



Hornsea Project Four

FFC SPA: Gannet Compensation Plan

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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).
European site	A Special Area of Conservation (SAC) or candidate SAC (cSAC), a Special Protection Area (SPA) or a site listed as a Site of Community Importance (SCI). Potential SPAs (pSPAs), possible SACs (pSACs) and Ramsar sites are also afforded the same protection as European sites by the National Planning Policy Framework – para 176 (Ministry of Housing, Communities and Local Government, 2019). European offshore marine sites are also referred to as "European sites" for the purposes of this document.
Habitats Regulations	The Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017
Habitats Regulations Assessment (HRA)	A process which helps determine likely significant effects and (where appropriate) assesses adverse impacts on the integrity of European sites. The process consists of up to four stages: 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.
Offshore Ornithology Engagement Group (OOEG)	The Hornsea Four Offshore Ornithology Engagement Group means the group that will assist, through consultation the undertaker in relation to the delivery of each compensation measures as identified in the gannet compensation plan, the kittiwake compensation plan and the gannet razorbill and guillemot compensation plan. Matters to be consulted upon to be determined by the Applicant and will include site selection, project/study design, methodology for implementing the measure, monitoring, and adaptive management options as set out in the gannet compensation plan, the kittiwake compensation plan and the gannet razorbill and guillemot compensation plan.
National Site Network	The network of European Sites in the UK. Prior to the UK's exit from the EU and the coming into force of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 these sites formed part of the EU ecological network known as "Natura 2000".
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 population's breeding and migratory range.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).

Term	Definition
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Report to Inform Appropriate Assessment	The information that the Competent Authority needs to inform an Appropriate Assessment at Stage 2 of the HRA process and which has been provided by the Applicant in [the RIAA (Volume 2, Annex 2: Report to Inform Appropriate Assessment (Part 1) (submitted at Deadline 5), REP2-005, AS-013, REP1-012, APP-171-178).
Special Area of Conservation (SAC)	Strictly protected sites designated pursuant to Article 3 of the Habitats Directive (via the Habitats Regulations) for habitats listed on Annex I and species listed on Annex II of the directive.
Special Protection Area (SPA)	Strictly protected sites designated pursuant to Article 4 of the Birds Directive (via the Habitats Regulations) for species listed on Annex I of the Directive and for regularly occurring migratory species.

Acronyms

Term	Definition
AEOI	Adverse Effect on Integrity
cSAC	Candidate Special Area of Conservation
DCO	Development Consent Order
FFC	Flamborough and Filey Coast
GCIMP	Gannet Compensation Implementation and Monitoring Plan
HRA	Habitats Regulations Assessment
MMO	Marine Management Organisation
NFFO	National Federation of Fisheries Organisation
OEL	Ocean Ecology Limited
OOEG	Offshore Ornithology Engagement Group
PINS	Planning Inspectorate
pSACs	Possible Special Area of Conservation
pSPAs	Potential Special Protection Area
RIAA	Report to Inform Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SCI	Site of Community Importance
SNCBs	Statutory Nature Conservation Bodies
SoS	Secretary of State
SPA	Special Protection Area
SU	Swansea University
UK	United Kingdom
UoH	University of Hull
YWT	Yorkshire Wildlife Trust

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 the 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. Detailed information on the project design can be found in [A1.4: Project Description \(APP-010\)](#), with detailed information on the site selection process and consideration of alternatives described in [A1.3: Site Selection and Consideration of Alternatives \(APP-009\)](#).
- 1.1.1.2 The Hornsea Four Agreement for Lease (AfL) area was 846 km² at the Scoping phase of project development. In the spirit of keeping within Hornsea Four's approach to Proportionate Environmental Impact Assessment (EIA), the project has given due consideration to the size and location (within the existing AfL area) of the final project that is being taken forward to Development Consent Order (DCO) application. This consideration is captured internally as the "Developable Area Process", which includes Physical, Biological and Human constraints in refining the developable area, balancing consenting and commercial considerations with technical feasibility for construction.
- 1.1.1.3 The combination of Hornsea Four's Proportionality in EIA and Developable Area Process has resulted in a marked reduction in the array area taken forward at the point of DCO application. Hornsea Four adopted a major site reduction from the array area presented at Scoping (846 km²) to the Preliminary Environmental Information Report (PEIR) boundary (600 km²), with a further reduction adopted for the Environmental Statement (ES) and DCO application (486 km²) due to the results of the PEIR, technical considerations and stakeholder feedback. The evolution of the Hornsea Four Order Limits is detailed in [A1.3: Site Selection and Consideration of Alternatives \(APP-009\)](#) and [A4.3.2: Selection and Refinement of the Offshore Infrastructure \(APP-037\)](#).
- 1.1.1.4 Following the Applicant's submission, 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 or in combination for all other qualifying species (guillemot, razorbill and gannet) of the FFC SPA and for all other European sites.
- 1.1.1.5 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 has updated the Applicant's Report to Inform Appropriate Assessment (RIAA) (Revision 3 of [B2.2 Report to Inform Appropriate Assessment Part 1](#) (to be 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.

