Hornsea Project Four

Clarification Note on Seismic Surveys

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Revision Summary

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Glossary

Term	Definition
Appropriate Assessment (AA)	An assessment to determine the implications of a plan or project on a European site in view of the site's Conservation Objectives. An AA forms part of a Habitats Regulations Assessment and is required when a plan or project is likely to have a significant effect on a European site.
Cumulative effects	The combined effect of Hornsea Four in combination with the effects from a number of different projects, on the same single receptor/resource. Cumulative impacts are those that result from changes caused by other past, present or reasonably foreseeable actions together with Hornsea Project Four.
Environmental Impact Assessment (EIA)	A statutory process by which certain planned projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Directive and the EIA Regulations, including the publication of an Environmental Statement (ES).
European Site	A Special Area of Conservation (SAC) or candidate SAC (cSAC), a Special Protection Area (SPA) or potential SPA (pSPA), a site listed as a Site of Community Importance (SCI) or a Ramsar site.
Speciale beschermingszone	The Belgium equivalent of a Special Protection Area (SPA).
Habitats Regulations Assessment (HRA)	A process which helps determine likely significant effects and (where appropriate) assesses adverse impacts on the integrity of European conservation sites and Ramsar sites. The process consists of up to four stages of assessment: screening, appropriate assessment, assessment of alternative solutions and assessment of imperative reasons of over-riding public interest (IROPI) and compensatory measures.
Hornsea Project Four Offshore Wind Farm	The term covers all elements of the project (i.e. both the offshore and onshore). Hornsea Four infrastructure will include offshore generating stations (wind turbines), electrical export cables to landfall, and connection to the electricity transmission network. Hereafter referred to as Hornsea Four.
In-combination Effect	The combined effect of Hornsea Four in-combination with the effects from a number of different projects on the same feature / receptor.
Maximum Design Scenario (MDS)	The maximum design parameters of each Hornsea Four asset (both on and offshore) considered to be a worst case for any given assessment.
Preliminary Environmental Information Report (PEIR)	Defined in the EIA regulations as information referred to in Part 1, Schedule 4 information for inclusion in environmental statements which has been compiled by the Applicant and is reasonably required to assess the environmental effects of the development.
Sites of Community Importance (SCI)	Sites that have been adopted by the European Commission in accordance with the Habitats Directives but not yet formally designated by the governmental of each country.
Special Area of Conservation (SAC)	Strictly protected sites designated under Article 3 of the Habitats Directive for habitats listed on Annex I of the Directive and for regularly occurring migratory species.

Term	Definition
Transboundary	Crossing into other Euorpean Economic Area (EEA) states.

Acronyms

Term	Definition
AA	Appropriate Assessment
CfD	Contract for Difference
EA1N	East Anglia ONE North Offshore Wind Farm
EA2	East Anglia TWO Offshore Wind Farm
EDR	Effective Deterrent Range
EIA	Environmental Impact Assessment
ES	Environmental Statement
HRA	Habitats Regulations Assessment
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effects
Natural England	Natural England
OWF	Offshore Wind Farm
PEIR	Preliminary Environmental Impact Assessment
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SBZ	Speciale beschermingszone
SCI	Site of Community Importance
SIP	Site Integrity Plan
SMRU	Sea Mammal Research Unit
SNS	Southern North Sea
UXO	Unexploded Ordnance

Units

Unit	Definition
km^2	Square kilometre

1 Introduction

1.1.1.1 In response to Natural England's comments at Deadline 4 – **Applicant's comments on other submissions received at Deadline 4 (REP5-081)**, the Applicant is providing this clarification note with respect to the need for the inclusion of a nominal seismic survey and a high order unexploded ordnance (UXO) clearance to be included the in-combination assessment for marine mammals within the **B2.2 Report to Inform Appropriate Assessment (RIAA) Part 1 (REP5-012)**.

