviewed at the time of decommissioning.	Secondary: Co139 Tertiary: Co89 Co90 Co93 Co94 Co95 Co99 Co111 Co180	**Likely significant effect without secondary mitigation** As described for the construction phase; effect likely to be of of not significant to minor adverse significance, depending on fleet assessed. Potential for some loss of fishing opportunities over decommissioning period, though effect is short-term and localised, and the operational range of fleets is typically not limited to the array area.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Moderate	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Moderate	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
CF-D-17	Offshore Export Cable	Decommissioning	Hornsea Four offshore ECC decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds.	As per MDS for "Hornsea Four array area decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds (CF-D-16)".	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned.	Secondary: Co139 Tertiary: Co89 Co90 Co93 Co94 Co95 Co99 Co111 Co180	**Likely significant effect without secondary mitigation** As described for the construction phase; effect likely to be of of not significant to moderate adverse significance, depending on fleet assessed. Potential for some loss of fishing opportunities over decommissioning period, though effect is short-term and localised, and the operational range of fleets is typically not limited to the offshore ECC	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Minor to Moderate	Low to Medium	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Minor to Moderate	Low to Medium	**No significant effect (Slight Adverse)**	No	Project activity and impact relate to offshore ECC only; no change to MDS and therefore ES conclusions remain valid.
CF-D-18	Array Area	Decommissioning	Displacement from Hornsea Four array area leading to gear conflict and increased fishing pressure on adjacent grounds.	As per MDS for "Hornsea Four array area decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds (CF-D-16)".	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned.	Tertiary: Co89 Co90 Co93 Co94 Co95 Co99 Co111 Co180	**Likely significant effect without secondary mitigation** As described for the construction phase; effect likely to be of of not significant to minor adverse significance, depending on fleet assessed. Potential for displacement of fishing activity, though effect will be short-term and localised, and the operational range of fleets is typically not limited to the array area.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
CF-D-19	Offshore Export Cable	Decommissioning	Displacement from the Hornsea Four offshore ECC leading to gear conflict and increased fishing pressure on adjacent grounds.	As per MDS for "Hornsea Four array area decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds (CF-D-16)".	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned.	Tertiary: Co89 Co90 Co93 Co94 Co95 Co99 Co111 Co180	**Likely significant effect without secondary mitigation** As described for the construction phase; effect likely to be of of not significant to minor adverse significance, depending on fleet assessed. Potential for displacement of fishing activity, though effect will be short-term and localised, and the operational range of fleets is typically not limited to the offshore ECC.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	Project activity and impact relate to offshore ECC only; no change to MDS and therefore ES conclusions remain valid.
CF-D-20	All-Offshore	Decommissioning	Physical presence of any infrastructure left in situ and potential exposure of that infrastructure leading to gear snagging.	As per MDS for "Hornsea Four array area decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds (CF-D-16)".	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned.	Primary: Co83 Tertiary: Co81 Co89 Co90 Co93 Co94 Co95 Co99 Co111	**Likely significant effect without secondary mitigation** As described for the operation and maintenance phase; effect likely to be of of not significant to minor adverse significance, depending on fleet assessed. Standard industry practice and protocol (i.e., seabed infrastructure will be buried and/or marked on charts) minimise this risk, but it remains likely to be an area of industry concern.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Negligible to Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
CF-D-21	All-Offshore	Decommissioning	Decommissioning activities leading to displacement or disruption of commercially important fish and shellfish resources.	As per MDS for "Hornsea Four array area decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds (CF-D-16)".	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned.	Tertiary: Co180	**No likely significant effects** Effects of Hornsea Four on species of commercial importance are not expected to be significant in EIA terms and scoped out of further fish and shellfish ecology assessment.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.8.1).	Minor	Low to Medium	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Minor	Low to Medium	**No significant effect (Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.
CF-D-22	All-Offshore	Decommissioning	Decommissioning activities leading to longer steaming distances to alternative fishing grounds.	N/A as impact scoped out.	N/A as impact scoped out	N/A	**No likely significant effects** This effect will be localised and limited deviations to steaming routes are expected. Given adequate notification, it is expected that vessels, which typically have an operational range beyond that the Hornsea Four development area, will be in a position to avoid temporary construction/decommissioning areas and installed infrastructure with no or minimal impact on their steaming times.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.8.2). Effects are expected to be highly localised and temporary during decommissioning; limited deviations to existing steaming routes are expected. Given adequate notification it is expected that these vessels, which have an operational range beyond that of the development, will be in a position to avoid decommissioning areas with no or minimal effect upon steaming times.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
CF-D-23	Array Area	Decommissioning	Increased vessel traffic within fishing grounds as a result of changes to shipping routes and transiting decommissioning vessel traffic from Hornsea Four array area and Hornsea Four offshore ECC leading to interference with fishing activity.	As per MDS for "Hornsea Four array area decommissioning activities leading to reduction in access to, or exclusion from, potential and/or established fishing grounds (CF-D-16)".	The scenario which represents the potential for the maximum level of infrastructure to be decommissioned.	Tertiary: Co89 Co90 Co93 Co94 Co95 Co99 Co111 Co180	**No likely significant effects** Vessel movements associated with Hornsea Four construction, operation and maintenance, and decommissioning, will add to the existing volume of traffic in the area. However, the effect will be localised and given adequate notification, fleets will be able to avoid Hornsea Four vessel traffic.	**Detailed Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.8.3).	Minor	Low to Medium	**No significant effect (Not Significant to Minor Adverse)**	**Detailed Assessment**	Detailed assessment at PEIR concluded No LSE. Change in assessment methodology request in S42 response and hence reassessed in ES.	Minor	Low to Medium	**No significant effect (Neutral to Slight Adverse)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
SN-C-1	All-offshore	Construction	Construction activities associated with the Hornsea Four array area, offshore ECC and HVAC booster station search area may cause vessels to be deviated leading to increased encounters and therefore may also lead to increased vessel to vessel collision risk for all vessels in all weather conditions.	**Construction Timeline:** • Single phase of offshore construction over approximately three years. **Buoyed Construction Areas:** • Maximum extent of the Hornsea Four array area including 500 m construction Safety Zones and 50 m pre-commissioning Safety Zones; and • 500 m construction Safety Zones deployed around the HVAC booster stations. **Construction Vessels:** • Up to eight construction vessels within a given 5 km^2 area with approximately three or four 5 km^2 areas at any one time; • Up to 77 for the WTG foundations engaged at any given time with up to 2,880 return trips; • Up to 38 for the WTGs engaged at any given time with up to 900 return trips; • Up to 18 for substation and accommodation platform foundations engaged at any given time with up to 180 return trips; • Up to 18 for substation and accommodation platform installation engaged at any given time with up to 270 return trips; • Up to 18 for the inter-array and interconnector cables engaged at any one time with up to 1,488 return trips; and • Up to 24 for the export cables engaged at any given time with up to 408 return trips.	Largest extent and maximum number of construction vessels over the longest construction period with highest level of vessel activity.	Secondary: Co139 Co179 Tertiary: Co89 Co93 Co98 Co99 Co177	**Likely significant effect without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Minor	Medium	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Minor	Low	**No significant effect (Slight)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area. Based on professional experience and judgement, no significant effect is anticipated.
SN-C-2	All-offshore	Construction	Pre-commissioned structures within the Hornsea Four array area and HVAC booster station search area will create powered and drifting allision risk for all vessels.	**Construction Timeline:** • Single phase of offshore construction over approximately three years. **Array Area:** • Up to 180 WTGs on suction bucket jacket or piled jacket foundations (foundation with largest surface area at the sea surface). • Up to six offshore transformer substations on GBS foundations (foundation with largest surface area at the sea surface); • Up to three offshore High Voltage Direct Current (HVDC) converter substations on GBS foundations (foundation with largest surface area at the sea surface); and • Up to one offshore accommodation platform on GBS foundations (foundation with largest surface area at the sea surface). **Offshore ECC:** • Up to three HVAC booster stations on GBS foundations with minimum spacing of 1.00 m (foundation with largest surface area at the sea surface).	Largest extent and maximum number of structures over the longest construction period.	Secondary: Co139 Tertiary: Co89 Co93 Co94 Co98 Co99 Co177	**Likely significant effect without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Minor	Low	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Minor	Low	**No significant effect (Slight)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area. Based on professional experience and judgement, no significant effect is anticipated.
SN-C-3	All-offshore	Construction	Pre-commissioned cables associated with the Hornsea Four array area and offshore ECC may increase anchor snagging risk for all vessels.	**Construction Timeline:** • Single phase of offshore construction over approximately three years. **Export Cables:** • Maximum export cable length of approximately 654 km (six cables of 109 km each), including within the Hornsea Four array area. **Inter Array and Interconnector Cables:** • Maximum length of array cables, up to 600 km; and • Up to six interconnector cables linking the offshore substations, up to 90 km (1.5 km in total length each).	Largest extent and maximum number of structures over the longest construction period.	Primary: Co83 Secondary: Co139 Tertiary: Co81 Co89 Co98 Co99 Co176	**Likely significant effect without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Negligible	Low	**No significant effect (Not Significant)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Negligible	N/A	**No significant effect (Not Significant)**	No	Reduction in MDS and therefore effects will be of no greater significance than ES conclusions.
SN-C-4	All-offshore	Construction	Construction activities associated with the Hornsea Four array area and offshore ECC may restrict the emergency response capability of existing resources.	**Construction Vessels and Helicopters:** • Up to eight construction vessels within a given 5 km^2 area with approximately three or four 5 km^2 areas at any one time; • Up to 77 construction vessels for the WTG foundations engaged at any given time with up to 2,880 return trips and up to 180 helicopter return trips; • Up to 38 construction vessels for the WTGs engaged at any given time with up to 900 return trips and up to 1.35 helicopter return trips; • Up to 18 construction vessels for substation and accommodation platform foundations engaged at any given time with up to 180 return trips and up to 42 helicopter return trips; • Up to 18 construction vessels for substation and accommodation platform installation engaged at any given time with up to 270 return trips and up to 63 helicopter return trips; • Up to 18 construction vessels for the inter-array and interconnector cables engaged at any one time with up to 1,488 return trips and up to 396 helicopter return trips; and • Up to 24 construction vessels for the export cables engaged at any given time with up to 408 return trips and up to 800 helicopter return trips.	Maximum number of construction vessels over the longest construction period.	Secondary: Co179 Tertiary: Co89 Co98	**Likely significant effects without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Minor	Low	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Minor	Medium	**No significant effect (Slight)**	No	Reduction in MDS and therefore effects will be of no greater significance than ES conclusions.
SN-O-5	All-offshore	Operation	Presence of structures within the Hornsea Four array area, offshore ECC and HVAC booster station search area and activities associated with the Hornsea Four array area, offshore ECC and HVAC booster station search area may cause vessels to be deviated leading to increased encounters and therefore increased vessel to vessel collision risk for all vessel in all weather conditions.	**Operational Life:** • Operational life of 35 years. **Array Area:** • Structure deployment across full developable area; and • Maintenance Safety Zones of up to 500 m. **Operation and Maintenance Vessels:** • Up to 1,433 return trips per year by operation and maintenance vessels operational 24/7.	Largest extent over the longest operational period with most operational activity.	Secondary: Co178 Co179 Co200 Tertiary: Co89 Co94 Co99 Co177	**Likely significant effects without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Moderate	Medium	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Moderate	Low	**No significant effect (Slight)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area. Based on professional experience and judgement, no significant effect is anticipated.
SN-O-6	All-offshore	Operation	Operational structures within the Hornsea Four array area and HVAC booster station search area may create powered and drifting allision risk for all vessels.	**Operational Life:** • Operational life of 35 years. **Array Area:** • Up to 180 WTGs on suction bucket jacket or piled jacket foundations (foundation with largest surface area at the sea surface); • Up to six offshore transformer substations on GBS foundations (foundation with largest surface area at the sea surface); • Up to three offshore HDVC converter substations on GBS foundations (foundation with largest surface area at the sea surface); • Up to one offshore accommodation platform on GBS foundations (foundation with largest surface area at the sea surface); • Minimum spacing of 810 m between structures within the Hornsea Four array area; • Maintenance Safety Zones of up to 500 m. **Offshore ECC:** • Up to three HVAC booster stations on GBS foundations (foundation with largest surface area at the sea surface); and • Minimum spacing of 1.00 m between the HVAC booster stations; and • Maintenance Safety Zones of up to 500 m.	Largest extent and maximum number of operation and maintenance vessels over the longest operational period.	Secondary: Co179 Co200 Tertiary: Co89 Co93 Co94 Co96 Co99 Co177	**Likely significant effect without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Minor	Medium	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Minor	Low	**No significant effect (Slight)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area. Based on professional experience and judgement, no significant effect is anticipated.