- 1.1.1.6 In light of the Applicant's updated position on kittiwake, it is considered appropriate to separate the compensatory measures for gannet and kittiwake 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.
- 1.1.1.7 This document sets out the Compensation Plan for northern gannet *Morus bassanus* (gannet) associated with the FFC SPA. Collectively it has been termed the Gannet Compensation Plan. It has been developed in support of Hornsea Four in the instance that the Secretary of State does not agree with the conclusions of the RIAA in relation to the impact on gannet from the operation of the proposed wind farm.
- 1.1.1.8 Specifically, this plan sets out how the compensation measures of artificial nesting and bycatch reduction for gannet can be secured at the time of DCO being granted (should the Secretary of State determine that compensation is required). In addition, this plan sets out the resilience measure for gannet compensation through fish habitat enhancement. It is important to note at this stage that the site selection, detailed design, monitoring and adaptive management of the proposed compensation and resilience measures would be developed in consultation with the Hornsea Four Offshore Ornithology Engagement Group (OOEG) and outlined in the Gannet Compensation Implementation and Monitoring Plans (GCIMPs) (artificial nesting GCIMP and bycatch GCIMP) for approval by the Secretary of State post-consent. Both artificial nesting and bycatch reduction have the capability to ensure the scale of compensation is met (see [Table 2](#) of Revision 2 of [B2.6: Compensation measures for FFC SPA: Overview](#) (updated revision submitted at Deadline 5)).
- 1.1.1.9 Further details on the precise delivery methodology for the measure would be provided in the GCIMPs submitted to the Secretary of State prior to the operation of any wind turbine generator. The GCIMPs would be approved by the Secretary of State in consultation with the MMO/local planning authority and Natural England prior to the operation of any wind turbine generator. An outline version of the GCIMPs (which details its proposed content) is presented in [G5:16 Outline Gannet Compensation Implementation and Monitoring Plan Artificial Nesting Structure](#) and [G5:16 Outline Gannet Compensation Implementation and Monitoring Plan Bycatch](#) (submitted at Deadline 5).

1.2 Predicted Effects

- 1.2.1.1 This Gannet Compensation Plan relates to the potential collision and displacement effect for gannet mortality from the operation and maintenance phase of Hornsea Four. The predicted magnitude of this impact on the gannet features of the FFC SPA is presented in [Table 2](#) of Revision 2 of [B2.6: Compensation measures for FFC SPA Overview](#) (updated revision submitted at Deadline 5).
- 1.2.1.2 The Applicant has undertaken a robust RIAA ([B2.2: Report to Inform Appropriate Assessment](#) (Revision 3 of [Part 1](#) to be submitted at Deadline 5, [AS-013](#), [REP-012](#), [REP2-005](#) and [APP-171-APP-178](#))) and concluded that based on the available evidence relating to the potential for collision and displacement for gannet, it does not consider there to be

potential for AEol on the conservation objectives of the FFC SPA either from the project alone or in-combination.

- 1.2.1.3 **Table 2** of Revision 2 of **B2.6: Compensation measures for FFC SPA Overview** (updated revision submitted at Deadline 5) presents the species impact levels, compensation numbers, compensation measure ratio and percentage of current breeding population relative to FFC SPA.

1.3 Compensation Measures

1.3.1 Background

- 1.3.1.1 In the event that the Secretary of State would be unable to reach a conclusion of no AEol on the conservation objectives of the FFC SPA for gannet, the Applicant has developed a "without prejudice" package of compensation measures that could be applied (by the Secretary of State) to compensate at scalable levels for the predicted collision and displacement impact upon gannet, from Hornsea Four.

- 1.3.1.2 The proposed compensation measures for gannet are outlined in **Table 1** and are presented in detail in **Sections 3** and **4**. The location of the search area for these measures (as well as the other compensation and resilience measures being proposed for Hornsea Four) is shown in **Figure 1**. Hornsea Four is confident that the compensation measures are robust, deliverable and scalable. Furthermore, the inclusion of a resilience measure (fish habitat enhancement) provides stakeholders with additional comfort on the level of compensation that can be provided.

1.3.2 Strategic Compensation

- 1.3.2.1 The Applicant has amended the DCO wording in **Section 6** to reflect their intention to rely upon the option to discharge their obligation of compensation through the delivery of strategic compensation. The detail of strategic compensation approach and the Marine Recovery Fund (MRF) is set out in within **G5.8 Ørsted's approach to strategic ecological compensation** (submitted at Deadline 5), and set out in the Roadmaps. If the Applicant has elected to pay a contribution to the Marine Recovery Fund ("MRF") or equivalent fund then the relevant section in the KCIMP shall include the sum of the contribution as agreed between the Applicant and the Department for Environment Food and Rural Affairs (Defra) in consultation with the OoEG. If the contribution is in substitution for one or more of the compensation measures, then the relevant sections in the KCIMP will not be completed as they will no longer be required. For the avoidance of doubt, the Applicant's obligations to deliver compensation measures shall either be discharged through the delivery of strategic compensation through the contribution to the MRF, or through the delivery of compensation measures as set out within this compensation plan, with either option detailed within the KCIMP.

