



Hornsea Project Four: Derogation Information

Compensation measures for FFC SPA: Overview

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Revision Summary

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Revision Change Log

<i>Rev</i>	<i>Page</i>	<i>Section</i>	<i>Description</i>
01	-	-	Initial submission by the Applicant.
02	5	-	Updated acronyms list.
02	Updated throughout	Updated throughout	Separation of gannet from kittiwake and guillemot and razorbill compensation measures.
02	8	1.3	Update to the species predicted impacts and compensation.
02	Updated throughout	Updated throughout	Addition of APP reference numbers.
02	16	7	Update on the seagrass workstream.
02	Updated throughout	Updated throughout	Updated regarding strategic compensation and Marine Recovery Fund.

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Glossary

Term	Definition
Compensation / Compensatory Measures	If an Adverse Effect on the Integrity on a designated site is determined during the Secretary of State's Appropriate Assessment, compensatory measures for the impacted site (and relevant features) will be required. The term compensatory measures is not defined in the Habitats Regulations. Compensatory measures are however, considered to comprise those measures which are independent of the project, including any associated mitigation measures, and are intended to offset the negative effects of the plan or project so that the overall ecological coherence of the national site network is maintained.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Habitats Regulations	The Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017.
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.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Black-legged kittiwake biogeographic population	The east Atlantic breeding population of kittiwake which includes individuals from the Flamborough and Filey Coast SPA (Stroud <i>et al.</i> , 2016). Proposed compensation measures will be undertaken within this populations breeding and migratory range.
Northern gannet biogeographic population	The east Atlantic breeding population of gannet which includes individuals from the Flamborough and Filey Coast SPA (Stroud <i>et al.</i> , 2016). Proposed compensation measures will be undertaken within this populations breeding and migratory range.
Common guillemot biogeographic population	The north east Atlantic breeding population of guillemot which includes the <i>Uria aalge albonis</i> and <i>Uria aalge aalge</i> subspecies and includes individuals from the Flamborough and Filey Coast SPA (Stroud <i>et al.</i> , 2016). Proposed compensation measures will be undertaken within this populations breeding and migratory range.
Razorbill biogeographic population	The breeding population of razorbill which includes <i>Alca torda islandica</i> and includes individuals from the Flamborough and Filey Coast SPA (Stroud <i>et al.</i> , 2016). Proposed compensation measures will be undertaken within this populations breeding and migratory range.

Acronyms

Term	Definition
AEoI	Adverse Effect on Integrity
DCO	Development Consent Order
FFC	Flamborough and Filey Coast
GCIMP	Gannet Compensation Implementation and Monitoring Plan
GRCIMP	Guillemot and Razorbill Compensation Implementation and Monitoring Plan
JNCC	Joint Nature Conservation Committee
KCIMP	Kittiwake Compensation Implementation and Monitoring Plan
MMO	Marine Management Organisation
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SNCBs	Statutory Nature Conservation Bodies
SPA	Special Protection Area
UK	United Kingdom

1 Introduction

1.1 Background

1.1.1.1 Orsted Hornsea Project Four Limited (hereafter the 'Applicant') is proposing to develop Hornsea Project Four Offshore Wind Farm (hereafter 'Hornsea Four'). Hornsea Four will be located approximately 69 km offshore of East Riding of Yorkshire in the Southern North Sea and will be the fourth project to be developed in the former Hornsea Zone. Hornsea Four will include both offshore and onshore infrastructure including an offshore generating station (wind farm), export cables to landfall, and connection to the electricity transmission network.

1.1.1.2 This document provides an overview of the documents prepared by the Applicant in relation to its proposed compensation measures, which form part of its without prejudice derogation case. These proposals have been prepared by the Applicant in response to stakeholder consultation on the potential effects from Hornsea Four on certain ornithological features of the Flamborough and Filey Coast (FFC) Special Protection Area (SPA). The intention of this document is to introduce the proposed compensation measures (that would be implemented if deemed necessary by the Secretary of State (SoS)) and to describe what other documents accompany the Development Consent Order (DCO) application that contain further details on the compensation proposals.

1.2 Flamborough and Filey Coast SPA

1.2.1.1 The Flamborough Head and Bempton Cliffs SPA was classified in August 1998. In August 2018, the site was extended and re-named the Flamborough and Filey Coast SPA. The site qualified under Article 4(2) of the Habitats Directive (92/43/EC) by supporting over 1% of the biogeographical populations of four regularly occurring migratory species and a breeding seabird assemblage of European importance (see [Table 1](#)).