SN-O-7	All-offshore	Operation	Operational cables within the Hornsea Four array area and offshore ECC may increase anchor snagging risk for all vessels and cable protection used may reduce navigable water depths for all vessels.	**Operational Life:** • Operational life of 35 years. **Export Cables:** • Maximum export cable length of approximately 654 km (six cables of 109 km each), including within the Hornsea Four array area. **Inter Array and Interconnector Cables:** • Maximum length of array cables, up to 600 km; and • Up to six interconnector cables linking the offshore substations, up to 90 km (1.5 km in total length each).	Largest extent and maximum number of structures over the longest operational period with use of cable burial protection.	Primary: Co83 Secondary: Co139 Tertiary: Co81 Co89 Co99 Co176	**Likely significant effects without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Negligible	Low	**No significant effect (Not Significant)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Minor	Low	**No significant effect (Neutral)**	No	Reduction in MDS and therefore effects will be of no greater significance than ES conclusions.
SN-O-8	All-offshore	Operation	Operation and maintenance activities associated with the Hornsea Four array area and offshore ECC may restrict the emergency response capability of existing resources.	**Operational Life:** • Operational life of 35 years. **Operation and maintenance vessels:** • Up to 1,433 return trips per year by operation and maintenance vessels and/or helicopters operational 24/7.	Maximum number of operation and maintenance vessels over the longest operational period.	Secondary: Co179 Tertiary: Co96 Co99	**Likely significant effects without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Negligible	Low	**No Significant effect (Not Significant)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Minor	Medium	**No significant effect (Slight)**	No	Reduction in MDS and therefore effects will be of no greater significance than ES conclusions.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement					
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
SN-O-9	All-offshore	Operation	Operational structures within the Hornsea Four array area and offshore ECC may impact a vessel's use of its Radar, communications and navigation equipment during navigational transits.	**Operational Life:** • Operational life of 35 years. **Array Area:** • Up to 180 WTGs on suction bucket jacket or piled jacket foundations (foundation with largest surface area at the sea surface); • Up to six offshore transformer substations on GBS foundations (foundation with largest surface area at the sea surface); • Up to three offshore HDVC converter substations on GBS foundations (foundation with largest surface area at the sea surface); • Up to one offshore accommodation platform on GBS foundations (foundation with largest surface area at the sea surface); • Minimum spacing of 810 m between structures within the Hornsea Four array area; and • Maintenance Safety Zones of up to 500 m. **Offshore ECC:** • Up to three HVAC booster stations on GBS foundations (foundation with largest surface area at the sea surface); • Minimum spacing of 100 m between the HVAC booster stations; and • Maintenance Safety Zones of up to 500 m.	Largest extent and maximum number of structures over the longest operational period.	Tertiary: Co99	**Likely significant effects without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Negligible	Low	**No significant effect (Not Significant)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Negligible	Low	**No significant effect (Neutral)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area. Based on professional experience and judgement, no significant effect is anticipated.
SN-D-10	All-offshore	Decommissioning	Decommissioning activities associated with the Hornsea Four array area and HVAC booster station search area may cause vessels to be deviated leading to increased encounters and therefore increased vessel to vessel collision risk for all vessels in all weather conditions.	**Decommissioning Timeline:** • Single phase of offshore decommissioning over approximately three years. **Buoyed Decommissioning Areas:** • Buoyed decommissioning area deployed around the maximum extent of the Hornsea Four array area including 500 m decommissioning Safety Zones; and • Buoyed decommissioning area deployed around the HVAC booster stations including 500 m decommissioning Safety Zones.	Largest extent over the longest decommissioning period.	Secondary: Co139 Co179 Tertiary: Co89 Co93 Co99 Co177 Co181	**Likely significant effects without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Minor	Medium	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Minor	Low	**No significant effect (Slight)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area. Based on professional experience and judgement, no significant effect is anticipated.
SN-D-11	All-offshore	Decommissioning	Decommissioning structures within the Hornsea Four array area and HVAC booster station search area will create powered and drifting allision risk for all vessels.	**Decommissioning Timeline:** • One phase of offshore decommissioning over approximately three years. **Array Area:** • Up to 180 pre-decommissioned WTGs on suction bucket jacket or piled jacket foundations (foundation with largest surface area at the sea surface); • Up to six pre-decommissioned offshore transformer substations on GBS foundations (foundation with largest surface area at the sea surface); • Up to three pre-decommissioned offshore HVDC converter substations on GBS foundations (foundation with largest surface area at the sea surface); and • Up to one pre-decommissioned offshore accommodation platform on GBS (foundation with largest surface area at the sea surface). **Offshore ECC:** • Up to three pre-decommissioned HVAC booster stations on GBS foundations with minimum spacing of 100 m (foundation with largest surface area at the sea surface).	Largest extent and maximum number of structures over the longest decommissioning period.	Secondary: Co139 Tertiary: Co89 Co93 Co94 Co99 Co177 Co181	**Likely significant effects without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Minor	Low	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Minor	Low	**No significant effect (Slight)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area. Based on professional experience and judgement, no significant effect is anticipated.
SN-D-12	All-offshore	Decommissioning	Decommissioned cables left in-situ within the Hornsea Four array area and offshore ECC may increase anchor snagging risk for all vessels.	**Decommissioning Timeline:** • Single phase of offshore decommissioning over approximately three years. **Export Cables:** • Maximum export cable length of approximately 654 km (six cables of 109 km each, including within the Hornsea Four array area) left *in-situ* . **Inter Array and Interconnector Cables:** • Maximum length of array cables, up to 600 km left *in-situ*; and • Up to six interconnector cables linking the offshore substations, up to 90 km (1.5 km in total length each) left *in-situ* .	Largest extent and maximum number of structures over the longest decommissioning period. Cables left *in-situ* .	Primary: Co83 Secondary: Co139 Tertiary: Co81 Co89 Co99 Co176 Co181	**Likely significant effects without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Moderate	Low	**No significant effect (Minor Adverse)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Moderate	Low	**No significant effect (Slight)**	No	Reduction in MDS and therefore effects will be of no greater significance than ES conclusions.
SN-D-13	All-offshore	Decommissioning	Decommissioning activities associated with the Hornsea Four array area and offshore ECC may restrict the emergency response capability of existing resources.	**Decommissioning Timeline:** • Single phase of offshore decommissioning over approximately three years. **Decommissioning Vessels:** • Up to eight decommissioning vessels within a given 5 km^2 area with approximately three or four 5 km^2 areas at any one time; • Up to 77 decommissioning vessels for the WTG foundations engaged at any given time with up to 2,880 return trips and up to 180 helicopter return trips; • Up to 38 decommissioning vessels for the WTGs engaged at any given time with up to 900 return trips and up to 135 helicopter return trips; • Up to 18 decommissioning vessels for substation foundations engaged at any given time with up to 180 return trips and up to 42 helicopter return trips; • Up to 18 decommissioning vessels for the substation and accommodation platforms engaged at any given time with up to 270 return trips and up to 63 helicopter return trips; • Up to 18 decommissioning vessels for the inter-array and interconnector cables engaged at any one time with up to 1,488 return trips and up to 396 helicopter return trips; and • Up to 24 decommissioning vessels for the export cables engaged at any given time with up to 408 return trips and up to 800 helicopter return trips.	Maximum number of construction vessels over the longest decommissioning period.	Secondary: Co179 Tertiary: Co99 Co181	**Likely significant effects without secondary mitigation**	**Detailed Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.9.1).	Negligible	Low	**No significant effect (Not Significant)**	**Detailed Assessment**	Change in baseline data/assessment methodology and/or Project description assessment rerun and included in ES.	Negligible	N/A	**No significant effect (Not Significant)**	No	Reduction in MDS and therefore effects will be of no greater significance than ES conclusions.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
AV-C-1	Array Area	Construction	Wind turbine effects on aviation radar systems during the construction process.	N/A as impact scoped out.	N/A as impact scoped out	N/A	**No likely significant effect** During construction, and prior to commissioning WTG blades will not be rotational. As a result, the infrastructure will not be processed and presented onto RDDS by the radar system. Therefore, there will be no impacts on radar systems during the construction phase of the project.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.10.1). During construction, and prior to commissioning WTG blades will not be rotational. As a result, the infrastructure will not be processed and presented onto Radar Data Display Screens (RDDS) by the radar system. Therefore, there will be no impacts on radar systems during the construction phase of the project.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
AV-C-2	Array Area	Construction	Creation of aviation obstacle to fixed wing and rotary aircraft operating offshore.	**Array**: • 180 WTGs with a maximum tip height of 370 m LAT; • Installation vessels – maximum of eight vessels in a given 5 km^2 area and associated construction activity; and • Impact starting from a point of zero infrastructure present to full presence over a single phase of construction over approximately three years.	Maximum number of wind turbines in the Hornsea Four array area. Maximum physical obstruction to aviation operations due to size and number of above sea level infrastructure within the Hornsea Four array area.	Tertiary: Co93 Co99 Co102	**Impact not identified at Scoping**	**Simple Assessment**	Impact not identified at EIA Scoping, scoped in for assessment at PEIR.	Minor	Medium	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Order Limits. Assessment rerun and included in ES.	Minor	Medium	**No significant effect (Slight)**	No	No change to MDS and therefore ES conclusions remain valid.
AV-C-3	Array Area	Construction	Increased air traffic in the area related to wind farm activities in the construction phase may affect the available airspace for other users.	**Array**: • 180 WTGs with a maximum tip height of 370 m LAT; • Up to 135 helicopter return trips for WTG installation; • Up to 180 helicopter return trips for WTG foundation installaion; • Up to 63 helicopter return trips for OSS and accommodation platform installation; • Up to 42 helicopter return trips for OSS and accommodation platform foundation installation; • Up to 396 helicopter return trips for array and interconnector cable installation; • Up to 800 helicopter return trips for export cable installation; and • Impact starting from a point of zero infrastructure present to full presence over a single phase of construction over approximately three years.	Maximum number of helicopter trips as a result of being engaged on works for Hornsea Four causing an increased possibility of aircraft to aircraft collision.	Tertiary: Co93 Co99 Co102	**Impact not identified at Scoping**	**Simple Assessment**	Impact not identified at EIA Scoping, scoped in for assessment at PEIR.	Minor	Low	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Order Limits. Assessment rerun and included in ES.	Minor	Low	**No significant effect (Slight)**	No	No change to MDS and therefore ES conclusions remain valid.
AV-O-1	All-Offshore	Operation	Creation of aviation obstacle to fixed wing and rotary aircraft operating offshore.	**Array**: • 180 WTGs with a maximum tip height of 370 m LAT; • Up to three HVAC Booster Stations along the ECC; and • Impact throughout the operation and maintenance phase of 35 years.	Maximum number of wind turbines in the Hornsea Four array area. Maximum physical obstruction to aviation operations due to size and number of above sea level infrastructure within the Hornsea Four array area.	Tertiary: Co93 Co99 Co102	**Impact not identified at Scoping**	**Simple Assessment**	Impact not identified at EIA Scoping, scoped in for assessment at PEIR.	Minor	Medium	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Order Limits. Assessment rerun and included in ES.	Minor	Medium	**No significant effect (Slight)**	No	No change to MDS and therefore ES conclusions remain valid.
AV-O-2	Array Area	Operation	Wind turbines causing permanent interference on civil and military radar systems.	**Array**: • 180 WTGs with a maximum tip height of 370 m LAT; and • Impact throughout the operation and maintenance phase of 35 years.	These parameters represent the MDS for height of infrastructure within the array which has the greatest potential for interference with radar systems. Impact duration present during operational period.	None	**Likely significant effect without secondary mitigation**	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, Novermber 2018)	Moderate	High	**Significant effect (Moderate Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Order Limits. Assessment rerun and included in ES.	Moderate	High	**Significant effect (Moderate)**	No	No change to MDS and therefore ES conclusions remain valid.
AV-O-3	Array Area	Operation	Wind turbines creating an impact to offshore helicopter operations to oil and gas platforms.	**Array**: • 180 WTGs with a maximum blade tip height of 370 m above LAT; and • Impact throughout the operation and maintenance phase of 35 years.	Wind turbines with the maximum possible blade tip height creating a physical obstruction to aviation operations due to size of above sea level infrastructure.	None	**Likely significant effects without secondary mitigation**	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, Novermber 2018)	Moderate	Low	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Order Limits. Assessment rerun and included in ES.	Minor	Medium	**No significant effect (Slight)**	No	No change to MDS and therefore ES conclusions remain valid.
AV-O-4	Array Area	Operation	Disruption to aircraft using HMRs.	**Array**: • 180 WTGs with a maximum tip height of 370 m LAT; and • Impact throughout the operation and maintenance phase of 35 years.	Maximum number of wind turbines in the Hornsea Four array area. Maximum physical obstruction to aviation operations due to size and number of above sea level infrastructure within the Hornsea Four array area.	Tertiary: Co102	**Impact not identified at Scoping**	**Simple Assessment**	Impact not identified at EIA Scoping, scoped in for assessment at PEIR.	Minor	Low	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Order Limits. Assessment rerun and included in ES.	Moderate	Low	**No significant effect (Slight)**	No	No change to MDS and therefore ES conclusions remain valid.