- 1.3.2.2 Alternatively, if the contribution to the MRF is an adaptive measurement measure then the relevant section of the KCIMP shall include details as to the trigger for payment of the contribution (see **Section 6**).

Table 1: Compensation Measures developed by Hornsea Four for gannet.

Compensation Measure	Summary
Artificial Nesting Structure: Offshore	These measures would comprise of the repurposing of an existing offshore structure (preferred compensation measure) or the creation of a new offshore or onshore structure to increase the annual recruitment of gannet into the biogeographical gannet populations. The location would be discussed with the OOEG (see Section 3) prior to implementation and agreed with the Secretary of State through submission of the artificial nesting GCIMP. The implementation of the measure would be monitored, and adaptive management measures developed, if required.
Artificial Nesting Structure: Onshore	
Bycatch Reduction	Bycatch reduction involves the initial identification of gannet bycatch rates in longlines and techniques that may be deployed to reduce this. Following the implementation of a method/ methods, monitoring will be undertaken to assess the bycatch rates of gannet and an adaptive management plan will be prepared in consultation with the OOEG.
Fish Habitat Enhancement	This resilience measure would comprise the enhancement of the chosen site where seagrass beds have been known to previously exist and works undertaken to restore (or reinstate) this habitat. The success of the reinstatement would be monitored along with the recording of increased biodiversity within the habitats including fish species.

Hornsea 4

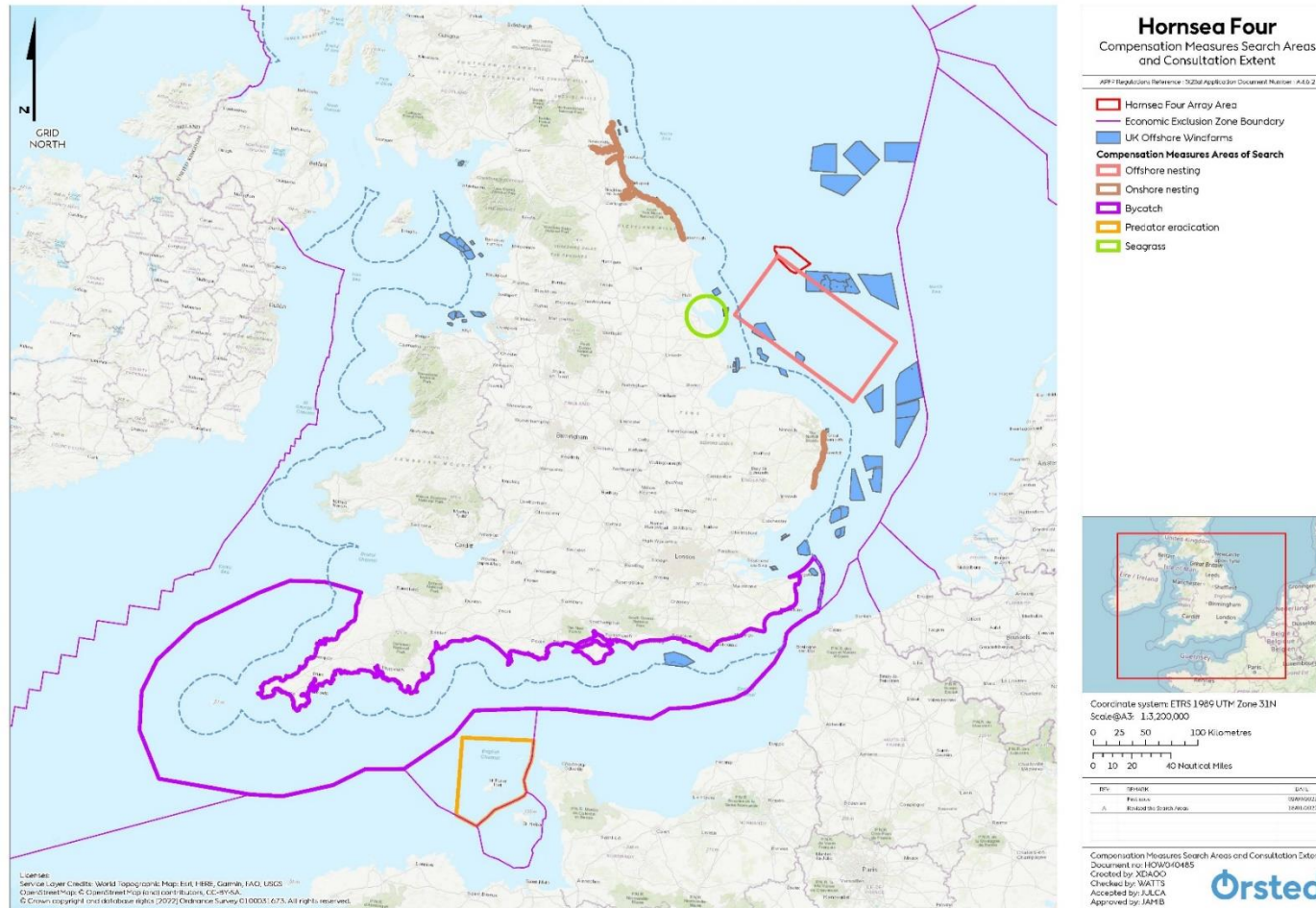


Figure 1: Location of areas of search for the Hornsea Four compensation measures.¹

¹ For gannet, longline bycatch reduction is being explored with fishers who use the Cornwall area and further west towards Gran Sol (west Atlantic region) and the Applicant is gathering information to refine locations. The Applicant is however, confident in the conclusion of no AEoI for gannet and therefore the requirement to deliver this compensation measure is not currently envisaged.