Table 1: Qualifying features of the FFC SPA

Species	Count (period)	% of subspecies or population (pairs)
Black-legged kittiwake <i>Rissa tridactyla</i>	44,520 pairs (latest count ¹ cites 51,535) 89,040 breeding adults (2008-2011)	2% North Atlantic
Northern gannet <i>Morus bassanus</i>	8,469 pairs (latest count cites 13,392) 16,938 breeding adults (2008-2012)	2.6% North Atlantic
Common guillemot <i>Uria aalge</i>	41,607 pairs (latest count 60,877) 83,214 breeding adults (2008-2011)	15.6% (<i>Uria aalge albionis</i>)
Razorbill <i>Alca torda</i>	10,570 pairs (latest count 20,253) 21,140 breeding adults (2008-2011)	2.3% (<i>Alca torda islandica</i>)
	Count period	Average number of individuals
Seabird assemblage	2008-2012	216,730

1.2.1.2 The site's conservation objectives apply to the site and the individual species and/or assemblage of species for which the site has been classified. The objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as

¹ Latest colony census (2017) identified a population of 51,535 breeding pairs

appropriate and that the site contributes to achieving the aims of the Birds Directive²³, by maintaining or restoring:

- the extent and distribution of the habitats of the qualifying features;
- the structure and function of the habitats of the qualifying features;
- the supporting processes on which the habitats of the qualifying features rely;
- the populations of each of the qualifying features; and
- the distribution of qualifying features within the site.

1.2.1.3 It is important to note that all conservation objectives are ‘subject to natural change’, which ‘recognises that there are European sites and their wildlife which will be influenced and modified by unforeseen or unpredictable natural forces, events or processes which cannot be effectively prevented, avoided or managed at an individual site-level’ (Natural England, 2014⁴). Natural change includes natural physical change, effects of climate change, changes in economic factors and changes in social factors (Natural England, 2014). Additionally, this also includes interactions between habitats and species and their responses to these changes. The compensatory measures proposed should also be understood in this context.

1.2.1.4 The specific features of the FFC SPA that are of relevance to these without prejudice compensation measures, comprise:

- Kittiwake *Rissa tridactyla* (in relation to potential collision mortality);
- Gannet *Morus bassanus* (in relation to potential collision mortality and potential mortality as a consequence of displacement)⁵;
- Guillemot *Uria aalge* (in relation to potential mortality as a consequence of displacement); and
- Razorbill *Alca torda* (in relation to potential mortality as a consequence of displacement).

1.3 Potential for Adverse Effects from Hornsea Four

1.3.1.1 Following submission of its DCO application, the Applicant has revisited its conclusion of no adverse effect on integrity (AEol) in respect of the kittiwake feature of the Flamborough and Filey Coast Special Protection Area (FFC SPA) from Hornsea Four in combination with other plans and projects and concluded AEol on the FFC SPA in combination with other plans and projects. The Applicant maintains its position of no AEol alone for kittiwake and alone or in combination for all other qualifying species (guillemot, razorbill and gannet) of the FFC SPA, and for all other European sites.

1.3.1.2 The Applicant’s predicted impacts on these seabird species and relevant features of the FFC SPA from Hornsea Four are set out in [Table 2](#) along with the Applicant’s proposed

² Directive 2009/147/EC

³ The Habitats Directive requires Member States to nominate sites to be designated as Special Areas of Conservation (SACs) and the Birds Directive requires sites to be classified as Special Protection Areas (SPAs). Once a SAC has been designated or a SPA classified, such sites will be subject to the protection measures as set out in the Habitats Directive. (Articles 3 and 7 of the Habitats Directive extend its requirements to the Birds Directive).

⁴ Natural England Standard (2014) Conservation Objectives for European Sites in England Strategic Standard

⁵ Natural England are “minded to advise that AEol can be ruled out for the gannet feature of FFC SPA for Hornsea Four alone”. Regarding in-combination impacts, agreement has not been reached as yet solely because of the inclusion of the Dudgeon and Sherringham extension projects in the in-combination assessments and the uncertainties associated with those projects. Natural England further acknowledge, in their most recent advice, a shared ambition to rule out an adverse effect subject to clarification on impacts from the latest iteration of the Hornsea Four array. Despite the Applicant’s confidence that agreement will be reached with Natural England of no AEol in combination, Hornsea Four’s DCO application will be accompanied by a derogation case (including compensatory measures) for gannet which will be provided on a “without prejudice basis”.