2 RIAA marine mammals in-combination assessment

2.1.1.1 The Habitats Regulations and the Offshore Habitats Regulations include a requirement for the Competent Authority to carry out an Appropriate Assessment (AA) in respect of the likely significant effects (LSE) of a plan or project alone and / or in-combination with other plans or projects, where these are not directly connected with or necessary to the management of the site. The following list, in line with Advice Note 10 from the Planning Inspectorate (The Inspectorate), Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects[1] has been applied to Hornsea Four when identifying plans and projects for consideration in the in-combination assessment:

- Projects in operation (that do not form part of the baseline);
- Projects that are under construction;
- Permitted application(s) not yet implemented;
- Submitted application(s) not yet determined;
- All refusals subject to appeal procedures not yet determined;
- Projects on the National Infrastructure's programme of projects; and
- Projects identified in the relevant development plan (and emerging development plans – with appropriate weight being give as they move close to adoption) recognizing that information on any relevant proposals will be limited and the degree of uncertainty which may be present.

2.1.1.2 For marine mammals, the in-combination screening for Hornsea Four considered those designated sites where the potential for LSE was identified for the project alone. For all other designated sites, the distance is such that there is no pathway for effect from Hornsea Four to reach the designated site boundary and therefore no potential for an in-combination effect to occur (effectively screening out all transboundary harbour porpoise sites). The screening ranges applied for marine mammals in-combination are the same as those applied for the project alone, being 26 km for harbour porpoise (JNCC *et al.*, 2020), 120 km for harbour seal (SMRU, 2011) and 145 km for grey seal (Thompson et al., 1996), together with consideration of site connectivity in the same manner as screening for the project alone. The screening in-combination presented in Appendix A of the RIAA (**REP5-012**) considered the following sites:

- Southern North Sea (SNS) Special Area of Conservation (SAC) (harbour porpoise);
- Moray Firth SAC (bottlenose dolphin);
- The Wash and North Norfolk Coast SAC (harbour seal);
- Humber Estuary SAC (grey seal);

[1] https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-ten/

- Humber Estuary Ramsar (grey seal);
- Berwickshire and North Northumberland SAC (grey seal);
- Transboundary sites for harbour seal (Doggersbank (Netherlands) SAC and Klaverbank Sites of Community Importance (SCI); and
- Transboundary sites for grey seal (Doggersbank (Netherlands) SAC, and Klaverbank SCI, Bancs des Flandres SCI, Vlaamse Banken SCI, Speciale beschermingszone (SBZ) 1 SCI, SBZ 2 SCI, SBZ 3 SCI, Vlakte van de Raan SCI, Westerschelde & Saeftinghe SCI, Voordelta SCI, Noordzeekustzone SCI and Waddenszee SCI).

2.1.1.3 As noted in Section 8.1 of the RIAA (**REP5-012**), a detailed tiering structure (see **Table 1** below) was applied to the marine mammals assessment to ensure all specific concerns related to these receptors were accurately addressed.

Table 1: The Tiering Structure used in the RIAA Marine Mammals Assessment.

Tiers	Description of stage of development project
Tier 1a	Operational and under construction projects which were not in place when baseline data was collected.
	Projects with a legally secure consent that have been awarded a Contracts for Difference (CfD) but have not yet been implemented.
Tier 1b	Includes all projects/plans that have a legally secured consent, but have no CfD; therefore, there is uncertainty about the timeline for construction of these projects.
Tier 1c	Projects for which an application has been submitted, but not yet determined. Consequently there is information on which to base a quantitative assessment of cumulative impact however, there is also a degree of uncertainty as to the final approved design and timeline for construction of the project.
Tier 1d	Relevant marine infrastructure projects that the regulatory body are expecting to be submitted for determination and projects for which the Preliminary Environmental Information Report (PEIR) has been submitted, but not yet a full Environmental Statement (ES). Consequently there is information on which to base a quantitative assessment of cumulative impact however, there is also a degree of uncertainty as to the final approved design and timeline for construction of the project.
Tier 1e	Relevant marine infrastructure projects that the regulatory body are expecting to be submitted for determination.
Tier 2	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted.
Tier 3	Projects on the Planning Inspectorate's Programme of Projects where a Scoping Report has been submitted.
	Identified in the relevant Development Plan (and emerging Development Plans with appropriate weight being given as they move closer to adoption) recognising that information on any relevant proposals will be limited.
	Identified in other plans and programmes (as appropriate) which set the framework for future development consents/approvals, where such development is reasonably likely to come forward.