AV-D-1	Array Area	Decommissioning	Creation of aviation obstacle to fixed wing and rotary aircraft operating offshore.	**Array**: • 180 WTGs with a maximum tip height of 370 m LAT; • Decommissioning vessels - maximum of eight vessels in a given 5 km^2 area; and • Impact starting from a point of full presence of infrastructure to zero presence over a decommissioning period of approximately three years.	Maximum number of wind turbines in the Hornsea Four array area. Maximum physical obstruction to aviation operations due to size and number of above sea level infrastructure within the Hornsea Four array area.	Tertiary: Co93 Co99 Co102 Co181	**Impact not identified at Scoping**	**Simple Assessment**	Impact not identified at EIA Scoping, scoped in for assessment at PEIR.	Minor	Medium	**No significant effect (Minor Adverse)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in Order Limits. Assessment rerun and included in ES.	Minor	Medium	**No significant effect (Slight)**	No	No change to MDS and therefore ES conclusions remain valid.
AV-D-2	Array Area	Decommissioning	Increased air traffic in the area related to wind farm activities may affect the available airspace for other users	**Array**: MDS is identical (or less) to that of the construction phase (AC-C-3).	Maximum number of helicopter trips as a result of being engaged on works for Hornsea Four causing an increased possibility of aircraft to aircraft collision.	Secondary: Co200 Tertiary: Co93 Co99 Co102 Co181	**Impact not identified at Scoping**	**Impact not identified at PEIR**	Impact not identified at PEIR.	N/A	N/A	**N/A**	**Simple Assessment**	Assessment included in ES.	Minor	Low	**No significant effect (Slight)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
MA-C-1	All-Offshore	Construction	Disturbance, removal, intrusion, compression and/or penetration of sediments containing archaeological receptors (material or contexts) leading to total or partial loss in Hornsea Four array area and offshore ECC from construction activities.	N/A as scoped out.	N/A as scoped out.	Primary: Co46 Secondary: Co166 Co167 Tertiary: Co140	**No likely significant effect** The implementation of Commitments will result in a negligible impact on marine archaeology receptors. Previous assessments for Hornsea Project One, Hornsea Project Two and Hornsea Three have shown that this will have no likely significant effect with application of best-practice mitigation.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.7.1).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
MA-C-2	All-Offshore	Construction	Intrusion of piling foundations disturbing or destroying archaeological receptors in Hornsea Four array area and offshore ECC from construction activities.	N/A as scoped out.	N/A as scoped out.	Primary: Co46 Secondary: Co166 Co167 Tertiary: Co140	**No likely significant effect** The implementation of Commitments will result in a negligible impact during piling operations, primarily by ensuring identification of marine archaeology receptors and avoidance. Previous assessments for Hornsea Project One, Hornsea Project Two and Hornsea Three have shown that this will have no likely significant effect with application of best-practice mitigation.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.7.2).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
MA-C-3	All-Offshore	Construction	Compression of stratigraphic contexts containing archaeological material from combined weight of foundation, transition piece, tower, and wind turbines in Hornsea Four array area and offshore ECC from construction activities.	N/A as scoped out.	N/A as scoped out.	Primary: Co46 Secondary: Co166 Co167 Tertiary: Co140	**No likely significant effect** The implementation of Commitments will result in a negligible impact from compression effects. Previous assessments for Hornsea Project One, Hornsea Project Two and Hornsea Three have shown that this will have no likely significant effect with application of best-practice mitigation.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.7.3).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
MA-C-6	All-Offshore	Construction	Disturbance of sediment containing potential archaeological receptors (material and contexts) during cable laying operations.	N/A as scoped out.	N/A as scoped out.	Primary: Co46 Secondary: Co166 Co167 Tertiary: Co140	**No likely significant effect** The implementation of Commitments will result in a negligible impact resulting from cable laying operations, primarily through the identification and avoidance of marine archaeology receptors. Previous assessments for Hornsea Project One, Hornsea Project Two and Hornsea Three have shown that this will have no likely significant effect with application of best-practice mitigation.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.7.4).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
MA-O-7	All-Offshore	Operation	Scour, penetration, draw down and compression effects caused by (a) the presence of Wind Turbine Generator (WTG) and substation foundations, and (b) the exposure and replacement of cables or the use of cable protection measures (such as remedial cable burial), impacting archaeological receptors and exposing such material to natural, chemical or biological processes and causing or accelerating loss of the same.	**Array Area:** **WTG Foundations:** • 110 Gravity Base Structures (GBS) (WTG-type) foundations with associated scour protection, total seabed permanent area 504,540 m^2; and • 70 suction caisson jacket (WTG type) foundations with associated scour protection, total seabed permanent area 296,881 m^2. **Offshore Platforms:** • Up to six small Offshore Substations (OSS) on GBS (Box-type) foundations with association scour protection, and up to three large OSS on GBS (large OSS) foundations with associated scour protection, total seabed permanent area 37,1,250 m^2; and • One offshore accommodation platform on a GBS (Box type) foundations, total seabed permanent area 30,625 m^2. **Array and Interconnector Cable Protection:** • 32 cable crossings (including interconnector cables); • 204,000 m^2 cable/pipe crossings: pre- and post-lay rock berm area; and • 221,000 m^3 cable/pipe crossings: pre- and post-lay rock berm volume. **Array Cable Activities:** • Remedial burial of array cables (42 km total length reburied, 100 m width) = 4,200,000 m^2; • Array cable repairs (up to 10 array cable repairs) = 363,736 m^2; and • Cable protection replacement (25% of cable protection replaced) = 156,000 m^2. **Interconnector Cable Activities:** • Remedial burial of interconnector cables (7 km total length reburied, 100 m width) = 700,000 m^2; • Interconnector cable repairs (up to three interconnector cable repairs) = 20,028 m^2; and • Cable protection replacement (25% of cable protection replaced) = 23,500 m^2. **Offshore ECC:** **High Voltage Alternating Current (HVAC) Booster Stations:** • Up to three HVAC booster stations on GBS (Box-type) foundations with associated scour protection, total seabed permanent area 91,875 m^2. **Offshore Export Cable Protection:** • 54 cable crossings; • 344,000 m^2 cable/pipe crossings: pre- and post-lay rock berm area; and • 372,000 m^3 cable/pipe crossings: pre- and post-lay rock berm volume. **Offshore Export Cable Activities:** • Remedial burial of export cables (1.4 km total length reburied, 100m width) = 1,400,000 m^2; • Export cable repairs (up to 23 export cable repairs) = 153,548 m^2; and • Cable protection replacement (25% of cable protection replaced) = 198,000 m^2.	Design scenario representing the maximum spatial extent of disturbance to archaeological receptors in relation to scour, penetration, draw down and compression effects. It is important to note that three HVDC converter substations in the array area are mutually exclusive with three HVAC booster stations along the ECC in a single transmission system. As secured by C1_1 Draft DCO including Draft DML, a maximum of ten OSS and platforms will be constructed within the Hornsea Four Order Limits, however in order to assess the MDS for both the array and the ECC, the presence of the maximum numbers of OSS and platforms in each area has been considered (ten and three, respectively). As a result, the outcome of the assessment is therefore inherently precautionary.	Primary: Co46 Co201 Secondary: Co166 Co167 Tertiary: Co140	**Likely significant effect without secondary mitigation** Currently only the broad locations of known wrecks and obstructions are available, with the position and extent of the marine archaeological resources at Hornsea Four not yet established.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in baseline data/ assessment methodology and/or Project Description. Assessment rerun and included in ES.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report				Environmental Statement					
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
MA-O-8	Array Area	Operation	Penetration and compression effects on seabed caused by corrective and preventative operation and maintenance activities (via jack-up vessels or divers) leading to total or partial loss of archaeological receptors (material or contexts).	**WTG O&M activities requiring Jack Up Vessels (JUVs):** • Component replacement (1260 events, 300 m^2 disturbances per jack-up event) = 378,000 m^2; • Access ladder replacement (1260 events, 300 m^2 disturbances per jack-up event) = 378,000 m^2; • Foundation anode replacement (1260 events, 300 m^2 disturbances per jack-up event) = 378,000 m^2; and • J-Tube repair/ replacement (360 events, 300 m^2 disturbances per jack-up event) = 108,000 m^2. **Offshore Platform O&M activities requiring JUV or anchoring:** • Offshore substation component replacement (20 events, 300 m^2 disturbances per jack-up event) = 6,000 m^2; • Access ladder replacement (300 events, 300 m^2 disturbances per jack-up event) = 90,000 m^2; • Foundation anode replacement (70 events, 300 m^2 disturbances per jack-up event) = 21,000 m^2; and • J-Tube repair/ replacement (20 events, 300 m^2 disturbances per jack-up event) = 6,000 m^2. **Cable O&M activities requiring JUV or anchoring:** • Array cable repairs (10 events, 300 m^2 disturbance per jack-up event) = 3,000 m^2; • Export cable repairs (23 events, 300 m^2 disturbance per jack-up event) = 6,900 m^2; and • Interconnector cable repairs (3 events, 300 m^2 disturbance per jack-up event) = 900 m^2.	Design scenario representing the maximum spatial extent of disturbance to archaeological receptors in relation to penetration and compression effects.	Primary: Co46 Secondary: Co166 Co167 Tertiary: Co140	**Likely significant effect without secondary mitigation** Currently only the broad locations of known wrecks and obstructions are available, with the position and extent of the marine archaeological resources at Hornsea Four not yet established.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in baseline data/ assessment methodology and/or Project Description. Assessment rerun and included in ES.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.
MA-D-9	Array Area	Decommissioning	Draw-down of sediment into voids left by removed foundations or cables leading to loss of sediment, destabilising archaeological sites and contexts, and exposing such material to natural, chemical or biological processes, and causing or accelerating loss of the same.	**WTGs and Offshore Platforms:** • All structures above the seabed or ground level will be completely removed. The decommissioning sequence will generally be the reverse of the construction sequence; and • Total disturbance as a result of the removal of all structures is assumed to be the same as during installation as set out in MA-O-7. **Cable removal activities:** • Although it is expected that most array and export cables will be left in situ, it has been assumed that all cables will be removed during decommissioning, though any cable protection installed will be left in situ; and • Total disturbance as a result of the removal of all cables is assumed to be the same as during installation as set out in MA-O-7.	Design scenario representing the maximum spatial extent of disturbance to archaeological receptors in relation to draw-down effects. The removal of cables and rock protection is considered the MDS, however the necessity to remove cables and rock protection will be reviewed at the time of decommissioning.	Primary: Co46 Co201 Secondary: Co166 Co167 Tertiary: Co140 Co181	**Likely significant effect without secondary mitigation** Currently only the broad locations of known wrecks and obstructions are available, with the position and extent of the marine archaeological resources at Hornsea Four not yet established.	**Simple Assessment**	Scoped into assessment at PEIR based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible	N/A	**No significant effect (Not Significant)**	**Simple Assessment**	Simple assessment at PEIR concluded No LSE. Change in baseline data/ assessment methodology and/or Project Description. Assessment rerun and included in ES.	Negligible	N/A	**No significant effect (Not Significant)**	No	No change to MDS and therefore ES conclusions remain valid.
MA-D-10	Array Area	Decommissioning	Draw-down of sediment into voids left by removed foundations leading to loss of sediment and penetration and compression effects of jack-up barges and anchoring of decommissioning vessels leading to total or partial loss of archaeological receptors (material or contexts).	N/A as scoped out.	N/A as scoped out.	Primary: Co46 Secondary: Co166 Co167 Tertiary: Co140 Co181	**No likely significant effect** The implementation of Commitments will result in a negligible impact on marine archaeology receptors. Previous assessments for Hornsea Project One, Hornsea Project Two and Hornsea Three have shown that this will have no likely significant effect with application of best-practice mitigation.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.7.7).	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.