required populations for compensation. The quantification of effects (see [Table 2](#)) have been updated following advice from Natural England in [Relevant Representations \(RR-029\)](#) on the MRSea baseline modelling. These amendments have resulted in small increases in the quantification of EIA and HRA effects since DCO submission (see [G5.25 Ornithology EIA and HRA Annex](#) submitted at Deadline 5). The bycatch reduction technology selection phase results (see [G5.13 Bycatch Reduction Technology Selection Phase Summary](#) submitted at Deadline 5) have also been used to update the number of vessels required to compensate for guillemot and razorbill, if deemed necessary by the Secretary of State. These revisions have been incorporated into [Table 2](#). The calculation methods for the compensation measures are provided in [G1.41 Calculation Methods of Hornsea Fours Proposed Compensation Measures for Features of the FFC SPA \(REP1-063\)](#).

Table 2: Summary of Hornsea Four predicted impacts on the relevant features of the FFC SPA

Impact	Quantification of Effect	Impact on site	Population required per annum by measure(s)	Population required per annum with a 1:2 ratio applied
Project Collision Risk on kittiwake (G5.25 Ornithology EIA and HRA Annex (submitted at Deadline 5))	Project alone: 23 (23.31) breeding adult individuals	The impact equates to a maximum of 0.15% of the current breeding population at FFC SPA (individuals).	62 (62.25) pairs (artificial nesting)	125 (124.5) pairs (artificial nesting)
Project Collision Risk and Displacement Effect on gannet (G5.25 Ornithology EIA and HRA Annex (submitted at Deadline 5))	Project alone: 6-8 (6.4-7.8) ⁶ (11 (11.02) – 12 (12.34) ⁷) breeding adult individuals	The impact equates to a maximum of 0.30-0.36% ⁸ (0.51-0.57% ⁹) of the current breeding population at FFC SPA (individuals).	36-43 (35.7-43.1) ¹⁰ (61-68 (61.11-68.49 ¹¹)) pairs (artificial nesting)	72-87 (71.4-86.2) ¹² (122-137 (122.23-136.98 ¹³)) pairs (artificial nesting) ¹⁴
Project Displacement Effect on guillemot (G5.25 Ornithology EIA and HRA Annex (submitted at Deadline 5))	Project alone: 40 (39.50) breeding adult individuals (based on 50% displacement and 1% mortality)	The impact equates to a maximum of 0.53% of the current breeding population at FFC SPA (individuals).	175 (174.58) breeding adults	175 (174.58) available nesting spaces (predator eradication) and 7 (7.42) vessels (bycatch reduction)

⁶ Based upon Natural England's new advice regarding inclusion of macro avoidance in collision risk assessments for gannet.

⁷ Without consideration of Natural England's new advice regarding inclusion of macro avoidance in collision risk assessments for gannet.

⁸ Based upon Natural England's new advice regarding inclusion of macro avoidance in collision risk assessments for gannet.

⁹ Without consideration of Natural England's new advice regarding inclusion of macro avoidance in collision risk assessments for gannet.

¹⁰ Based upon Natural England's new advice regarding inclusion of macro avoidance in collision risk assessments for gannet.

¹¹ Without consideration of Natural England's new advice regarding inclusion of macro avoidance in collision risk assessments for gannet and level that the Applicant proposes to compensate for.

¹² Based upon Natural England's new advice regarding inclusion of macro avoidance in collision risk assessments for gannet.

¹³ Without consideration of Natural England's new advice regarding inclusion of macro avoidance in collision risk assessments for gannet and level that the Applicant proposes to compensate for at a 1:2 ratio.

¹⁴ The number of vessels required for bycatch reduction compensation will be determined following further information that will be obtained throughout the gannet bycatch reduction workstreams.