2.1.1.4 Table 8 of the RIAA (REP5-012) contains the plans and projects screened in per designated site for the marine mammal in-combination assessment.

2.1.1.5 For reference, the maximum potential for overlap within the SNS SAC for single activity only, excluding project overlap as shown in Table 33 of the RIAA (REP5-012) can be found below (see Table 2).

Table 2: Maximum Potential for Overlap with the SNS SAC for Single Activity Only, Excluding Project Overlap.

Scenario		Winter Season Overlap		Summer Season Overlap	
		Km²	%	Km²	%
Scenario 1: Hornsea Four plus Tier 1a projects (Dogger Bank A, Dogger Bank B, Dogger Bank C and Sofia)	Max	0	**0**	6,912.7	**25.6**
	Min	0	**0**	3,972.4	**14.7**
Scenario 2: Hornsea Four plus Tier 1a projects plus Tier 1b projects (as above plus Hornsea Project Three)	Max	2.43	**0.02**	7,344.3	**27.2**
	Min	0	**0**	3,972.4	**14.7**
Scenario 3: Hornsea Four plus Tier 1a, Tier 1b and Tier 1c projects (as above plus Norfolk Vanguard, Norfolk Boreas, East Anglia One North, East Anglia Two)	Max	5,053.6	**39.8**	11,547.3	**42.8**
	Min	2,655.8	**20.9**	5,748.9	**21.3**
Scenario 4: Hornsea Four plus Tier 1a, Tier 1b, Tier 1c and Tier 2 projects (as above plus Sheringham Shoal and Dudgeon Offshore Wind Farm Extensions)	Max	5,053.6	**39.8**	11,750.3	**43.5**
	Min	2,655.8	**20.9**	5,748.9	**21.3**

3 Consideration of additional impacts

3.1 Position of the Applicant

3.1.1.1 At Deadline 4, Natural England requested (Applicant's comments on other submissions received at Deadline 4 (REP5-081)) that the Applicant consider additional theoretical/illustrative scenarios of noise sources for which there is no available information as to whether those activities may be being undertaken during the time periods relevant to the Hornsea Four RIAA. Namely, these activities include a single "high-order" Unexploded Ordnance (UXO) detonation and the consideration of a seismic survey.

3.1.1.2 The Applicant maintains that consideration of these activities, the requesting inclusion of which is based on historical activity trends, without any information as to the likelihood, timing, extent or location of these activities being available, does not provide any increased confidence in the conclusions of the RIAA. Furthermore, as under all in-combination assessment scenarios it has been concluded that there is a risk that the thresholds for the Southern North Sea SAC may be exceeded, the Applicant has committed to the appropriate mitigation to manage noise levels to ensure these thresholds are not exceeded; namely the Site Integrity Plan, which requires a consideration of all known activities at the time of the production of the final version of the document (and so would capture any relevant UXO or seismic surveys at that point in time, with details of location, timing and extent being known and consequently possible to include in the assessment).

3.1.1.3 Notwithstanding the above, the consideration of a single, high-order UXO is relatively simple, with this noise source emanating from a single point in time and space, with the only

assumption being the location. The consideration of a seismic survey, however, requires multiple assumptions of parameters which would all be survey specific, including but not limited to:

- Location;
- Vessel speed;
- Survey track lines;
- Survey area;
- Track line orientation; and
- Line separation.

3.1.1.4 The recent guidance on assessment impacts to SACs for harbour porpoise (JNCC *et al.* (2020)), outlines effective deterrent ranges (EDRs; area within which it is assumed that all harbour porpoise are displaced from for the calendar day which is being considered in the assessment) for both UXO (26km) and seismic survey (12km). For a single UXO, it can be simply assumed that the UXO is location centrally to the SAC and the full impact radius is contained within the SAC boundary; this then represents the worst-case possible impact.