- 1.3.2.3 For gannet, there are two potential primary compensation measures being proposed. The first is the provision of an artificial nesting structure (either onshore or offshore). Artificial nesting was initially developed for kittiwake (detail within the [B2.7 Kittiwake Compensation Plan \(APP-186\)](#)), this design has been refined and adapted to be suitable for gannet and this is reflected in the design presented in the [G5.19 Gannet Artificial Nesting Roadmap](#) (submitted at Deadline 5). The Applicant's preference is supported by the acquired ecological evidence ([B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence \(APP-187\)](#)) indicating strong efficacy for a repurposed existing offshore structure for artificial nesting. However, if deemed necessary by the Secretary of State, the Applicant could provide either a new offshore or a new onshore structure as a compensation measure for gannet (see [Section 3](#)). The objective of the second primary compensation measure is to reduce bycatch at a chosen fishery or fisheries hence reducing the number of direct mortalities per annum. Hook shielding in longline fisheries has been identified as the technique with the highest potential to reduce gannet mortalities in bycatch ([G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#)) (submitted at Deadline 1). In addition, as part of the suite of measures to support gannet (and as outlined within the Kittiwake Compensation Plan and the Guillemot and Razorbill Compensation Plan as well ([B2.7 FFC SPA: Kittiwake Compensation Plan \(APP-186\)](#) and [B2.8 FFC SPA Guillemot and Razorbill Compensation Plan \(APP-193\)](#)), fish habitat enhancement would also be undertaken at a chosen location. The habitat restored (namely, seagrass) would support a number of fish species upon which gannet (and seabirds more generally including kittiwake, guillemot and razorbill) target as prey resource, therefore, this measure serves as a more indirect means to offer resilience to the gannet populations within the targeted area(s).
- 1.3.2.4 Information is presented in [Sections 3, 4](#) and [5](#) on a measure-by-measure basis and draws on evidence presented in the associated evidence reports ([B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence \(APP-187\)](#), [B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence \(APP-189\)](#), [G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#) (submitted at Deadline 1) and [B2.8.5 Compensation measures for FFC SPA: Fish Habitat Enhancement: Ecological Evidence \(APP-198\)](#)). To avoid repetition, this document should be read alongside each relevant Evidence Report. However, a brief summary of the key evidence that underpins the compensation measure is provided in this report.

1.4 Stakeholder Engagement

- 1.4.1.1 The Applicant has undertaken extensive consultation with relevant stakeholders (namely, Natural England, Joint Nature Conservation Committee (JNCC), the Royal Society for the Protection of Birds (RSPB), BirdLife International, the Marine Management Organisation (MMO), the Planning Inspectorate (PINS), Defra, The Crown Estate (TCE), East Riding of Yorkshire Council (ERYC), The Wildlife Trusts, the National Federation of Fisherman's Organisations (NFFO) and relevant local organisations) on the compensation measures for Hornsea Four. Further detail on this consultation is presented in the Record of Consultation ([B2.9: Record of Consultation \(APP-201\)](#)).
- 1.4.1.2 If the Secretary of State determines that compensation is required, following the DCO being granted, a Hornsea Four OOEG would be established with core members being the relevant

Statutory Nature Conservation Bodies (SNCBs) and the MMO/local planning authority. The RSPB and the NFFO would also be invited to form part of the OOEG, as an advisory member. The purpose of this group would be to align on detailed site selection, design, adaptive management and monitoring to inform the delivery of the compensation post consent.

- 1.4.1.3 The Applicant would engage with and inform (as appropriate) the OOEG at least annually in the establishment phase and as needed, and as documented in GCIMP throughout the monitoring period. Terms of Reference would be agreed between the parties, which would also be submitted to the Secretary of State for approval. The Applicant would be the chair and convener of the OOEG.

2 Guidance

2.1 European Commission Guidance

- 2.1.1.1 This Gannet Compensation Plan takes into consideration information from Defra 2012 Guidance, Defra Best Practice Guidance for developing compensatory measures in relation to Marine Protected Areas 2021 (in consultation), European Commission (EC) 2018 Managing Natura 2000 sites, the Planning Inspectorate's Advice Note Ten, precedents sets by recent cases such as the Hornsea Three DCO, the principles drawn from relevant case law, and Tyldesley and Chapman's HRA Handbook. The EC 2018 guidance identifies the following criteria must be considered when developing compensatory measures:

- Coordination and cooperation between Natura 2000 authorities, assessment authorities and the proponent of the plan or project;
- Clear objectives and target values according to the site's conservation objectives;
- Description of the compensatory measures, accompanied by a scientifically robust explanation of how they will effectively compensate for the negative effects and how they will ensure the overall coherence of Natura 2000 is protected;
- Demonstration of the technical feasibility of the measures in relation to their objectives;
- Demonstration of the legal and/or financial feasibility of the measures according to the timing required;
- Analysis of suitable locations and acquisition of the rights;
- Timeframe in which the compensation measures are expected to achieve their objectives;
- Timetable for implementation of compensation and co-ordination with the schedule for the project implementation;
- Public information and/or consultation stages;
- Specific monitoring and reporting schedules; and
- The financing.