Impact	Quantification of Effect	Impact on site	Population required per annum by measure(s)	Population required per annum with a 1:2 ratio applied
Project Displacement Effect on razorbill (G5.25 Ornithology EIA and HRA Annex (submitted at Deadline 5))	Project alone: 2 (1.94) breeding adult individuals (based on 50% displacement and 1% mortality)	The impact equates to a maximum of 0.05% of the current breeding population at FFC SPA (individuals).	12 (11.98) breeding adults	12 (11.98) available nesting spaces (predator eradication) and 1 (0.39) vessel (bycatch reduction)

1.4 Consultation

1.4.1.1 The Applicant has undertaken further consultation with statutory consultees, specifically in relation to the Compensation Measures, and key stakeholders located in the vicinity of the land potentially affected by some of the measures. This targeted consultation ran from 5th August to 6th September 2021. All responses and comments are presented in [B2.9 Record of Consultation \(APP-201\)](#) alongside the regard the Applicant has had to these consultation responses. Updates regarding stakeholder engagement and further consultation are provided in the Roadmaps (submitted at Deadline 5) and [G1.50 Compensation measures for FFC SPA: Derogation and Compensation Update Position Statement \(REP1-071\)](#).

2 Overarching compensation documents

2.1.1.1 Alongside this overview document, there are a number of key documents which contain the Applicant's without prejudice proposals for compensation measures. Those documents set out the criteria applied to the selection of the measure, a detailed description of each measure, and consideration of its deliverability and locations for delivery (see [Table 4](#)). The Applicant also provides details of proposals relating to wider workstreams being undertaken by the Applicant in relation to seabird prey resource, which whilst do not form part of the specific proposal, support the Applicant's submission. Further detail on these submissions is set out in [Table 3](#).

Table 3: Overarching Compensation Documents

Document Reference	Document Title	Detail
B2.6	Compensation measures for FFC SPA Overview	Document summarising the submission documents on the without prejudice compensation measure proposals.
B2.6.1	Compensation measures for FFC SPA: Compensation Criteria	The criteria that have been applied in identifying, evaluating and ultimately, selecting potential compensation measure options.
B2.6.2	Compensation measures for FFC SPA: Prey Resource Evidence	Detail of evidence linking seabird populations, prey availability and commercial fishing activity in the North Sea, and consideration of mechanisms to control or influence fishing.
B2.6.2.1	Ørsted's Strategic Compensation Approach	Detail of the funding proposed by the Applicant to demonstrate the financial commitment made to ensure the Secretary of State can have certainty that the research fund will be delivered,

Document Reference	Document Title	Detail
		therefore not requiring securement within the DCO (only required if Article 6(4) is engaged).

3 Prey Resource

- 3.1.1.1 The offshore wind sector has been engaging with key stakeholders (Natural England, JNCC and RSPB) on matters relating to seabird compensation for a number of years, and it is evident through this engagement that there is a view that tackling the pressure on seabird prey resource is an avenue that merits discussion. This has been reflected within the examination / determination phase submissions by interested parties on Hornsea Three, Norfolk Vanguard & Boreas and East Anglia ONE North and TWO. Similarly, it has been raised during consultations held by Hornsea Four with key stakeholders.
- 3.1.1.2 The Applicant has therefore, explored the evidence linking kittiwake, guillemot and razorbill (and to a lesser degree gannet) to prey species and identified gaps in knowledge ([B2.6.2 Compensation measures for FFC SPA: Prey Resource Evidence \(APP-184\)](#)). The report firstly provides an overview of the evidence linking prey resource of key species (namely kittiwake, guillemot and razorbill (and to a lesser degree gannet)) with commercial fishing activity in the North Sea. Aspects that are considered in detail comprise:
- a review of the role of forage fish species in the North Sea;
 - an evidence review of kittiwake, guillemot and razorbill feeding strategy;
 - an evidence review of prey dynamics, including interactions with commercial fisheries;
 - an overview of existing fisheries management; and
 - a summary of relevant evidence gaps.
- 3.1.1.3 The report then goes on to consider the mechanisms by which fishing practices within UK waters can be controlled and or influenced, with specific regard to:
- Fisheries management;
 - Spatial management;
 - Fishing restriction order or byelaw;
 - Quota management;
 - Rights acquisition; and
 - Commercial agreement.
- 3.1.1.4 The report identifies that whilst there is a clear link between seabird populations, prey resource and commercial fishing activity, there remains to be significant challenges for proportionate control measures to be developed at a project level.
- 3.1.1.5 All measures identified within the report ([B2.6.2 Compensation measures for FFC SPA: Prey Resource Evidence \(APP-185\)](#)) have a high level of technical difficulty and most have a measure of political challenge associated with them. All measures, apart from a commercial agreement, would need significant support from Defra, MMO, JNCC, Natural England and in some cases the Danish Government, as well as significant engagement and interaction with the Danish sandeel fishing industry.
- 3.1.1.6 Given the findings of the report ([B2.6.2 Compensation measures for FFC SPA: Prey Resource Evidence \(APP-185\)](#)), the Applicant advocates the need for a science-led and ecosystem-based assessment of predicted mortality to understand the predation rate

needed to feed into the maximum sustainable yield calculation. Therefore, a government-led approach to sustainable management of forage fish fisheries seems the only feasible proposition for a long-term measure addressing prey availability.