3.1.1.5 For seismic surveys, all the above parameters need to be considered in the development of a theoretical scenario, ultimately resulting in it being impossible to generate a survey which could be deemed "realistic". This inability to create a "realistic" scenario which could be used in a robust assessment is demonstrated by the scenario used in the Southern North Sea SAC Review of Consents (RoC) HRA, which used a very simplistic assumption of a single vessel transiting north-to-south through the centre of the SAC, for 24 hours; this resulted in an impact from this scenario of >19% of the daily threshold, which would in and of itself prevent any other activities on that day.

3.2 Presentation of additional assessment

3.2.1.1 In light of the request from Natural England, the Applicant has presented the in-combination assessment including these impacts. In light of the considerations described above, the illustrative scenario for seismic surveys has been based on a single, static point source for a seismic survey, following the assessment undertaken for East Anglia ONE North (EA1N) and East Anglia TWO (EA2) Offshore Wind Farms that were provided by Natural England.

3.2.1.2 In section 5.10.2.3 of EA1N's Habitat Regulations Assessment[2] the following assumption was made for seismic surveys: "*The Applicant's worst-case scenario assumed there could be up to two seismic surveys from the oil and gas industry, one in the summer area and one in the winter area, at any one time. The area of disturbance could be up to 314 km^2 (based on applying a 10 km buffer around the survey operations), which is approximately 1.2% of the summer area and approximately 2.5% of the winter area of the SNS SAC.*"

3.2.1.3 This same assumption has been applied to Hornsea Four and the results of this are depicted in **Table 3** below. It is noted that the 10km buffer (EDR) is based on a previous guidance document which has been superseded by JNCC *et al.* (2020).

[2]https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010077/EN010077-009803-EA1N%20-%20Habitats%20Regulations%20Assessment.pdf

Table 3: Maximum Potential for Overlap with the SNS SAC for Single Activity Only, Excluding Project Overlap – assuming a 10 km EDR for O&G seismic surveys.

Scenario		Winter Season Overlap		Summer Season Overlap	
		Km²	%	Km²	%
Scenario 1: Hornsea Four plus Tier 1a projects (Dogger Bank A, Dogger Bank B, Dogger Bank C and Sofia)	Max	0	0	6,913	25.6
	Min	0	0	3,972	14.7
Scenario 2: Hornsea Four plus Tier 1a projects plus Tier 1b projects (as above plus Hornsea Project Three)	Max	0	0	7,344	27.2
	Min	2.43	0.02	3,972	14.7
Scenario 3: Hornsea Four plus Tier 1a, Tier 1b and Tier 1c projects (as above plus Norfolk Vanguard, Norfolk Boreas, East Anglia One North, East Anglia Two)	Max	5,054	39.8	11,547	42.8
	Min	2,656	20.9	5,749	21.3
Scenario 4: Hornsea Four plus Tier 1a, Tier 1b, Tier 1c and Tier 2 projects (as above plus Sheringham Shoal and Dudgeon Offshore Wind Farm Extensions)	Max	5,054	39.8	11,750	43.5
	Min	2,656	20.9	5,749	21.3
High-order UXO detonation (26 km EDR)		2124	16.72	2,124	7.87
Oil and Gas seismic airgun survey (10 km EDR stationary)		314	2.47	314	1.16
TOTAL Scenario 1 + O&G + UXO	Max	**2438**	**19.20**	**9,351**	**34.63**
	Min	**2438**	**19.20**	**6,410**	**23.74**
TOTAL Scenario 2 + O&G + UXO	Max	**2438**	**19.20**	**9,782**	**36.23**
	Min	**2438**	**19.20**	**6,410**	**23.74**
TOTAL Scenario 3 + O&G + UXO	Max	**7,492**	**58.99**	**13,985**	**51.80**
	Min	**5,094**	**40.11**	**8,817**	**30.32**
TOTAL Scenario 4 + O&G + UXO	Max	**7,492**	**58.99**	**14,188**	**52.55**
	Min	**5,094**	**40.11**	**8,187**	**30.32**

3.2.1.4 The Applicant has also performed analysis utilising a 12 km EDR (JNCC et al., 2020) for seismic surveys and the results of this can be found in Table 4 below.

Table 4: Maximum Potential for Overlap with the SNS SAC for Single Activity Only, Excluding Project Overlap – assuming a 12 km EDR for seismic surveys.