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ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
SVR-C-1A	Array Area	Construction	Offshore construction activities of array area visible by day and night from offshore visual receptors	N/A as scoped out.	N/A as scoped out	None	**No likely significant effects** The considerable distance from the area where the majority of movements of people on recreational boats (which are considered to be the most sensitive receptors) are shown to occur.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.11.1). The considerable distance from the area where the majority of movements of people on recreational boats (which are considered to be the most sensitive receptors) are shown to occur.	N/A	N/A	**No LSE**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
SVR-C-1B	Offshore HVAC booster stations	Construction	Offshore construction activities of HVAC booster stations visible by day and night from offshore visual receptors	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**Likely significant effect without secondary mitigation** The considerable distance from the area where the majority of movements of people on recreational boats (which are considered to be the most sensitive receptors) are shown to occur.	**Impact not considered in PEIR**	Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17), this impact is not required to be considered in the ES.	N/A	N/A	**No LSE**	**Not considered in detail in the ES.**	Not considered in detail in the ES. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
SVR-C-2	Offshore HVAC booster stations	Construction	Impact on landscape character of FHHC as a result of views of HVAC booster station and cable construction	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**No likely significant effects** The visual effect on any areas designated for their landscape or scenic quality (i.e. the seaward area of the Heritage Coast) is limited due to distance.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.11.1 - 4.11.3).	Low	Medium	**No LSE (Not Significant)**	**Not considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
SVR-C-3	Offshore HVAC booster stations	Construction	Impact on the views and visual receptors located within the FHHC as a result of views of HVAC booster station and cable construction.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**No likely significant effects** The visual effect on any areas designated for their landscape or scenic quality (i.e. the seaward area of the Heritage Coast) is limited due to distance.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Low	Medium to Medium-High	**No LSE (Not Significant)**	**NNot considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
SVR-C-4	Offshore HVAC booster stations	Construction	Impact on landscape character, views and visual receptors located within FHHC as a result of HVAC booster stations and cable corridor construction lighting	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**No likely significant effects** The visual effect on any areas designated for their landscape or scenic quality (i.e. the seaward area of the Heritage Coast) is limited due to distance.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Medium-Low	Medium	**No LSE (Not Significant)**	**Not considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
SVR-C-5	All-Offshore	Construction	Impact on seascape character of MCAs as a result of physical presence and views of all offshore project elements during construction.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**No likely significant effects** The impact on MCAs will be limited and the areas will remain open and characterised by its existing elements which include oil and gas platforms and offshore wind farms.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Medium	Low to Medium	**No LSE (Not Significant)**	**Not considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
SVR-O-1.3	Offshore HVAC booster stations	Operation & Maintenance	Offshore array area, Offshore export cables and HVAC booster stations night-time impacts on seascape character effects.	N/A as scoped out.	N/A as scoped out	Secondary: Co200	**No likely significant effects** The considerable distance from the area where the majority of movements of people on recreational boats (which are considered to be the most sensitive receptors) are shown to occur.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.11.4). The considerable distance from the area where the majority of movements of people on recreational boats (which are considered to be the most sensitive receptors) are shown to occur.	N/A	N/A	**No LSE**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
SVR-O-5	All-Offshore	Operation & Maintenance	Impact on seascape and landscape character of MCAs as a result of physical presence and views of the array area and HVAC booster stations	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**No likely significant effects** The considerable distance from the area where the majority of movements of people on recreational boats (which are considered to be the most sensitive receptors) are shown to occur.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID:4.11.6).	Negligible to Medium	Low to Medium	**No LSE (Not Significant)**	**Not considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
SVR-O-6	Offshore HVAC booster stations	Operation & Maintenance	Impact on the views and visual receptors located within the FHHC as a result of views of HVAC booster stations.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**No likely significant effects** The visual effect on any areas designated for their landscape or scenic quality (i.e. the seaward area of the Heritage Coast) is limited due to distance.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Low	Medium to Medium-High	**No significant effect (Not Significant)**	**Not considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.

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SVR-O-7	Offshore HVAC booster stations	Operation & Maintenance	Impact on landscape character, views and visual receptors located within FFHHC as a result of HVAC booster station lighting	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**No likely significant effects** The visual effect on any areas designated for their landscape or scenic quality (i.e. the seaward area of the Heritage Coast) is limited due to distance.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Low	Medium	**No significant effect (Not Significant)**	**Not considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
SVR-D-9	All-Offshore	Decommissioning	Impact on seascape of MCAs as a result of physical presence and views of the array area and HVAC booster stations being decommissioned.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**No likely significant effects** The considerable distance from the area where the majority of movements of people on recreational boats (which are considered to be the most sensitive receptors) are shown to occur.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Negligible to Medium	Low to Medium	**No significant effect (Not Significant)**	**Not considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
SVR-D-10	Offshore HVAC booster stations	Decommissioning	Impact on landscape character of FFHHC as a result of views of HVAC booster stations being decommissioned.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**No likely significant effects** The visual effect on any areas designated for their landscape or scenic quality (i.e. the seaward area of the Heritage Coast) is limited due to distance.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Low	Medium	**No significant effect (Not Significant)**	**Not considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
SVR-D-11	All-Offshore	Decommissioning	Impact on the views and visual receptors located within the FFHHC as a result of views of HVAC booster stations being decommissioned.	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**No likely significant effects** The visual effect on any areas designated for their landscape or scenic quality (i.e. the seaward area of the Heritage Coast) is limited due to distance.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Low	Medium to Medium-High	**No significant effect (Not Significant)**	**Not considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.
SVR-D-12	Offshore HVAC booster stations	Decommissioning	Impact on landscape character, views and visual receptors located within FFHHC as a result of HVAC booster station decommissioning lighting	N/A as not considered in detail in the ES.	N/A as not considered in detail in the ES.	Secondary: Co200	**No likely significant effects** The visual effect on any areas designated for their landscape or scenic quality (i.e. the seaward area of the Heritage Coast) is limited due to distance.	**Simple Assessment**	Scoped into assessment based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018).	Medium-Low	Medium	**No significant effect (Not Significant)**	**Not considered in detail in the ES. No likely significant effect identified at PEIR.**	Not considered in detail in the ES. No likely significant effect identified at PEIR. Simple Assessment at PEIR which concluded that there was no likely significant effect. Refined lighting requirements for the HVAC booster stations. Consultation undertaken with relevant stakeholders (ERYC and Natural England) who agreed that based on the distance of the array area and the HVAC Booster Stations from receptors and the refined lighting requirements for the HVAC Booster Stations (secured by the HVAC Booster Station Lighting Plan (Document F2.17)), this impact is not required to be considered in the ES.	N/A	N/A	**No significant effect**	No	N/A as not considered in detail in the ES.

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ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
IOU-AP-1	All Offshore	All phases	Impacts on aggregate extraction or resource areas.	N/A as scoped out	N/A as scoped out	N/A	**No likely significant effect** Given that there are no licensed aggregate dredging sites within 30+km to the Hornsea Four array area or offshore ECC, impacts on aggregate dredging activity will be scoped out of any further consideration in the EIA process.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.1). Given that there are no licensed aggregate dredging sites within 30+ km of the Hornsea Four array area or offshore ECC, impacts on aggregate dredging activity will be scoped out of any further consideration in the EIA process.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
IOU-AP-2	All Offshore	All phases	Impacts on marine disposal sites	N/A as scoped out	N/A as scoped out	N/A	**No likely significant effect** As there are no active, licensed sites within or within 2 km of the Hornsea Four array area (excluding the adjacent Hornsea One and Two sites) or offshore ECC, impacts on disposal sites will be scoped out of any further consideration in the EIA process.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.2). As there are no active, licensed sites within or within 2 km of the Hornsea Four array area (excluding the adjacent Hornsea Project One and Hornsea Project Two sites) or offshore ECC, and significant effects are unlikely to occur at any phase of the project development on licensed disposal sites the receptor will be scoped out of any further consideration in the EIA process.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
IOU-AP-4	All Offshore	All phases	Safety zones and advisory safety distances associated with Hornsea Four infrastructure, may lead to temporary loss or restrict access to cables for repair and maintenance.	N/A as scoped out	N/A as scoped out	Tertiary: Co89 Co107	**No likely significant effect** Restriction of access to the Viking Link for inspection and maintenance activities could be critical to the operator. The operators of active cables are deemed to be of medium vulnerability, medium recoverability and high value.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.4). Restriction of access to the Viking Link Interconnector for inspection and maintenance activities could be critical to the operator. The operators of active pipelines and cables are deemed to be of medium vulnerability, medium recoverability and high value. The suggested embedded mitigation, including crossing and proximity agreements with known existing pipeline and cables operators, will ensure access for cable or pipeline repair and maintenance, and as such does not need to be considered any further in the assessment.	N/A	N/A	**No significant effect**	**Scoped Out**	N/A as scoped out.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
IOU-AP-5	All Offshore	All phases	Displacement of recreational craft and recreational fishing vessels resulting in a loss of recreational resource.	N/A as scoped out	N/A as scoped out	Primary: Co2 Tertiary Co89	**Impact not identified at Scoping**	**Scoped Out**	Impact not identified at EIA Scoping, scoped out for assessment at PEIR.	N/A	N/A	**No significant effect**	**Scoped Out**	A consideration of marine recreational activity was not included within the Scoping process. However, consideration of impacts were considered at PEIR, although the Applicant considered that there will be no significant impacts and therefore scoped out further consideration of impacts on marine recreational receptors at PEIR. No objection came forward from consultees in s42 responses.	N/A	N/A	**No significant effect**	No	N/A as scoped out.
IOU-C-1	All Offshore	Construction	Hornsea Four infrastructure, safety zones and advisory safety distances may restrict access to the proposed Endurance CCS Site and associated infrastructure.	**Total temporary reduction:** **WTG and platforms:** • Seabed preparation for 110 GBS (Wind Turbine Generator (WTG) type) foundations for WTGs = 411,321 m^2; • Seabed preparation for 70 suction caisson jacket (WTG type) foundations for WTGs = 198,870 m^2; • Seabed preparation for OSS within the array (three large OSS on GBS (large OSS) foundations and six small OSS on suction caisson jacket (small OSS) = 156,594 m^2; • Seabed preparation for one accommodation platform on a suction caisson jacket (small OSS) foundation = 12,321 m^2; **Offshore cables:** • Boulder and sandwave clearance for array cables (600 km length, 40 m width) = 24,000,000 m^2; • Burial of array cables (600 km length, 1.5 m width) = 9,000,000 m^2; • Boulder and sandwave clearance for interconnector cables (90 km length, 40 m width) = 3,600,000 m^2; • Burial of interconnector cables (90 km length, 1.5 m width) = 1,350,000 m^2; and **Safety Zones:** **WTG, platforms and HVAC platforms:** • 500 m exclusion zones around construction activities = 790,000 m^2 per structure under construction at any one time; and • 50 m exclusion zones around incomplete structures = 7,854 m^2 per partially constructed structure at any one time. **Offshore Cables:** • Roaming 500 m safe passing distance for mobile installation vessels, which may, in exceptional circumstances, be increased to 1,000 m dependant on the nature of the installation works. **Total permanent reduction:** **WTG and platforms:** • Total seabed area for 180 WTG on GBS (WTG-type) foundations and associated scour protection footprint = 1,222,724 m^2. • Total seabed area for OSS in the array (three large OSS on GBS (large OSS) foundations and six small OSS on GBS (Box-type) foundations, including associated scour protection = 371,250 m^2; and • Total seabed area for one offshore accommodation platform within the array on a small OSS foundation (GBS (Box-type)), including associated scour protection = 30,625 m^2. **Offshore cables:** • Cable protection for array cables = 624,000 m^2; • Cable protection for interconnector cables = 94,000 m^2; and • Pre- and post-lay rock berm area for 32 cables crossings within the array area = 204,000 m^2.	Parameters that create the greatest reduction in available sea room and are most likely to give rise to potential interactions with CCS activities in terms of area affected and duration.	Primary: Co201 Secondary: Co139 Tertiary: Co57 Co81 Co89 Co93 Co94 Co107	**Impact not identified at Scoping and therefore scoped out of PEIR**	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.3).	N/A	N/A	**No significant effect**	**Detailed Assessment**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.3). Impact re-considered in the ES following consultation and scoped in for assessment at ES.	Moderate	High	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