- 3.1.1.7 The Applicant will contribute to the Marine Recovery Fund (MRF) or other equivalent fund for the delivery of strategic compensation. The Applicant consider this to be an appropriate fund for the sums to be paid and has drafted specific wording to include in the DCO.

No turbine forming part of the authorised development may begin operation until the undertaker has paid the sum of £500,000 (five hundred thousand pounds) to the Marine Recovery Fund.

- 3.1.1.8 Further detail on the MRF and strategic compensation is detailed within [G5.8 Ørsted's approach to strategic ecological compensation](#) (submitted at Deadline 5).

4 Kittiwake Compensation Proposals

- 4.1.1.1 The Applicant has developed two options in relation to kittiwake compensation and a further supporting measure that seeks to provide additional resilience to seabirds, including kittiwake. The two options Hornsea Four are considering comprise the provision of either an offshore or onshore artificial nesting structure with a preference for an offshore repurposed artificial nesting structure. These proposals have been developed following on from experience gained on Hornsea Project Three (Hornsea Three), which was consented on the basis of delivering sufficient onshore artificial nesting structures to support the production of a specific number of breeding kittiwake. Hornsea Three undertook extensive evaluation of potential kittiwake compensation options, and through that process and subsequent determination from the Secretary of State, it has been firmly established that the provision of an artificial nesting structure forms a viable and deliverable mechanism for compensating potential impacts on the species.

- 4.1.1.2 Further detail on these submissions is set out in [Table 4](#).

- 4.1.1.3 In the DCO Application the Applicant's proposed "without prejudice" compensatory measures for gannet and kittiwake were presented together in a single B2.7 Gannet and Kittiwake Compensation Plan (APP-186). However, as set out in the Applicant's position paper ([G1.5 Kittiwake AEol Conclusion \(AS-023\)](#)), the Applicant is updating the Applicant's Report to Inform Appropriate Assessment (RIAA) ([B2.2 Report to Inform Appropriate Assessment Part 1](#) (submitted at Deadline 5) and [Part 4 \(REP1-012\)](#)), and its derogation case ([B2.5 Without Prejudice Derogation Case \(REP1-014\)](#)) based on an overall conclusion that there is potential for an AEol on kittiwake at the FFC SPA from Hornsea Four in-combination with other projects.

- 4.1.1.4 In light of the Applicant's updated position on kittiwake, it is considered appropriate to separate the compensatory measures for gannet ([G5.17: FFC SPA: Gannet Compensation Plan](#); to be submitted at Deadline 5) and kittiwake (Revision 2 of [B2.7: FFC SPA: Kittiwake Compensation Plan](#); to be submitted at Deadline 5) into separate compensation plans (and consequently separate Implementation and Monitoring plans), reflecting that compensatory measures for kittiwake are now considered necessary, whereas for gannet the Applicant remains confident there would be no AEol alone or in combination and the compensatory measures for gannet remain "without prejudice" measures.