- 2.1.1.2 These have been addressed through the subsequent sub-headings in this Gannet Compensation Plan.

2.2 Conservation Objectives

- 2.2.1.1 The Conservation Objectives for the FFC SPA are to ensure that the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Birds Directive, by maintaining or restoring (see [B2.2: Report to Inform Appropriate](#)

Assessment (Revision 3 of Part 1, 3 & 4 to be submitted at Deadline 5, [REP2-005 and APP-171-APP-178](#)) for further detail):

- 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 population of each of the qualifying features; and,
- The distribution of the qualifying features within the site.

2.2.1.2 Given the potential impact pathway of Hornsea Four wind farm for which compensation may be required, it is the latter two points only which are of relevance. The evidence presented within this Gannet Compensation Plan and supporting annexes demonstrates that the proposed measure is predicted to more than offset the estimated impact of Hornsea Four wind farm on the qualifying gannet features (as determined by the Secretary of State). Whilst the measure cannot be undertaken within the FFC SPA, the birds that the compensation measure will generate will assimilate into the biogeographical gannet populations and thereby ensure that the coherence of the national site network is maintained. Further information to support this is provided in ([B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence \(APP-187\)](#)), [B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence \(APP-189\)](#), and [G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#) (submitted at Deadline 1)).

3 Onshore and Offshore Gannet Nesting Structure

3.1 Introduction

- 3.1.1.1 One of the compensation measures that the Applicant proposes to implement for gannet is the provision of an artificial nesting structure. This structure would be either the preferred option of repurposing an existing offshore structure or constructing a new structure, either offshore or onshore. The following sections provide an overview of the key aspects which have been evidenced by the Applicant to date to provide the Secretary of State with sufficient confidence in onshore or offshore nesting structure as a compensation measure for Hornsea Four. The artificial nesting structure was initially developed for kittiwake (detail within the [B2.7 Kittiwake Compensation Plan \(APP-186\)](#)), and has been refined and adapted to also be suitable for gannet as outlined in this Compensation Plan and presented in the [G5.19 Gannet Artificial Nesting Roadmap](#) (submitted at Deadline 5).
- 3.1.1.2 The aim of the compensation is to provide one structure that can sustain the required breeding population of gannet (breeding adults) as set out in [Table 2](#) of Revision 2 of [B2.6: Compensation measures for FFC SPA Overview](#) (updated at Deadline 5).
- 3.1.1.3 This section of the Gannet Compensation Plan covers the intended plan for either offshore or onshore artificial nesting options due to the similarity between the implementation of both. Where differences between the offshore and onshore options exist, this is clearly noted and described.
- 3.1.1.4 While the following sections provide a brief overview of the evidence in support of the measures for gannet, to avoid repetition, a detailed overview of the evidence supporting this compensation measure is provided in the Onshore Nesting Structure Evidence Report and

the Offshore Nesting Structure Evidence Report (**B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence (APP-187)**), **B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence (APP-189)**). Therefore, the evidence reports should be read alongside this Compensation Plan.

- 3.1.1.5 The EC Guidance recognises that the feasibility of the identified compensation measure must be based on the best scientific knowledge available. The novelty of developing compensation for a seabird species in the UK increases the importance of pre- and post-implementation monitoring. There will, following award of consent, be a phase of further evidence gathering followed by monitoring which will continue through operation. Where necessary, monitoring and adaptive management will ensure, in line with Guidance, that the proposals are developed in the most appropriate manner and can be flexible to enable modifications to be made where evidence suggests it is merited. These topics are covered in the following sections of the report.
- 3.1.1.6 Should this compensation measure be deemed necessary, the next steps required to implement it by the Applicant are set out in the Gannet Artificial Nesting Roadmap (**G5:19: Compensation measures for FFC SPA: Gannet Artificial Nesting Roadmap** (submitted at Deadline 5)).