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IOU-C-2	All Offshore	Construction	Hornsea Four infrastructure, safety zones and advisory safety distances may lead to a temporary impact upon access to existing pipelines and wells for repairs and maintenance.	**<u>Total temporary reduction:</u>** **Wind Turbine Generators (WTG) and platforms:** • Seabed preparation for 180 WTG on GBS (WTG-type) foundations = 673,071 m^2; • Seabed preparation for offshore transformer substations (OSS) within the array (three large OSS on GBS (large OSS) foundations and six small OSS on suction caisson jacket (small OSS) = 156,594 m^2; • Seabed preparation for one accommodation platform on a suction caisson jacket (small OSS) foundation = 12,321 m^2; **Offshore cables:** • Boulder and sandwave clearance for array cables (600 km length, 40 m width) = 24,000,000 m^2; • Burial of array cables (600 km length, 1.5 m width) = 9,000,000 m^2; • Boulder and sandwave clearance for interconnector cables (90 km length, 40 m width) = 3,600,000 m^2; • Burial of interconnector cables (90 km length, 1.5 m width) = 1,350,000 m^2; and **HVAC Offshore platforms:** • Seabed preparation for three HVAC booster stations on suction caisson jacket (small OSS) foundations = 36,963 m^2; **HVAC Offshore Cables:** • Boulder and sandwave clearance for export cables (654 km length, 40 m width) = 26,160,000 m^2; • Burial of export cables (654 km length, 1.5 m width) = 9,810,000 m^2; • Cable jointing (four joints per cables, six cables and 3,500 m2 per joint) = 84,000 m^2; and **Safety Zones:** **WTG, platforms and HVAC platforms:** • 500 m exclusion zones around construction activities = 790,000 m^2 per structure under construction at any one time; and • 50 m exclusion zones around incomplete structures = 7,854 m^2 per partially constructed structure at any one time. **Offshore and HVAC Cables:** • Roaming 500 m safe passing distance for mobile installation vessels, which may, in exceptional circumstances, be increased to 1,000 m dependant on the nature of the installation works. **Construction Duration:** Offshore construction over a three-year period, including: • Foundation installation = 12 months; • Turbine installation = 24 months • Platform installation = two months per platform; and • Cable installation = 24 months. **<u>Total permanent reduction:</u>** **WTG and platforms:** • Total seabed area for 180 WTG on GBS (WTG-type) foundations and associated scour protection footprint = 1,222,724 m^2. • Total seabed area for OSS in the array (three large OSS on GBS (large OSS) foundations and six small OSS on GBS (Box-type) foundations, including associated scour protection = 371,250 m^2; and • Total seabed area for one offshore accommodation platform within the array on a small OSS foundation (GBS (Box-type)), including associated scour protection = 30,625 m^2. **Offshore cables:** • Cable protection for array cables = 624,000 m^2; • Cable protection for interconnector cables = 94,000 m^2; and • Pre- and post-lay rock berm area for 32 cables crossings within the array area = 204,000 m^2. **HVAC Offshore platforms:** • Total seabed area for three HVAC booster stations on small OSS GBS (Box-type) foundations, including associated scour protection = 91,875 m^2. **HVAC Offshore cables:** • Cable protection for export cables = 792,000 m^2; • Pre- and post-lay rock berm area for 54 cable crossings within the offshore ECC = 344,000 m^2.	Parameters that create the greatest reduction in available sea room and the greatest disruption to vessel access in terms of area affected and duration.	<u>Primary</u>: Co201 <u>Secondary</u>: Co139 <u>Tertiary</u>: Co57 Co81 Co89 Co94 Co96 Co98 Co102 Co107 Co200	**No likely significant effect** Restriction of access to the pipelines for inspection and maintenance activities could be critical to the operator. The operators of active pipelines are deemed to be of medium vulnerability, medium recoverability and high value.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.4).	N/A	N/A	**No significant effect**	**Detailed Assessment**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.4). Impact re-considered in the ES following consultation and scoped in for assessment at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-C-3	All Offshore	Construction	The piling of Hornsea Four wind turbine and substation foundations will generate vibration that may cause damage to existing pipelines and wells.	**Array Area (spatial MDS):** • 180 monopile WTG foundations (1.5 m diameter) with two foundations installed concurrently; • Six small OSS (1.5 m diameter monopiles); • Three large OSS (1.5 m diameter monopiles); • One offshore accommodation platform (1.5 m diameter monopiles); • Maximum hammer energy 5,000 kJ; • Four hour piling duration; • 1.2 days per monopile; • 216 piling days (single vessel); • 106 piling days (two vessels); and • Maximum separation distance between piling events will be the maximum extent of the array area. **Array Area (temporal MDS):** • 180 WTG on piled jacket (WTG-type) foundations (three 4 m diameter pin piles per jacket) – 540 pin piles; • Six OSS on piled jacket (small OSS) foundations (six legs per jacket and four 3.5 m pin piles per leg) – 144 pin piles; • Three OSS on piled jacket (large OSS) foundations (eight legs per jacket and two piles per leg) – 48 pin piles; • One offshore accommodation platform on a piled jacket (small OSS) foundation (six legs and four 3.5 m pin piles per leg – 24 pin piles; • Total of 756 pin piles in the array; • Maximum hammer energy 3,000 kJ; • 1.5 days per jacket foundation; • 270 piling days (single vessel); and • 135 days (two vessels). **HVAC Booster Area of Search (spatial MDS):** • Three HVAC booster stations on 1.5 m diameter monopile foundations; • Maximum hammer energy 5,000 kJ; • Four hour piling duration; and • 1.2 days per monopile. **HVAC Booster Area of Search (temporal MDS):** • Three HVAC booster stations on piled jacket (small OSS) foundations (six legs per jacket and four 3.5 m diameter pin piles per leg) – 72 pin piles.	Parameters that equates to the largest number of piling activities and for the greatest duration.	<u>Secondary</u>: Co139 <u>Tertiary</u>: Co107	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.

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ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
IOU-C-4	All Offshore	Construction	Anchor snagging or dropping from vessel traffic associated with Hornsea Four that may cause damage to existing pipelines and wells.	**WTG Foundation Installation (if gravity base foundation WTG type):** • Six installation vessels (two Jack Up Vessels (JUV), two anchored or four DP2 or six Tugs) (90 return trips if two JUVs, two anchored or four DP2; 540 if six tugs); • 19 support vessels (900 return trips); • 40 Transport / Feeder vessels (incl. Tugs) (720 return trips); • 12 Dredging vessels (720 return trips); and • Duration: 12 months. **WTG Installation:** • Two installation vessels (90 return trips); • 12 Support vessels (270 return trips); • 24 transport (540 return trips); and • Duration: 24 months. **Substation foundation installation (all OSSs and the accommodation platform):** • Two installation vessels (24 return trips); • 12 Support vessels (108 return trips); • Four transport (48 return trips); and • Duration: 12 months. **Substation installation (all OSSs and the accommodation platform):** • Two installation vessels (36 return trips); • 12 Support vessels (162 return trips); • Four transport (72 return trips); and • Duration: 24 months. **Array and offshore interconnector cables installation:** • Three main laying vessels (204 return trips); • Three main burying vessels (204 return trips); • 12 support vessels (1,080 return trips); and • Duration: 24 months. **Offshore export cables installation:** • Three main laying vessels (96 return trips); • Three main jointing vessels (72 return trips); • Three main burying vessels (96 return trips); • 15 support vessels (1,44 return trips); and • Duration: 24 months.	Parameters that create the greatest reduction in available sea room and are most likely to give rise to potential interactions with existing pipelines and wells.	Secondary: Co139 Tertiary: Co107	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-C-5	All Offshore	Construction	Allision risk to oil and gas platforms due to vessels being deviated from existing routes due to the presence of Hornsea Four infrastructure	**The presence of the installed Hornsea Four infrastructure:** • Construction of 180 WTG utilising the entire array area (468 km^2) • 10 offshore platforms within the array area (up to six OSS, three convertor substations and one accommodation platform) • Three HVAC booster stations within the HVAC booster station area of search **Safety zones:** • 500 m safety zones around infrastructure under construction • 50 m safety zones around incomplete structures **Duration:** • Anticipated three year constuction phase.	Parameters that create the greatest reduction in available sea room and are most likely to give rise to deviation of shipping from existing routes.	Secondary: Co139 Tertiary: Co81 Co89 Co93	**Impact not identified at Scoping**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area therefore not decreasing proximity to any third party installation. The conclusion of no significant effect remains to be confirmed.
IOU-C-6	All Offshore	Construction	Proximity to Hornsea Four infrastructure and associated works may restrict or hamper vessel access to oil and gas platforms and subsurface infrastructure during certain periods (e.g., allowable weather).	**The presence of the installed Hornsea Four infrastructure within the array area:** • Construction of 180 WTG utilising the entire array area (468 km^2) • 10 offshore platforms within the array area (up to six OSS, three convertor substations and one accommodation platform) **The WTG dimensions are as follows:** • 42.43 m minimum height of lowest blade tip above Lowest Astronomical Tide (LAT) • 370 m maximum blade tip height above LAT • 305 m maximum rotor blade diameter **Safety zones:** • 500 m safety zones around infrastructure under construction • 50 m safety zones around incomplete structures **Duration:** • Anticipated three year constuction phase.	Parameters that create the greatest disruption to vessel access in terms of area affected and duration.	Secondary: Co139 Tertiary: Co81 Co89 Co93 Co94	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	Reduction in MDS (array layout extent) and therefore effects will be of no greater significance than ES conclusions.
IOU-C-7	All Offshore	Construction	Wind turbines and associated works may result in deviations to routine support vessel routeing to oil and gas platforms.	As per MDS above (Impact ID IOU-C-6)	As MDS justification above (Impact ID IOU-C-7).	Secondary: Co139 Tertiary: Co81 Co89 Co93 Co94	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area therefore not decreasing proximity to any third party installation. The conclusion of no significant effect remains to be confirmed.
IOU-C-8	All Offshore	Construction	Hornsea Four infrastructure, safety zones, advisory safety distances and piling may restrict or cause acoustic interference with potential seismic survey activity	**Array Area (spatial MDS):** • 180 monopile WTG foundations (1.5 m diameter) with two foundations installed concurrently; • Six small OSS (1.5 m diameter monopiles); • Three large OSS (1.5 m diameter monopiles); • One offshore accommodation platform (1.5 m diameter monopiles); • Maximum hammer energy 5,000 kJ; • Four hour piling duration; • 1.2 days per monopile; • 216 piling days (single vessel); • 106 piling days (two vessels); and • Maximum separation distance between piling events will be the maximum extent of the array area. **Array Area (temporal MDS):** • 180 WTG on piled jacket (WTG-type) foundations (three 4 m diameter pin piles per jacket) – 540 pin piles; • Six OSS on piled jacket (small OSS) foundations (six legs per jacket and four 3.5 m pin piles per leg) – 144 pin piles; • Three OSS on piled jacket (large OSS) foundations (eight legs per jacket and two piles per leg) – 48 pin piles; • One offshore accommodation platform on a piled jacket (small OSS) foundation (six legs and four 3.5 m pin piles per leg – 24 pin piles; • Total of 756 pin piles in the array; • Maximum hammer energy 3,000 kJ; • 1.5 days per jacket foundation; • 270 piling days (single vessel); and • 135 days (two vessels). **HVAC Booster Area of Search (spatial MDS):** • Three HVAC booster stations on 1.5 m diameter monopile foundations; • Maximum hammer energy 5,000 kJ; • Four hour piling duration; and • 1.2 days per monopile. **HVAC Booster Area of Search (temporal MDS):** • Three HVAC booster stations on piled jacket (small OSS) foundations (six legs per jacket and four 3.5 m diameter pin piles per leg) – 72 pin piles.	Parameters that create the greatest disruption to seismic survey activities in terms of area affected and duration.	Secondary: Co139 Tertiary: Co57 Co89 Co93 Co94 Co96 Co98 Co102 Co107	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