Table 4: Kittiwake Compensation Documents

Document Reference	Document Title	Detail
B2.7	FFC SPA: Kittiwake Compensation Plan	Document setting out the without prejudice compensation measure proposals for the delivery of artificial nesting structures (for both offshore and onshore options) and fish habitat enhancement measures). Specifically, the document includes detail of Stakeholder Engagement, the DCO Requirement, the guidance that underpins the measure and, how the measure links to the sites Conservation Objectives. It then summarises the Evidence base to support the measures, provides an outline roadmap for further work required in the delivery of the measure, an outline of the monitoring approach and adaptive management measures and, the success criteria by which the measure can be evaluated. It will also provide detail on the site selection and consideration of alternatives, the design and construction of a structure, and the location, and any planning considerations. The plan then sets out an indicative outline programme for the delivery of the measure and finally, provides evidence as to how the measure will be funded and secured.
B2.7.1	Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence	A document setting out the ecological evidence base to demonstrate that offshore artificial nesting structures can provide a robust compensation measure option for kittiwake and gannet.
B2.7.1.	Appendix F: Population modelling of black-legged kittiwake on the English east coast to identify the population of first time breeders available to recruit to new colonies	A report detailing the PVA modelling to consider the resultant effect of reducing fishing pressure on kittiwake populations, inclusive of evidence on key foraging areas and prey resource around offshore platforms.
B2.7.2	Compensation measures for FFC SPA: Kittiwake Offshore Artificial Nesting Roadmap	A roadmap setting out the steps that will be undertaken by the Applicant between the point of DCO application and the commissioning of the wind farm, by which point the compensation measure will have been implemented.
B2.7.3	Compensation measures for FFC SPA: Onshore Artificial Nesting Ecological Evidence	A document setting out the ecological evidence that demonstrates that onshore artificial nesting structures can provide a robust compensation measure option for kittiwake and gannet.
B2.7.4	Compensation measures for FFC SPA: Kittiwake Onshore Artificial Nesting: Roadmap	A roadmap setting out the steps that will be undertaken by the Applicant between the point of DCO application and the commissioning of the wind farm, by which point the compensation measure will have been implemented.
B2.7.5	Compensation measures for FFC SPA: Artificial Nesting Site Selection and Design	A document providing initial design concepts and site selection for the offshore structures.
B2.7.6	Outline Kittiwake Compensation	A high level document that will set out the structure of the Kittiwake Compensation, Implementation and Monitoring Plan

Document Reference	Document Title	Detail
	Implementation and Monitoring Plan	(KCIMP), which will serve as the template for the pivotal document that will be secured via the DCO and developed post consent and which will set out the full delivery proposals for the compensatory measure(s) (including fish habitat enhancement as a resilience measure).

5 Guillemot and Razorbill Compensation Proposals

- 5.1.1.1 The Applicant has developed a package of compensation measures in relation to guillemot and razorbill compensation and a further supporting measure that seeks to provide additional resilience to seabirds, including guillemot and razorbill. The compensation measure being proposed by the Applicant are relative to the numbers being compensated for in **Table 2** and comprise bycatch reduction measures (to benefit guillemot and razorbill) and predator eradication at specific locations (to benefit guillemot and razorbill). These proposals have been developed following extensive discussions with the key stakeholder organisations (namely Natural England, JNCC and RSPB) as well as the wider scientific community.
- 5.1.1.2 The compensation measures proposed for guillemot and razorbill are both feasible and scalable for both species. It is important to note that if the Secretary of State deems compensation necessary for only one of the species, or for both species at a number greater than presented in **Table 2** then the scale of the compensation measure implemented would be altered appropriately in relation to the level of impact predicted (see Revision 2 of **B2.8 FFC SPA Guillemot and Razorbill Compensation Plan** (updated at Deadline 5)).
- 5.1.1.3 Further detail on these submissions is set out in **Table 5**.
- 5.1.1.4 In light of the Applicant's updated position on kittiwake the Applicant has separated the compensatory measures for gannet and kittiwake into separate Roadmaps, Compensation Plans (and consequently separate Implementation and Monitoring plans). Upon reflection the Applicant has also separated the Roadmaps, Compensation Plans (and consequently the Implementation and Monitoring Plans) for the auk species (guillemot and razorbill) and gannet. All of the compensation measures remain "without prejudice".

Table 5: Guillemot and Razorbill Compensation Documents

Document Reference	Document Title	Detail
B2.8	FFC SPA: Guillemot and Razorbill Compensation Plan	Document setting out the without prejudice compensation measure proposals for the delivery of the predator eradication, bycatch reduction and fish habitat enhancement measures. Specifically, the document will include detail of Stakeholder Engagement, the DCO Requirement, the guidance that underpins the measures and, how the measures link to the sites Conservation Objectives. It then summarises the Evidence base to support the measures, provides an outline roadmap for further work required in the delivery of the measure, an outline of the monitoring approach and adaptive management measures and, the success criteria by which the measure can be evaluated. It will also provide detail on the proposed locations of the