3.2 Timescales for establishment of results of measure

- 3.2.1.1 The compensation measure comprises the delivery of one artificial nesting structure in either the offshore or onshore environment (preferred option being offshore repurposed) with each capable of supporting the number of breeding pairs of gannet as set out in **Table 2** of Revision 2 of **B2.6: Compensation measures for FFC SPA Overview** (updated at Deadline 5).
- 3.2.1.2 Based on the evidence provided in the Evidence Reports (**B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence (APP-187)**), **B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence (APP-189)**), the Applicant will factor in an appropriate lead in time such that the compensatory measure will deliver the appropriate number of adult (breeding age) gannet into the biogeographical population to offset the impact, thereby maintaining the coherence of the national site network.
- 3.2.1.3 The Applicant has carefully considered the ecological evidence and technical delivery of compensation in regard to an appropriate lead in time for the compensatory measure. The Applicant makes a commitment to implement the nesting structure three breeding seasons ahead of operation of the windfarm. Further information in relation to the timescales of the measure is presented within the Applicant's artificial nesting Roadmap for gannet (**G5:19 Compensation measures for FFC SPA: Gannet Artificial Nesting Roadmap** (submitted at Deadline 5)).
- 3.2.1.4 The Policy paper 'British Energy Security Strategy' published by BEIS in April 2022² recognises the even greater need for rapid development of offshore wind farms committing to 'cut the process time by over half' and 'helping to speed up delivery timelines'.
- 3.2.1.5 The Applicant recognises how vital it is that the compensation delivered is not only successful for Hornsea Four, but for the industry and that the progress will be watched

² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1069969/british-energy-security-strategy-web-accessible.pdf

closely. The Applicant retains its commitment to implement an artificial nesting structure three breeding seasons ahead of operation of the windfarm, as it has been argued that this balances the need to demonstrate the compensation measure will be effective with the pressing and urgent need to deliver 50GW of offshore wind energy by 2030, as set out in the British Energy Security Strategy. The Applicant does however believe that there is now a strong case to be made not to include a specific timescale in the DCO ahead of operation, but rather to simply state that the artificial nesting structures should be in place prior to operation. This approach would remove this issue as an impediment to the faster deployment of offshore wind energy.

- 3.2.1.6 The Applicant will continue to seek opportunities to accelerate the construction of the artificial nesting structure. It is noted that in February 2022, the UK Department of Business, Energy & Industrial Strategy (BEIS) committed to annual CfD auctions from March 2023 and Auction Round 5. Previously, CfD auctions 1 to 4 had been held on an approximate 2-year cycle. Coupled with the new 50GW target, this demonstrates the clear priority to deliver significant capacity of offshore wind by 2030.
- 3.2.1.7 This commitment to implement the nesting structure three breeding seasons ahead of operation of the windfarm is provided within **G5:19 Compensation measures for FFC SPA: Gannet Artificial Nesting Roadmap** (submitted at Deadline 5)).

3.3 Site Selection

- 3.3.1.1 The site selection has initially been developed for kittiwake (detailed within the **B2.7 Kittiwake Compensation Plan (APP-186)**), however during the refinement process, the preferred search area has also been further reviewed and considered for gannet suitability.

3.4 Design

- 3.4.1.1 Any new structure is most likely to be bespoke or a modification to an existing building or piece of infrastructure (such as a seawall or offshore platform) which is currently colonised. The design will also vary depending on the onshore or offshore location. The onshore structure design will likely be influenced by landowner negotiations, landscape character, and existing environment of the selected location. Hornsea Four will apply the results of ongoing Hornsea Three consultation on design as a starting point, to avoid repetition.
- 3.4.1.2 The Applicant will consult with the OoEG when developing the final design for the structure to ensure there is opportunity for stakeholders to feed into the process, with the final scheme set out in the relevant GCIMP.
- 3.4.1.3 The initial structure design (or design for repurposing) will allow for appropriate monitoring, adaptive management measures and any maintenance which may be required. This information will be provided within the relevant GCIMP, along with the evidence on which it is based. Furthermore, information in relation to health, safety and environment considerations, including health and safety during monitoring will also be provided in-line with industry standards.
- 3.4.1.4 The design has initially been developed for kittiwake as it has been accepted by the Applicant that compensation will be undertaken for the species. If compensation is required for gannet, a joint structure for both kittiwake and gannet has been proposed which will mimic natural seabird breeding colonies (including FFC SPA) where both kittiwake and

gannet (along with other seabird species) breed in close proximity to each other. The Applicant is working with consultants to ensure elements of the artificial nesting structure provide optimally designed nesting opportunities for gannet. The nest design for gannet draws upon the ecological evidence and associated design criteria derived from this evidence to optimise the measure (see [B2.7.5: Compensation measures for FFC SPA Artificial Nesting Site Selection and Design \(APP-191\)](#)). The following broad design concepts are all considered to have the potential to meet the necessary design criteria and will be considered within the artificial nesting GCIMP:

- Allocation on a flat, gently sloping or undulating surface, engineered to replicate the rock that gannet naturally nest on;
- Each gannet nest requires approximately 80 cm diameter hexagonal space based on measurement between adjacent nest centres at various colonies. the design would provide surface space for the required number of gannet nests with a centre to centre spacing of 75cm to 80cm between nests;
- Uninterrupted approach (i.e. without hand railings etc); and
- Gannets preferentially establish nests adjacent to an existing gannet nest, therefore a cluster of decoys and decoy nests is indicated as a potential mechanism for attracting nesting.