IOU-C-9	All Offshore	Construction	Drilling and the installation of oil and gas infrastructure has the potential to be restricted by the presence of Hornsea Four infrastructure, safety zones and advisory safety distances	**Total temporary reduction:** **WTG and platforms:** • Seabed preparation for 180 WTG on GBS (WTG-type) foundations = 673,071 m^2; • Seabed preparation for OSS within the array (three large OSS on GBS (large OSS) foundations and six small OSS on suction caisson jacket (small OSS) = 156,594 m^2; • Seabed preparation for one accommodation platform on a suction caisson jacket (small OSS) foundation = 12,321 m^2; **Offshore cables:** • Boulder and sandwave clearance for array cables (600 km length, 40 m width) = 24,000,000 m^2; • Burial of array cables (600 km length, 1.5 m width) = 9,000,000 m^2; • Boulder and sandwave clearance for interconnector cables (90 km length, 40 m width) = 3,600,000 m^2; • Burial of interconnector cables (90 km length, 1.5 m width) = 1,350,000 m^2; and **HVAC Offshore platforms:** • Seabed preparation for three HVAC booster stations on suction caisson jacket (small OSS) foundations = 36,963 m^2; **HVAC Offshore Cables:** • Boulder and sandwave clearance for export cables (654 km length, 40 m width) = 26,160,000 m^2; • Burial of export cables (654 km length, 1.5 m width) = 9,810,000 m^2; • Cable jointing (four joints per cables, six cables and 3,500 m2 per joint) = 84,000 m^2; and **Safety Zones:** **WTG, platforms and HVAC platforms:** • 500 m exclusion zones around construction activities = 790,000 m^2 per structure under construction at any one time; and • 50 m exclusion zones around incomplete structures = 7,854 m^2 per partially constructed structure at any one time. **Offshore and HVAC Cables:** • Roaming 500 m safe passing distance for mobile installation vessels, which may, in exceptional circumstances, be increased to 1,000 m dependant on the nature of the installation works. **Construction Duration:** • Offshore construction over a three-year period, including: • Foundation installation = 12 months; • Turbine installation = 24 months • Platform installation = two months per platform; and • Cable installation = 24 months. **Total permanent reduction:** WTG and platforms: • Total seabed area for 180 WTG on GBS (WTG-type) foundations and associated scour protection footprint = 1,222,724 m^2. **Offshore platforms:** • Total seabed area for OSS in the array (three large OSS on GBS (large OSS) foundations and six small OSS on GBS (Box-type) foundations, including associated scour protection = 371,250 m2; and • Total seabed area for one offshore accommodation platform within the array on a small OSS foundation (GBS (Box-type)), including associated scour protection = 30,625 m2. **Offshore cables:** • Cable protection for array cables = 624,000 m2; • Cable protection for interconnector cables = 94,000 m2; and • Pre- and post-lay rock berm area for 32 cables crossings within the array area = 204,000 m2. **HVAC Offshore platforms:** • Total seabed area for three HVAC booster stations on small OSS GBS (Box-type) foundations, including associated scour protection = 91,875 m2. **HVAC Offshore cables:** • Cable protection for export cables = 792,000 m2; • Pre- and post-lay rock berm area for 54 cable crossings within the offshore ECC = 344,000 m2.	Parameters that create the greatest disruption to oil and gas drilling and installation activities, including oil and gas decommissioning in terms of area affected and duration.	Secondary: Co139 Tertiary: Co57 Co81 Co89 Co94 Co96 Co98 Co102 Co107	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-O-10	All Offshore	Operation and Maintenance	Hornsea Four infrastructure, safety zones and advisory safety distances may restrict access to the proposed Endurance CCS Site and associated infrastructure.	**Total permanent reduction:** **WTG and platforms:** • Total seabed area for 180 GBS (WTG type) foundations and associated scour protection footprint = 1,222,724 m^2; • Minimum turbine spacing of 810 m. • Total seabed area for OSS in the array (three large OSS on GBS (large OSS) foundations and six small OSS on GBS (Box-type) foundations, including associated scour protection = 371,250 m^2; and • Total seabed area for one offshore accommodation platform within the array on a small OSS foundation (GBS (Box-type), including associated scour protection = 30,625 m^2. **Offshore cables:** • Cable protection for array cables = 624,000 m^2; • Cable protection for interconnector cables = 94,000 m^2; and • Pre- and post-lay rock berm area for 32 cables crossings within the array area = 204,000 m^2. **Temporary reduction from maintenance activities:** **WTG Activities:** • Component replacement = 378,000 m^2; • Access ladder replacement = 378,000 m^2; • Foundation anode replacement = 378,000 m^2; and • J-Tube repair/ replacement = 108,000 m^2. **Offshore substation and accommodation activities:** • Offshore substation component replacement = 6,000 m^2; • Access ladder replacement = 90,000 m^2; • Foundation anode replacement = 21,000 m^2; and • J-Tube repair/ replacement = 6,000 m^2. **Array cable activities:** • Remedial burial of array cables (42 km total length reburied) = 4,200,000 m^2; • Array cable repairs = 363,736 m^2; • Cable protection replacement = 156,000 m^2; • Ten array cable repair events over lifetime; and • Duration of each cable repair event: approximately three months. **Interconnector cable activities:** • Remedial burial of interconnector cables (7 km total length reburied) = 700,000 m^2; • Interconnector cable repairs = 20,028 m^2; • Cable protection replacement = 23,500 m^2; • Three interconnector cable repair events over lifetime; and • Duration of each cable repair event approximately three months. **ECC Activities:** • Remedial burial of export cables (1.4 km total length reburied) = 1,400,000 m^2;	Parameters that create the CCS activities in terms of area affected and duration.	Primary: Co201 Secondary: Co139 Tertiary: Co57 Co81 Co89 Co93 Co94 Co107	**Impact not identified at Scoping and therefore scoped out of PEIR**	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.3).	N/A	N/A	**No significant effect**	**Detailed Assessment**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.3). Impact re-considered in the ES following consultation and scoped in for assessment at ES. At the Scoping stage, it was noted that the proposed Endurance saline deposit reservoir overlaps in part with the northern part of the Hornsea Four array area and offshore extent of the offshore ECC. The Endurance reservoir was the identified CO^2 store for the White Rose CCS project being promoted by Capture Power Limited and National Grid Carbon Limited, to accept carbon produced by a proposed coal-fired power station at the existing Drax site in North Yorkshire. Development consent was refused for the power station project in 2016, together with an application for the connecting pipeline to the offshore CO^2 storage site which was refused in 2017. At the time of Scoping, there were no active CCS projects that would make use of the Endurance reservoir and this impact was therefore scoped out of assessment. In May 2019, Drax Group, Equinor and National Grid Ventures signed a Memorandum of Understanding, committing to work together to explore opportunities for creating a zero carbon cluster in the Humber (now known as Zero Carbon Humber), utilising the Endurance reservoir. In paralliel, in October 2019 the Applicant was approached by BP on behalf of Net Zero Teesside who are also looking to use the Endurance reservoir for CO^2 storage. Since then, consultation has been ongoing between the Applicant and both National Grid Ventures and BP regarding the two potential projects connecting into the Endurance reservoir. At the time of writing, no planning applications have been submitted in relation to these projects, with only Net Zero Teesside's onshore scheme listed on PINS Programme of Projects. Both projects are also in the early stages of development with only high-level information available.	Moderate	High	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	Project Element	Original Project Phase	Project Activity and Impact	Maximum Design Scenario (MDS)	Justification for MDS	Commitments	Likely Significance of Effect at Scoping Stage and Justification	Hornsea Four Position at PEIR	Justification for position at PEIR	Magnitude at PEIR	Sensitivity at PEIR	Likely Significant Effect at PEIR?	Hornsea Four Position at ES	Justification for position at ES	Magnitude at ES	Sensitivity at ES	Likely Significant Effect at ES?	Endurance Overlap Scenario - Any Change to Significance Conclusion?	Justification for Position
				• Remedial burial of export cables (14 km total length rebured) = 1,400,000 m²; • Export cable repairs = 153,548 m²; • Cable protection replacement = 198,000 m²; and • Duration of each cable repair event: approximately three months **Safety Zones:** • 500 m safety zones around manned offshore platforms; and • Temporary 500 m safety zones around turbines and offshore platforms undergoing major maintenance. **Duration:** • Operational design life of 35 years.																
IOU-O-11	All Offshore	Operation and Maintenance	Hornsea Four infrastructure, safety zones and advisory safety distances may lead to a temporary impact upon access to existing pipelines and wells for repairs and maintenance.	As per MDS for "Hornsea Four infrastructure, safety zones and advisory safety distances may restrict access to the proposed Endurance CCS Site and associated infrastructure (IOU-O-10)."	Parameters that create the greatest reduction in available sea room and the greatest disruption to vessel access in terms of area affected and duration.	Secondary: Co139 Tertiary: Co 57 Co81 Co89 Co94 Co96 Co98 Co102	**No likely significant effect** Restriction of access to the pipelines for inspection and maintenance activities could be critical to the operator. The operators of active pipelines are deemed to be of medium vulnerability, medium recoverability and high value.	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-O-12	All Offshore	Operation and Maintenance	Anchor snagging or dropping from vessel traffic associated with Hornsea Four that may cause damage to existing pipelines and wells.	**The presence of the installed Hornsea Four infrastructure:** **Total of 1,693 return vessel trips per year:** • 180 WTGs utilising the entire array area (468 km²); • 10 offshore platforms within the array area (up to six small OSS, three large OSS and one accommodation platform); • Three HVAC booster stations within the HVAC booster station area of search. **Total of 1,433 return vessel trips per year:** • 124 jack-up vessel trips; • 1,205 crew vessels wind turbine visits; and • 104 supply vessel accommodation platform visits. **Safety zones:** • 500 m safety zone around manned offshore platforms; and • Temporary 500 m safety zones around turbines and offshore platforms undergoing major maintenance. **Duration:** • Anticipated design life for Hornsea Four of 35 years.	Parameters that create the greatest reduction in available sea room and are most likely to give rise to potential interactions with existing pipelines and wells.	Secondary: Co139 Tertiary: Co107	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-O-13	All Offshore	Operation and Maintenance	Allision risk to oil and gas platforms due to vessels being deviated from existing routes due to the presence of Hornsea Four infrastructure	**Installed Hornsea Four infrastructure:** • WTGs and offshore platforms utilising the entire array area (468 km²); and • Three HVAC booster stations within the HVAC booster station area of search **Safety zones:** • 500 m safety zones around infrastructure undergoing maintenance • Temporary 500 m safety zones around turbines and offshore platforms undergoing major maintenance. **Duration:** • Anticipated design life of 35 years	Parameters that create the greatest reduction in available sea room and are most likely to give rise to deviation of shipping from existing routes.	Secondary: Co139 Tertiary: Co81 Co89 Co93	**Impact not identified at Scoping**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area therefore not decreasing proximity to any third party installation. The conclusion of no significant effect remains to be confirmed.
IOU-O-14	All Offshore	Operation and Maintenance	Proximity Hornsea Four infrastructure and associated works may restrict or hamper vessel access to oil and gas platforms and subsurface infrastructure during certain periods (e.g., allowable weather).	As per MDS for "Allision risk to oil and gas platforms due to vessels being deviated from existing routes due to the presence of Hornsea Four infrastructure (IOU-O-13)."	Parameters that create the greatest disruption to vessel access in terms of area affected and duration.	Secondary: Co139 Tertiary: Co81 Co89 Co93	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area therefore not decreasing proximity to any third party installation. The conclusion of no significant effect remains to be confirmed.
IOU-O-15	All Offshore	Operation and Maintenance	Wind turbines and associated works may result in deviations to routine support vessel routeing to oil and gas platforms.	As per MDS for "Allision risk to oil and gas platforms due to vessels being deviated from existing routes due to the presence of Hornsea Four infrastructure (IOU-O-13)."	As MDS justification above (Impact ID IOU-O-16).	Secondary: Co139 Tertiary: Co89 Co93 Co94	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area therefore not decreasing proximity to any third party installation. The conclusion of no significant effect remains to be confirmed.
IOU-O-16	Array Area	Operation and Maintenance	The presence of new wind turbines in previously open sea areas may cause interference with the performance of the REWS located on oil and gas platforms.	**The presence of the installed Hornsea Four infrastructure within the array area:** • 180 WTG utilising the entire array area (468 km²) • Up to 10 offshore platforms within the array area (up to six OSS, three convertor substations and one accommodation platform) **The wind turbine dimensions are as follows:** • 42.43 m minimum height of lowest blade tip above LAT • 370 m maximum blade tip height above LAT • 305 m maximum rotor blade diameter **Duration:** • Anticipated design life of 35 years.	Parameters that present the greatest radar cross section.	Tertiary: Co89 Co93	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area. The conclusion of no significant effect remains to be confirmed.
IOU-O-17	Array Area	Operation and Maintenance	The presence of new wind turbines in previously open sea areas will deviate vessels which may cause a change in CPA and TCPA alarms on oil and gas platforms equipped with REWS.	As per MDS for "The presence of new wind turbines in previously open sea areas may cause interference with the performance of the REWS located on oil and gas platforms (IOU-O-16)."	Parameters that create the greatest number of turbines with the greatest radar cross section.	Tertiary: Co89 Co93	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area. The conclusion of no significant effect remains to be confirmed.
IOU-O-18	All Offshore	Operation and Maintenance	Hornsea Four infrastructure and associated works may restrict or hamper helicopter access to oil and gas platforms	**The presence of the installed Hornsea Four infrastructure within the array area:** • 180 WTG utilising the entire array area (468 km²) • 10 offshore platforms within the array area (up to six OSS, three convertor substations and one accommodation platform) **The wind turbine dimensions are as follows:** • 42.43 m minimum height of lowest blade tip above LAT • 370 m maximum blade tip height above LAT • 305 m maximum rotor blade diameter • Minimum turbine spacing of 810 m. **Offshore platforms within the Array Area:** • A single accommodation platform with max height 64 m above LAT; • Six small platforms with a height of 90 m; and • Three large offshore platforms with height of 100 m LAT **Duration:** • Anticipated design life of 35 years.	The maximum number of wind turbines and other structures within the array area affecting the operation of helicopters approaching or departing from oil and gas platforms.	Tertiary: Co99	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	Reduction in MDS (array layout extent) and therefore effects will be of no greater significance than ES conclusions.

Impact Background							EIA Scoping	Preliminary Environmental Information Report					Environmental Statement						
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
IOU-O-19	All Offshore	Operation and Maintenance	Hornsea Four infrastructure and associated works may restrict or hamper helicopter access to oil and gas vessels	**The presence of the installed Hornsea Four infrastructure within the Array Area:** • Up to 180 WTGs utilising the entire array area (468 km²); • Up to 10 offshore platforms within the array area (up to six small OSS, three large OSS and one accommodation platform) **The wind turbine dimensions are as follows:** • 42.43 m minimum height of lowest blade tip above LAT • 370 m maximum blade tip height above LAT • 305 m maximum rotor blade diameter • Minimum turbine spacing of 810 m. **Offshore platforms within the Array Area:** • A single accommodation platform with max height 64 m above LAT; • Six small platforms with a height of 90 m; and • Three large offshore platforms with height of 100 m LAT **The presence of the installed HVAC Booster Stations:** • Three HVAC substations with height of 100 m LAT • Minimum spacing of 100 m. **Duration:** • Anticipated design life of 35 years	As above in relation to helicopter access to oil and gas vessels.	Tertiary: Co99	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	Reduction in MDS (array layout extent) and therefore effects will be of no greater significance than ES conclusions.