Scenario		Winter Season Overlap		Summer Season Overlap	
		Km²	%	Km²	%
Scenario 1: Hornsea Four plus Tier 1a projects (Dogger Bank A, Dogger Bank B, Dogger Bank C and Sofia)	Max	0	0	6,913	25.6
	Min	0	0	3,972	14.7
Scenario 2: Hornsea Four plus Tier 1a projects plus Tier 1b projects (as above plus Hornsea Project Three)	Max	0	0	7,344	27.2
	Min	2.43	0.02	3,972	14.7
Scenario 3: Hornsea Four plus Tier 1a, Tier 1b and Tier 1c projects (as above plus Norfolk Vanguard, Norfolk Boreas, East Anglia One North, East Anglia Two)	Max	5,054	39.8	11,547	42.8
	Min	2,656	20.9	5,749	21.3

Scenario		Winter Season Overlap		Summer Season Overlap	
		Km²	%	Km²	%
Scenario 4: Hornsea Four plus Tier 1a, Tier 1b, Tier 1c and Tier 2 projects (as above plus Sheringham Shoal and Dudgeon Offshore Wind Farm Extensions)	Max	5,054	39.8	11,750	43.5
	Min	2,656	20.9	5,749	21.3
High-order UXO detonation (26 km EDR)		2,124	16.72	2,124	7.87
Oil and Gas seismic airgun survey (10 km EDR stationary)		314	2.47	314	1.16
TOTAL Scenario 1 + O&G + UXO	Max	**2,576**	**20.29**	**9,489**	**35.15**
	Min	**2,576**	**20.29**	**6,548**	**24.25**
TOTAL Scenario 2 + O&G + UXO	Max	**2,576**	**20.29**	**9,920**	**36.74**
	Min	**2,576**	**20.29**	**6,548**	**24.25**
TOTAL Scenario 3 + O&G + UXO	Max	**7,630**	**60.08**	**14,123**	**52.31**
	Min	**5,232**	**41.20**	**8,325**	**30.83**
TOTAL Scenario 4 + O&G + UXO	Max	**7,631**	**60.09**	**14,236**	**53.06**
	Min	**5,232**	**41.20**	**8,325**	**30.83**

4 Conclusions

4.1.1.1 When both a nominal seismic survey and a high-order UXO detonation are added to the marine mammal in-combination assessment for Hornsea Four, the impacted area increases from 43.5% to 53.06% in the summer area and 39.8% to 60.09% in the winter area of the SNS SAC. These results include the worst-case scenario of all Tier 1c offshore wind farm projects being constructed simultaneously alongside at least one seismic survey and one high-order UXO operation.

4.1.1.2 Therefore, the original conclusions illustrated within the Hornsea Four RIAA (**REP5-012**) remain the same. As concluded in Section 10.3, "*it is clear that Hornsea Four alone would not trigger the 20% threshold under any circumstances. However, there are apparent risks to the 20% threshold when other projects are screened in for assessment in-combination – on the assumption that all projects would in fact undertake such activity on the same day. Such risks need to be placed in context, to determine where risk may exist and what measures are available to help mitigate that risk. Key to the process is the requirement on all projects assessed here to be implementing a Site Integrity Plan (SIP), which will ensure on a case-by-case basis that the threshold will not be exceeded (alone and in-combination).*"

4.1.1.3 As such, the Examining Authority can have confidence that the original assessment undertaken within the RIAA was robust, and the inclusion of further activities (for which there is no certainty they will be required or what their contribution to any thresholds would be) does not alter the conclusions of the RIAA: no adverse effect on the integrity of the Southern North Sea SAC with the implementation of the appropriate mitigation, which will be secured through the Development Consent Order for Hornsea Four.

5 References

JNCC, DAERA and Natural England (2020). Guidance for assessing the significance of noise disturbance against Conservation Objectives of harbour porpoise SACs England, Wales and Northern Ireland. JNCC Report No. 654. Final May 2020.

SMRU (2011). Summary of seal count and telemetry data from the Humber area. Report to SMart Wind.

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Planning Inspectorate (2017). Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects (version 8). Available online https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-ten/ [accessed 28/06/2022].