3.4.1.5 The initial design has been refined and adapted to be suitable for gannet and this is reflected in the design presented in the [G5.19 Gannet Artificial Nesting Roadmap](#) (submitted at Deadline 5). This design would be further refined for the engineering detailed design stage should this compensation option be carried forward. Furthermore, the Applicant is also committed to developing a detailed monitoring and adaptive management plan to track the effectiveness of the artificial nests as part of the relevant GCIMP. If it becomes clear that some of the assumptions relating to key parameters that influence the establishment of the measure are not being realised as anticipated, adaptive management measures (see [Section 3.5.2](#)) will be implemented to improve effectiveness. Further information in relation to artificial nesting as compensation for gannet is provided within the Gannet Artificial Nesting Roadmap ([G5.19 Compensation measures for FFC SPA: Gannet Artificial Nesting Roadmap](#) (submitted at Deadline 5))

3.5 Monitoring Approach

3.5.1.1 Monitoring forms an integral component of the compensatory measure and will be discussed with relevant stakeholders through the OOEG.

3.5.1.2 The implementation of the gannet artificial nest structure will be monitored through observations of the number of return breeding birds and their subsequent breeding success. Monitoring of these rates will follow the standard methods provided by Walsh *et al.*, (1995) and specified by the JNCC Seabird Monitoring Programme which acts as the hub of seabird population information. All relevant monitoring data collected during the project will be contributed to the JNCC's Seabird Monitoring Programme. Collection of seabird data in this format will permit comparisons to be made with on-going monitoring at existing colonies along the east coast of England, including that undertaken by the RSPB at the FFC SPA (Babcock *et al.*, 2018). In order to monitor the number of breeding birds and their breeding

success whole colony counts and productivity monitoring will be conducted at the artificial nest sites.

- 3.5.1.3 Post construction monitoring of the artificial nesting structure will be conducted to record both breeding birds and breeding success of the first breeding season. The frequency and duration of any subsequent monitoring (while also informing adaptive management and maintenance) will be discussed in consultation with the OOEG. The precise nature of monitoring at the structure will be influenced by the final form and location the compensation measure takes, but the intention is to predominantly carry out remote monitoring using drones or other suitable techniques. It is noted within the relevant Evidence Reports, that the exact methods required may differ between an onshore and offshore structure, but the design of the structure will seek to incorporate monitoring whilst minimising disturbance. The frequency, duration and nature of the monitoring will be discussed with OOEG members following the Applicant's decision on the refined areas of search for the structure. Monitoring will also be undertaken at adjacent existing colonies (unless recent data exists, such as those presented by the JNCC and BTO on the Seabird Monitoring Programme data portal) to determine whether population trends at artificial nest structure are colony or site specific. The details of the monitoring will be set out within the GCIMP for approval by the Secretary of State.
- 3.5.1.4 Monitoring of the artificial nesting structure will inform the adaptive management programme (see [Section 3.5.2](#)) and influence any potential maintenance work required on the structure (either new or repurposed). With reference to adaptive management, monitoring of breeding pairs and breeding success each breeding season will likely determine the employment of adaptive management the following season.
- 3.5.1.5 It is also important to note that the Hornsea Four Outline Ornithological Monitoring Plan report ([F2.19: Outline Ornithological Monitoring Plan \(APP-254\)](#)) outlines the proposed approach and objectives of any ornithological monitoring required by the Deemed Marine Licences (DMLs) prior to the granting of development consent. The report considers both gannet along with other seabird species (including kittiwake, guillemot and razorbill).

3.5.2 Adaptive Management

- 3.5.2.1 Adaptive management is an iterative, post-consent process which combines management measures and subsequent monitoring with the aim of improving effectiveness whilst also updating knowledge and improving decision making over time. Adaptive management will be an important component of the compensation measure and will address unforeseen issues or deviations from expected time scales (i.e. colonisation rate of structure). Any adaptive measures will be thoroughly discussed and explored with relevant stakeholders as part of the OOEG prior to the implementation of any option. Multiple adaptive management measures will be explored prior to the construction of the artificial nesting structure as it is important to consider the differences between intelligent structure design (which is covered in a separate section) and maintenance activity, and adaptive management.
- 3.5.2.2 The data collected will be shared with relevant advisors and authorities in order to inform consideration of fisheries management by UK government if required. Any long-term challenges to the effectiveness of the artificial nest structure relating to prey resource should be viewed in a North Sea context and in the context of natural variability, climate

change and other pressures. In the event that the Applicant, in consultation with the OOEG, concludes that the artificial nesting structure is ineffective in delivering compensation and after all adaptive management options relating to the performance of the structure has been exhausted, the Applicant will consult with the OOEG with the aim of identifying alternative long-term compensation measures that are securable, deliverable and proportionate to the impact on the gannet at FFC SPA. In such circumstances, the Applicant will update the GCIMP and will carry out the updated Plan as approved. Adaptive management measures are designed to support the compensation measure once functioning (post construction) as a way of furthering the success and supporting resilience of the measure. As mentioned above, adaptive management will be linked closely to the monitoring plan, the full detail of which will be agreed through the OOEG and set out within the GCIMP.