IOU-O-20	All Offshore	Operation and Maintenance	Hornsea Four infrastructure, safety zones, advisory safety distances and piling may restrict or cause acoustic interference with potential seismic survey activity	As per MDS for "Hornsea Four infrastructure, safety zones and advisory safety distances may restrict access to the proposed Endurance CCS Site and associated infrastructure (IOU-O-1.0)".	Parameters that create the greatest disruption to seismic survey activities in terms of area affected and duration.	Secondary: Co139 Tertiary: Co57 Co89	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-O-21	All Offshore	Operation and Maintenance	Drilling and the installation of oil and gas infrastructure has the potential to be restricted by the presence of Hornsea Four infrastructure, safety zones and advisory safety distances	As per MDS for "Hornsea Four infrastructure, safety zones and advisory safety distances may restrict access to the proposed Endurance CCS Site and associated infrastructure (IOU-O-1.0)".	Parameters that create the greatest disruption to oil and gas drilling and installation activities in terms of area affected and duration.	Secondary: Co139 Tertiary: Co57 Co81 Co89	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-O-22	Array Area	Operation and Maintenance	Impact of physical presence of wind turbines in Hornsea Four array area on microwave links.	As per MDS for "The presence of new wind turbines in previously open sea areas may cause interference with the performance of the REWS located on oil and gas platforms (IOU-O-1.6)."	Parameters that create the greatest number of turbines with the greatest radar cross section.	Tertiary: Co89 Co93	**Impact not identified at Scoping**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	Reduction in MDS (array layout extent) and therefore effects will be of no greater significance than ES conclusions.
IOU-D-23	All Offshore	Decommissioning	Hornsea Four infrastructure, safety zones and advisory safety distances may restrict access to the proposed Endurance CCS Site and associated infrastructure.	In the absence of detailed methodologies and schedules, decommissioning works and associated implications for access to existing subsea cables for repairs and maintenance are considered analogous with those assessed for the construction phase. • Decommissioning of 180 WTG • Decommissioning of 10 offshore platforms within the array area (six small OSS, three convertor substations and one accommodation platform) • Decommissioning of six export cables • Removal of cables utilising the entire offshore ECC **Safety zones:** • 500 m safety zone around infrastructure being decommissioned **Duration:** • Decommissioning period of 3 years.	Parameters that create the CCS activities in terms of area affected and duration.	Secondary: Co139 Tertiary: Co57 Co81 Co89 Co93 Co94 Co107 Co181	**Impact not identified at Scoping and therefore scoped out of PEIR**	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.3).	N/A	N/A	**No significant effect**	**Detailed Assessment**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.3). Impact re-considered in the ES following consultation and scoped in for assessment at ES. At the Scoping stage, it was noted that the proposed Endurance saline deposit reservoir overlaps in part with the northern part of the Hornsea Four array area and offshore extent of the offshore ECC. The Endurance reservoir was the identified CO^2 store for the White Rose CCS project being promoted by Capture Power Limited and National Grid Carbon Limited, to accept carbon produced by a proposed coal-fired power station at the existing Drax site in North Yorkshire. Development consent was refused for the power station project in 2016, together with an application for the connecting pipeline to the offshore CO^2 storage site which was refused in 2017. At the time of Scoping, there were no active CCS projects that would make use of the Endurance reservoir and this impact was therefore scoped out of assessment. In May 2019, Drax Group, Equinor and National Grid Ventures signed a Memorandum of Understanding, committing to work together to explore opportunities for creating a zero carbon cluster in the Humber (now known as Zero Carbon Humber), utilising the Endurance reservoir. In parallel, in October 2019 the Applicant was approached by BP on behalf of Net Zero Teesside who are also looking to use the Endurance reservoir for CO^2 storage. Since then, consultation has been ongoing between the Applicant and both National Grid Ventures and BP regarding the two potential projects connecting into the Endurance reservoir. At the time of writing, no planning applications have been submitted in relation to these projects, with only Net Zero Teesside's onshore scheme listed on PINS Programme of Projects. Both projects are also in the early stages of development with only high-level information available.	Moderate	High	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-D-24	All Offshore	Decommissioning	Hornsea Four infrastructure, safety zones and advisory safety distances may lead to a temporary impact upon access to existing pipelines and wells for repairs and maintenance.	In the absence of detailed methodologies and schedules, decommissioning works and associated implications for access to existing pipelines and wells for repairs and maintenance are considered analogous with those assessed for the construction phase. • Decommissioning of 180 WTG • Decommissioning of 10 offshore platforms within the array area (six small OSS, three convertor substations and one accommodation platform) • Decommissioning of three HVAC substations • Decommissioning of six export cables • Removal of cables utilising the entire offshore ECC **Safety zones:** - 500 m safety zone around infrastructure being decommissioned **Duration:** - Decommissioning period of 3 years.	Parameters that create the greatest reduction in available sea room and the greatest disruption to vessel access in terms of area affected and duration.	Secondary: Co139 Tertiary: Co 57 Co89 Co94 Co96 Co98 Co102 Co107 Co181	**No likely significant effect** Restriction of access to the Viking Link for inspection and maintenance activities could be critical to the operator. The operators of active pipelines and cables are deemed to be of medium vulnerability, medium recoverability and high value.	**Scoped Out**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.4).	N/A	N/A	**No significant effect**	**Detailed Assessment**	Scoped out based on PINS Scoping Opinion (PINS Scoping Opinion, November 2018, ID: 4.12.4). Impact re-considered in the ES following consultation and scoped in for assessment at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-D-25	All Offshore	Decommissioning	Anchor snagging or dropping from vessel traffic associated with Hornsea Four that may cause damage to existing pipelines and wells	As per MDS for "Hornsea Four infrastructure, safety zones and advisory safety distances may lead to a temporary impact upon access to existing pipelines and wells for repairs and maintenance (IOU-D-24)."	Parameters that create the greatest reduction in available sea room and are most likely to give rise to potential interactions with existing pipelines and wells.	Secondary: Co139 Tertiary: Co107 Co181	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-D-26	All Offshore	Decommissioning	Allision risk to oil and gas platforms due to vessels being deviated from existing routes due to the presence of partially decommissioned Hornsea Four infrastructure.	As per MDS for "Hornsea Four infrastructure, safety zones and advisory safety distances may lead to a temporary impact upon access to existing pipelines and wells for repairs and maintenance (IOU-D-24)."	Parameters that create the greatest reduction in available sea room and are most likely to give rise to deviation of shipping from existing routes.	Secondary: Co139 Tertiary: Co81 Co89 Co93 Co181	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	The Endurance Overlap Scenario MDS has the same number of foundations in the array, but within a smaller area therefore not decreasing proximity to any third party installation. The conclusion of no significant effect remains to be confirmed.

Hornsea 4

Offshore Endurance Overlap Scenario Impacts Register
12. Infrastructure and Other Users

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Impact Background							EIA Scoping	Preliminary Environmental Information Report				Environmental Statement						
ID	**Project Element**	**Original Project Phase**	**Project Activity and Impact**	**Maximum Design Scenario (MDS)**	**Justification for MDS**	**Commitments**	**Likely Significance of Effect at Scoping Stage and Justification**	**Hornsea Four Position at PEIR**	**Justification for position at PEIR**	**Magnitude at PEIR**	**Sensitivity at PEIR**	**Likely Significant Effect at PEIR?**	**Hornsea Four Position at ES**	**Justification for position at ES**	**Magnitude at ES**	**Sensitivity at ES**	**Likely Significant Effect at ES?**	**Endurance Overlap Scenario - Any Change to Significance Conclusion?**	**Justification for Position**
IOU-D-27	All Offshore	Decommissioning	Proximity to Hornsea four infrastructure partially decommissioned and associated decommissioning works may restrict or hamper vessel access to oil and gas platforms and subsurface infrastructure during certain periods (e.g.	As per MDS for "Hornsea Four infrastructure, safety zones and advisory safety distances may lead to a temporary impact upon access to existing pipelines and wells for repairs and maintenance (IOU-D-24)."	Parameters that create the greatest disruption to vessel access in terms of area affected and duration.	Secondary: Co139 Tertiary: Co81 Co89 Co93 Co181	**Impact not identified at Scoping**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-D-28	All Offshore	Decommissioning	Wind turbines and associated works may result in deviations to routine support vessel routeing to oil and gas platforms.	As per MDS for "Hornsea Four infrastructure, safety zones and advisory safety distances may lead to a temporary impact upon access to existing pipelines and wells for repairs and maintenance (IOU-D-24)."	As MDS justification above (Impact ID IOU-D-29)	Secondary: Co139 Tertiary: Co89 Co93 Co94 Co181	**Impact not identified at Scoping**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-D-29	All Offshore	Decommissioning	Hornsea Four infrastructure, safety zones, advisory safety distances and piling may restrict or cause acoustic interference with potential seismic survey activity	As per MDS for "Hornsea Four infrastructure, safety zones and advisory safety distances may lead to a temporary impact upon access to existing pipelines and wells for repairs and maintenance (IOU-D-24)."	Parameters that create the greatest disruption to seismic survey activities in terms of area affected and duration.	Secondary: Co139 Tertiary: Co89 Co181	**No likely significant effect**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.
IOU-D-30	All Offshore	Decommissioning	Drilling and the installation of oil and gas infrastructure has the potential to be restricted by the presence of Hornsea Four infrastructure, safety zones and advisory safety distances	As per MDS for "Hornsea Four infrastructure, safety zones and advisory safety distances may lead to a temporary impact upon access to existing pipelines and wells for repairs and maintenance (IOU-D-24)."	Parameters that create the greatest disruption to oil and gas drilling and installation activities in terms of area affected and duration.	Secondary: Co139 Tertiary: Co89 Co181	**Impact not identified at Scoping**	**To be assessed for final Application**	N/A	N/A	N/A	N/A	**Detailed Assessment**	Assessment not included at PEIR - new assessment undertaken at ES.	N/A	N/A	**No significant effect (not significant)**	No	No change to MDS and therefore ES conclusions remain valid.

Appendix B: Endurance No Overlap HRA

Table 1: Summary of the Potential for Adverse Effect from Hornsea Four Alone.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
Sites primarily designated for subtidal and intertidal benthic ecology1							
Flamborough Head SAC	Reefs; and Submerged or partially submerged sea caves	Temporary increases in suspended sediment concentrations (SSC)/ smothering	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Invasive non-native species	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Accidental pollution	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
	Reefs	Changes to physical processes	N/A	No potential for AEoI	N/A	No	No change to MDS and therefore conclusions remain valid.
Humber Estuary SAC	Atlantic saltmeadows; and *Salicornia* and other colonising species	Nitrogen deposition	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Humber Estuary Ramsar	Saltmarsh	Nitrogen deposition	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Sites primarily designated for Marine Mammals							
Southern North Sea SAC	Harbour porpoise	Underwater noise	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.

[1] Where other features are relevant, these are addressed under the relevant receptor group.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel collision risk	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Accidental pollution	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Moray Firth SAC	Bottlenose dolphin	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel collision risk	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
The Wash and North Norfolk Coast SAC	Harbour seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Humber Estuary SAC	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel collision risk	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Humber Estuary Ramsar	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel collision risk	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
Berwickshire and North Northumberland Coast SAC	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel collision risk	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Doggersbank (Netherlands) SAC	Harbour seal; and Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Klaverbank SCI	Harbour seal; and Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Bancs de Flandres	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Vlaamse Banken	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
SBZ 1	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
SBZ 2	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
SBZ 3	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Vlakte van d Raan	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Westerschelde & Saeftinghe	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Voordelta	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Noordzeekustzone	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Waddenzee	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Sites primarily designated for Offshore Ornithology							
Greater Wash SPA	Little gull	Collision Risk	-	No potential for AEoI	-	No	No changes to baseline or MDS and therefore RIAA conclusions, remain valid.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
	Red-throated diver Common scoter	Disturbance and displacement	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No changes to baseline or MDS and therefore RIAA conclusions remain valid.
Flamborough and Filey Coast SPA	Gannet	Disturbance and displacement	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	Reduction in MDS with regards to the size of the 'no overlap' array layout leads to densities and abundances for each bio-season being less than those assessed in RIAA for gannet. Therefore, and based on professional experience and judgement, no AEoI is therefore anticipated.