Document Reference	Document Title	Detail
		measures, the considerations of alternative measures, and information on the potential bycatch reduction measures to be trialled (for bycatch reduction). The plan then sets out an indicative outline programme for the delivery of the measures and finally, provides evidence as to how the measures will be funded and secured.
B2.8.1	Compensation measures for FFC SPA: Bycatch: Ecological Evidence	A document setting out the evidence base for bycatch being a pressure on guillemot and razorbill, how bycatch mitigation could benefit guillemot and razorbill and the locations where such measures may be viable for these species, along with evidence to support the connectivity of birds at these locations to those of the national site network.
B2.8.2	Compensation measures for FFC SPA: Guillemot and Razorbill Bycatch Reduction: Roadmap	A roadmap setting out the steps that will be undertaken by the Applicant between the point of DCO application and the commissioning of the wind farm, by which point the compensation measure will have been implemented (and continuing for the lifespan of the project).
B2.8.3	Compensation measures for FFC SPA: Predator eradication: Ecological Evidence	A document setting out the evidence base for the predation of guillemot and razorbill, the predator eradication to benefit guillemot and razorbill and the locations where such measures may be viable for these species.
B2.8.4	Compensation measures for FFC SPA: Predator Eradication Roadmap	A roadmap setting out the steps that will be undertaken by the Applicant between the point of application and the commissioning of the wind farm, by which point the compensation measure will have been implemented (with biosecurity being continued for the lifespan of the project).
B2.8.7	Outline Guillemot and Razorbill Compensation Implementation and Monitoring Plan	A high level document that will set out the structure of the Guillemot and Razorbill Compensation, Implementation and Monitoring Plan (GRCIMP), which will serve as the template for the pivotal document that can be secured if deemed necessary by the SoS via the DCO and developed post consent and which will set out the full delivery proposals for the compensatory measure(s) (including fish habitat enhancement as a resilience measure).

6 Gannet Compensation Proposals

- 6.1.1.1 The Applicant has developed a package of compensation measures in relation to gannet compensation and a further supporting measure that seeks to provide additional resilience to seabirds, including gannet. The compensation measure being proposed by the Applicant are relative to the numbers being compensated for in **Table 2** and comprise either an offshore or onshore artificial nesting structure (with a preference for an offshore repurposed artificial nesting structure) combined with the kittiwake compensation measure, as well as bycatch reduction measures (to benefit gannet) and a further supporting measure that seeks to provide additional resilience to seabirds, including gannet.
- 6.1.1.2 The compensation measures proposed for gannet are both feasible and scalable (see **G5.17 FFC SPA: Gannet Compensation Plan** (submitted at Deadline 5)).

6.1.1.3 Further detail on these submissions is set out in [Table 6](#).

Table 6: Gannet Compensation Documents

Document Reference	Document Title	Detail
B2.7.1	Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence	A document setting out the ecological evidence base to demonstrate that offshore artificial nesting structures can provide a robust compensation measure option for kittiwake and gannet.
B2.7.3	Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence	A document setting out the ecological evidence base to demonstrate that onshore artificial nesting structures can provide a robust compensation measure option for kittiwake and gannet.
B2.7.5	Compensation measures for FFC SPA: Offshore Artificial Nesting: Site Selection and Design	A document providing initial design concepts and site selection for the offshore structures.
G1.42	Compensation measures for FFC SPA: Gannet Bycatch: Ecological Evidence	A document setting out the evidence base for bycatch being a pressure on gannet, how bycatch mitigation could benefit gannet, and the locations where such measures may be viable.
G5.15	Outline Gannet Compensation Implementation and Monitoring Plan Bycatch Reduction	A high level document that sets out the structure of the Gannet Compensation, Implementation and Monitoring Plan (GCIMP) for bycatch reduction, which will serve as the template for the pivotal document that can be secured if deemed necessary by the SoS via the DCO and developed post consent and which will set out the full delivery proposals for the compensatory measure(s) (including fish habitat enhancement as a resilience measure).
G5.16	Outline Gannet Compensation Implementation and Monitoring Plan Artificial Nesting Structure	A high level document that sets out the structure of the Gannet Compensation, Implementation and Monitoring Plan (GCIMP) for artificial nesting, which will serve as the template for the pivotal document that can be secured if deemed necessary by the SoS via the DCO and developed post consent and which will set out the full delivery proposals for the compensatory measure(s) (including fish habitat enhancement as a resilience measure).
G5.17	FFC SPA: Gannet Compensation Plan	A document setting out the without prejudice compensation measure proposals for the delivery of an artificial nesting structure (both offshore and onshore options are set out, of which one may be required), bycatch reduction and fish habitat enhancement measures for gannet. Specifically, the document includes detail of Stakeholder Engagement, the DCO Requirement, the guidance that underpins the measure and, how each of the measures link to the FFC Site Conservation Objectives. It then summarises the Evidence base to support the measures, provides an Roadmap for further work required in the delivery of the measure, an