	Gannet Kittiwake Herring gull	Collision Risk	-	No potential for AEoI.	-	No	Minor increase in gannet and kittiwake monthly densities / abundances, though limited difference to mortality rates. Therefore, and based on professional experience and judgement, no AEoI is therefore anticipated for these species. No changes to baseline or MDS and therefore RIAA conclusions for herring gull remain valid.
	Guillemot Razorbill Puffin	Disturbance and displacement	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	Reduction in guillemot and razorbill abundances, and as such, effects will be of no greater significance than RIAA conclusions. Minor reduction in puffin abundances, and as such, effects will be of no greater significance than RIAA conclusions.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
	Guillemot Razorbill Puffin	Barrier effect	-	No potential for AEoI	-	No	A smaller size of the 'no overlap' array layout reduces any potential barrier effect predicted at RIAA, so no change to RIAA conclusions, which remain valid and precautionary.
Humber Estuary SPA	Avocet, Golden plover, Black-tailed godwit, Bar-tailed godwit, Ruff, Shelduck, Dunlin, Redshank, Knot, Hen harrier	Risk of Collision	-	No potential for AEoI	-	No	No change to baseline or MDS, so RIAA conclusions remain valid.
Humber Estuary Ramsar	Golden plover, Black-tailed godwit, Bar-tailed godwit, Shelduck, Dunlin, Redshank, Knot, hen harrier, dark-bellied brent goose, teal, wigeon, goldeneye, avocet, oystercatcher, ringed plover, grey plover, lapwing,	Risk of Collision	-	No potential for AEoI	-	No	No change to baseline or MDS, so RIAA conclusions remain valid.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
	sanderling, curlew, whimbrel, turnstone						
Hornsea Mere SPA	Gadwall	Risk of Collision	-	No potential for AEoI		No	No change to baseline or MDS, so RIAA conclusions remain valid.
Northumbria Coast SPA	Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No change to baseline or MDS, so RIAA conclusions remain valid.
Teemouth and Cleveland Coast SPA	Sandwich tern Common tern	Risk of Collision	-	No potential for AEoI		No	No change to baseline or MDS, so RIAA conclusions remain valid.
Coquet Island SPA	Puffin	Disturbance and displacement	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	Minor reduction in puffin abundances and as such, effects will be of no greater significance than RIAA conclusions.
	Kittiwake, Common tern, Arctic tern, Roseate tern, Sandwich tern	Risk of Collision	-	No potential for AEoI	-	No	Minor increase in kittiwake monthly densities / abundances, though limited differences when apportioned to specific SPAs and as such, effects will be of no greater significance than RIAA conclusions. No change to baseline or MDS, so RIAA conclusions for tern species remain valid.
Farne Islands SPA	Guillemot Puffin	Disturbance and displacement	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	Reduction in guillemot abundances and as such, effects will be of no greater significance than RIAA conclusions. Minor reduction in puffin abundances, therefore effects will be of no greater significance than RIAA conclusions.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
	Kittiwake, Common tern, Arctic tern, Sandwich tern	Risk of Collision	-	No potential for AEoI	-	No	Minor increase in kittiwake monthly densities / abundances, though limited differences when apportioned to specific SPAs and as such, effects will be of no greater significance than RIAA conclusions. No change to baseline or MDS, so RIAA conclusions for tern species remain valid.
Northumberland Marine SPA	Guillemot Puffin	Disturbance and displacement	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	Reduction in guillemot abundances and as such, effects will be of no greater significance than RIAA conclusions. Minor reduction in puffin abundances, therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake, Common tern, Arctic tern, Roseate tern, Sandwich tern	Risk of Collision	-	No potential for AEoI	-	No	Minor increase in kittiwake monthly densities / abundances, though limited differences when apportioned to specific SPAs and as such, effects will be of no greater significance than RIAA conclusions. No change to baseline or MDS, so RIAA conclusions for tern species remain valid.
St Abb's SPA	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Guillemot Razorbill	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
							be of no greater significance than RIAA conclusions.
Forth Islands (UK) SPA	Guillemot, Razorbill, Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Gannet, Kittiwake, Common tern, Arctic tern, Sandwich tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Outer Firth of Forth and St. Andrew's Complex pSPA	Guillemot, Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Gannet Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Fowlsheugh SPA	Guillemot Razorbill	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
Buchan Ness to Collieston Coast SPA							be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Troup, Pennan and Lion's Heads SPA	Guillemot Razorbill	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
East Caithness Cliffs SPA	Guillemot Razorbill	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
North Caithness Cliffs SPA	Guillemot Razorbill Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
							be of no greater significance than RIAA conclusions.
Copinsay SPA	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Hoy SPA	Guillemot Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Arctic skua Great skua Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Marwick Head SPA	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Rousay SPA	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
							be of no greater significance than RIAA conclusions.
	Arctic skua Kittiwake Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Calf of Eday SPA	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake Great black-backed gull	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
West Westray SPA	Guillemot Razorbill	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Arctic skua Kittiwake Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Fair Isle SPA	Guillemot Razorbill Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Gannet Arctic skua Great skua	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
	Kittiwake Arctic tern						be of no greater significance than RIAA conclusions.
Sumburgh Head SPA	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Noss SPA	Guillemot Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Gannet Great skua Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Foula SPA	Guillemot Razorbill Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Arctic skua Great skua Kittiwake Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Fetlar SPA	Arctic skua Great skua Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
							be of no greater significance than RIAA conclusions.
Hermaness, Saxa Vord and Valla Field SPA	Guillemot Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Gannet Great skua Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Sites primarily designated for Onshore Ecology and Migratory Fish							
All potential effects alone that are related to onshore ecology and migratory fish have been screened out, as confirmed by Natural England following the updated Hornsea Four Screening Report (see **Appendix A** of **B2.2: Report to Inform Appropriate Assessment Part 2 (REP2-005)**).						N/A	N/A

Table 2: Summary of the Potential for Adverse Effect from Hornsea Four In-combination.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
Sites primarily designated for subtidal and intertidal benthic ecology							
Flamborough Head SAC	Reefs; and Submerged or partially submerged sea caves	Temporary increases in suspended sediment concentrations (SSC)/ smothering	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Invasive non-native species	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Accidental pollution	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
	Reefs	Changes to physical processes	N/A	No potential for AEoI	N/A	No	No change to MDS and therefore conclusions remain valid.
Humber Estuary SAC	Atlantic saltmeadows; and *Salicornia* and other colonising species	Nitrogen deposition	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Humber Estuary Ramsar	Saltmarsh	Nitrogen deposition	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Sites primarily designated for Marine Mammals							
Southern North Sea SAC	Harbour porpoise	Underwater noise	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel collision risk	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
		Accidental pollution	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Habitat loss	N/A	No potential for AEoI	N/A	No	No change to MDS and therefore conclusions remain valid.
Moray Firth SAC	Bottlenose dolphin	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel collision risk	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
The Wash and North Norfolk Coast SAC	Harbour seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Humber Estuary SAC	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel collision risk	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Humber Estuary Ramsar	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel collision risk	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Berwickshire and North	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
Northumberland Coast SAC		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel collision risk	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Doggersbank (Netherlands) SAC	Harbour seal; and Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Klaverbank SCI	Harbour seal; and Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Bancs de Flandres	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Vlaamse Banken	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
SBZ 1	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
SBZ 2	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
SBZ 3	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Vlakte van d Raan	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Westerschelde & Saeftinghe	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Voordelta	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Noordzeekustzone	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Waddenzee	Grey seal	Underwater noise	No potential for AEoI	N/A	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
		Vessel disturbance	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to MDS and therefore conclusions remain valid.
Sites primarily designated for Offshore Ornithology							
Greater Wash SPA	Little gull	Collision Risk	-	No potential for AEoI	-	No	No change to baseline or MDS, so RIAA conclusions remain valid.
	Red-throated diver	Disturbance and Displacement	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No change to baseline or MDS, so RIAA conclusions remain valid.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
	Common scoter						
Flamborough and Filey Coast SPA	Gannet Kittiwake Herring gull	Collision Risk	-	Potential for AEoI for kittiwake No potential for AEoI for gannet and herring gull	-	No – gannet & herring gull No - kittiwake	No material differences to in-combination values, therefore effects will be of no greater significance than RIAA conclusions for gannet and herring gull, which remain valid. The Applicant has accepted the Secretary of State's finding that an AEoI exists for the kittiwake feature of the FFC SPA in-combination. This change is not in relation to the Endurance No Overlap scenario.
	Guillemot Razorbill Puffin	Disturbance and displacement	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No material differences to in-combination values, therefore effects will be of no greater significance than RIAA conclusions for all auk species, which remain valid.
Humber Estuary SPA	Avocet, Golden plover, Black-tailed godwit, Bar-tailed godwit, Ruff, Shelduck, Dunlin, Redshank,	Risk of Collision	-	No potential for AEoI	-	No	No change to baseline or MDS, therefore RIAA conclusions remain valid.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
	Knot, Hen harrier						
Humber Estuary Ramsar	Golden plover, Black-tailed godwit, Bar-tailed godwit, Shelduck, Dunlin, Redshank, Knot, hen harrier, dark-bellied brent goose, teal, wigeon, goldeneye, avocet, oystercatcher, ringed plover, grey plover, lapwing, sanderling, curlew, whimbrel, turnstone	Risk of Collision	-	No potential for AEoI	-	No	No change to baseline or MDS, therefore RIAA conclusions remain valid.
Hornsea Mere SPA	Gadwall	Risk of Collision	-	No potential for AEoI		No	No change to baseline or MDS, therefore RIAA conclusions remain valid.
Northumbria Coast SPA	Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
							apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Teemouth and Cleveland Coast SPA	Sandwich tern Common tern	Risk of Collision	-	No potential for AEoI		No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Coquet Island SPA	Puffin	Disturbance and displacement	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake, Common tern, Arctic tern, Roseate tern, Sandwich tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Farne Islands SPA	Guillemot Puffin	Disturbance and displacement	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
	Kittiwake, Common tern, Arctic tern, Sandwich tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Northumberland Marine SPA	Guillemot Puffin	Disturbance and displacement	No potential for AEoI	No potential for AEoI	No potential for AEoI	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake, Common tern, Arctic tern, Roseate tern, Sandwich tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
St Abb's SPA	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Guillemot Razorbill	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
							greater significance than RIAA conclusions.
Forth Islands (UK) SPA	Guillemot, Razorbill, Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Gannet, Kittiwake, Common tern, Arctic tern, Sandwich tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Outer Firth of Forth and St. Andrew's Complex pSPA	Guillemot Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Gannet Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Fowlsheugh SPA	Guillemot Razorbill	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
							therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Buchan Ness to Collieston Coast SPA	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Troup, Pennan and Lion's Heads SPA	Guillemot Razorbill	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
							apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
East Caithness Cliffs SPA	Guillemot Razorbill	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
North Caithness Cliffs SPA	Guillemot Razorbill Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Copinsay SPA	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.

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			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Hoy SPA	Guillemot Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Arctic skua Great skua Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Marwick Head SPA	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
							greater significance than RIAA conclusions.
Rousay SPA	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Arctic skua Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Calf of Eday SPA	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake Great black-backed gull	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
West Westray SPA	Guillemot Razorbill	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
							therefore effects will be of no greater significance than RIAA conclusions.
	Arctic skua Kittiwake Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Fair Isle SPA	Guillemot Razorbill Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Gannet Arctic skua Great skua Kittiwake Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Sumburgh Head SPA	Guillemot	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Kittiwake Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	**Change in Conclusion? (Yes/No)**	**Justification for Conclusion/ Further Detail**
							apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Noss SPA	Guillemot Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Gannet Great skua Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Foula SPA	Guillemot Razorbill Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Arctic skua Great skua Kittiwake Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.

Designated Site	Relevant Features	Potential for Effect	Conclusion on Adverse Effect			Endurance No Overlap Scenario	
			Construction	Operation	Decommissioning	Change in Conclusion? (Yes/No)	Justification for Conclusion/ Further Detail
Fetlar SPA	Arctic skua Great skua Arctic tern	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Hermaness, Saxa Vord and Valla Field SPA	Guillemot Puffin	Disturbance and displacement	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
	Gannet Great skua Kittiwake	Risk of Collision	-	No potential for AEoI	-	No	No material differences to in-combination values when apportioned to specific SPAs and therefore effects will be of no greater significance than RIAA conclusions.
Sites designated for migratory fish							
All potential effects in-combination that are related to migratory fish have been screened out, as confirmed by Natural England following the updated Hornsea Four Screening Report (see **Appendix A** of **B2.2: Report to Inform Appropriate Assessment Part 2 (REP2-005)**).						N/A	N/A
Sites primarily designated for Onshore Ecology							
All potential effects in-combination that are related to onshore ecology have been screened out, as confirmed by Natural England following the updated Hornsea Four Screening Report (see **Appendix A** of **B2.2: Report to Inform Appropriate Assessment Part 2 (REP2-005)**).						N/A	N/A