Document Reference	Document Title	Detail
		outline of the monitoring approach and adaptive management measures and, the success criteria by which the measure can be evaluated. It also provides detail on the site selection and consideration of alternatives, the design and construction of any structures, and their location, and any planning considerations. Furthermore, the document outlines the bycatch reduction compensation measure also proposed for this species and the resilience measure of fish habitat enhancement for the benefit of kittiwake, guillemot, razorbill and gannet. The plan then sets out an indicative outline programme for the delivery of the measures and finally, provides evidence as to how the measures will be funded and secured.
G5.18	Compensation measures for FFC SPA: Gannet Bycatch Reduction Roadmap	A roadmap setting out the steps that will be undertaken (should they be deemed necessary) by the Applicant between the point of DCO application and the commissioning of the wind farm, by which point the compensation measure will have been implemented (and continuing for the lifespan of the project).
G5.19	Compensation measures for FFC SPA: Gannet Artificial Nesting Roadmap	A Roadmap setting out the steps that will be undertaken (should they be deemed necessary) by the Applicant between the point of DCO application and the commissioning of the wind farm, by which point the compensation measure will have been implemented.

7 Fish Habitat Enhancement

- 7.1.1.1 The Applicant has engaged with key stakeholders (namely Natural England, JNCC and RSPB) on the merits of developing a resilience measure linked to the enhancement of prey habitat, noting that prey resource has the potential to be a limiting factor for the success of seabird populations (Davies, 2012; Hjernquist and Hjernquist, 2010; Thaxter *et al.*, 2013; Unsworth and Butterworth, 2021). The Applicant has engaged the leading seagrass experts in the UK (namely, Swansea University) to provide advice on the ecological benefits of seagrass restoration, the practicality of undertaking restoration projects, and potentially suitable locations for such restoration work within the UK. Furthermore, the Applicant has been engaging with numerous organisations involved in seagrass restoration to explore opportunities and potential collaborators for a seagrass restoration project.
- 7.1.1.2 The work undertaken by Swansea University has identified that seagrass beds have the potential to significantly increase biodiversity and act as a refuge for juvenile fish species including species such as Ammodytidae, Clupeidae and Gadidae. These species of fish are common prey resource for the seabird species targeted by the principal compensation measure proposals (namely kittiwake, guillemot and razorbill). Engagement with Natural England, JNCC and RSPB has established that there is merit in the Applicant pursuing the restoration of seagrass beds. It has been acknowledged by the Applicant and Statutory Nature Conservation Bodies (SNCB), that the merit of the measure has the potential to be further enhanced via implementation in regions where the principal compensation measures are also being applied as part of a wider resilience programme, though its merit

is not limited in being delivered as such.

- 7.1.1.3 The Applicant has, therefore, taken steps to explore the potential to support the delivery of seagrass bed restoration projects initially in two strategic areas (the North East and the South West) to align with the geographical focus of the gannet, guillemot, razorbill and kittiwake distributions and compensation proposals. In support of this work, Hornsea Four has developed a number of documents as set out in [Table 7](#).
- 7.1.1.4 It is important to note that this proposed seagrass restoration work is not put forward as a compensation measure in its own right, but rather is proposed as a resilience measure to supplement the compensation measures described above and below for gannet, guillemot, razorbill and kittiwake. The Applicant has commissioned a trial scheme, which is being carried out by the Yorkshire Wildlife Trust of which 2 hectares of seagrass have been planted within the Humber Estuary and is being monitored to determine the trial scheme's success, prior to expanding to a wider area. The Applicant has commissioned the planting of a further 2 hectares following this initial success which will commence planting in 2022. In addition, Ocean Ecology Limited and Swansea University are conducting an implementation study for seagrass restoration to further inform large-scale restoration and adaptive management. The Applicant has committed to planting 30 hectares of seagrass as a resilience measure in the Humber Estuary following DCO consent. The resilience measure of fish habitat enhancement to support the compensation measures proposed is feasible, scalable and can be secured.

Table 7: Seagrass Habitat Restoration Compensation Documents

Document Reference	Document Title	Detail
B2.8.5	Fish Habitat Enhancement: Ecological Evidence	A document setting out the evidence base for the importance of seagrass habitats in terms of biodiversity enhancement, its ability to support prey resource of target seabird species, and the ability to restore such habitats in UK waters.
B2.8.6	Fish Habitat Enhancement: Roadmap	A document setting out the steps undertaken by the Applicant to date and planned in the future for the delivery of seagrass habitat restoration projects at specific locations within the UK.

8 References

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