- 3.5.2.3 An alternative approach than that outlined in paragraph 3.5.2.3 is for the Applicant to contribute to a fund as an adaptive management measure. Reference can be made to the Marine Net Gain - Consultation on the principles of marine net gain dated 7th June 2022 (Defra, 2022), which includes reference to the newly announced Marine Recovery Fund (MRF). The MRF proposes a "contributions based approach" to net gain requirements, but has been given a broad application to be used to develop strategic compensation. The MRF forms part of the Offshore Wind Environmental Improvement Package of the BESS. The Applicant has proposed some wording below in [Section 6](#) in relation to the option to contribute to the MRF for adaptive management.

3.5.3 Implementation Criteria

- 3.5.3.1 As set out in the Evidence Reports ([B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence \(APP-187\)](#), [B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence \(APP-189\)](#)), provision of additional artificial nesting opportunities for gannet within the specified search zones is expected to enhance productivity and therefore be effective as a compensatory measure to meet Article 6(4) requirements. The establishment of breeding colonies at the structure would produce young that would become part of the wider biogeographic population of gannet. The success of the measure will be determined by the required number of nesting pairs breeding on the structure and productivity rate. This will be reviewed within the context of variability in breeding success and how it can be driven by external factors and therefore, success will be considered over time.
- 3.5.3.2 As identified at the outset of this Gannet Compensation Plan, it is anticipated that the Secretary of State will determine the level of effect based on the Appropriate Assessment conclusions for the potential impact of Hornsea Four on breeding adult gannets associated with the FFC SPA. The Applicant's current position is presented in [Table 2](#) of Revision 2 of [B2.6: Compensation measures for FFC SPA Overview](#) (updated revision submitted at Deadline 5).
- 3.5.3.3 The compensation measure is a long-term commitment, with monitoring and adaptive management built in to ensure the long-term success of the measure. A key function of the OOEG will be to help define appropriate and proportionate monitoring and adaptive management in relation to the compensation. A timeframe will be developed with the above considerations in mind to ensure not only that the delivery of the measure is as

planned, but that relevant monitoring of gannet is undertaken at appropriate timescales to maximise its usefulness to the project and the wider scientific community.

3.6 Implementation Programme

3.6.1.1 The activities required to carry out the actions set out above (which would be outlined in the GCIMP) are well understood due to the experience of Hornsea Three and extensive construction, licensing and consenting in both the offshore and onshore environment. Hornsea Four are planning to undertake site investigation surveys during 2022 to refine the site selection and carry out detailed design. The Applicant would seek to develop the measures as soon as possible following a legally secure consent decision, with all surveys being complete prior to Financial Investment Decision. The GCIMP would be submitted to the Secretary of State for approval in consultation with relevant key stakeholders.

3.6.1.2 Further details on the timelines of the compensation measure are presented in the Gannet Artificial Nesting Roadmap ([G5.19 Compensation measures for FFC SPA: Gannet Artificial Nesting Roadmap](#) (submitted at Deadline 5)). The Applicant has designed the compensation measures to be effective and deliverable.

4 Bycatch Reduction

4.1 Introduction

4.1.1.1 The Applicant is proposing to reduce bycatch of gannet in commercial fisheries as compensation for Hornsea Four. This compensation measure is feasible and can be secured.

4.1.1.2 The following sections provide an overview of the key aspects which have been evidenced by the Applicant to provide the Secretary of State with sufficient confidence in bycatch reduction as a compensation measure for Hornsea Four. This has included the following key aspects:

- Evidencing that a high degree of gannet bycatch occurs within certain fisheries;
- Evidencing that particular locations, which have connectivity with gannet from southern North Sea breeding populations, have particularly high levels of bycatch;
- Identifying a set of bycatch reduction techniques available to reduce bycatch to gannet; and
- Evidence for monitoring and adaptive management measures to demonstrate the long-term sustainability of the measure.

4.1.1.3 While the following sections provide a brief overview of the evidence in support of the measure for gannet, to avoid repetition a detailed overview of the evidence supporting this compensation measure is provided in the Gannet Bycatch Reduction Evidence Report ([G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#) (submitted at Deadline 1)). Therefore, the evidence report should be read alongside this Compensation Plan.

4.1.1.4 The EC Guidance recognises that the feasibility of the identified compensation measure must be based on the best scientific knowledge available. The novelty of developing compensation for gannet increases the importance of pre and post-implementation monitoring. There would, following award of consent, be a phase of further evidence gathering followed by monitoring which would continue through operation. Where

necessary, monitoring and adaptive management would ensure, in line with appropriate Guidance, that the proposals are developed in the most appropriate manner and can be flexible to enable modifications to be made where evidence suggests it is merited. It is important to recognise that the compensatory measure proposed here is part of a suite of compensation measures which provides the benefits of flexibility, scalability and resilience across the compensation actions for gannet. This high level of precaution must be factored in when considering any uncertainty in the measure. These topics are covered in the following sections of the report.

- 4.1.1.5 The process for identifying, securing and finalising a suitable fishery/ location, bycatch reduction technology selection, implementation, monitoring and adaptive management measures (in so far as the ecological aspects are concerned) is discussed throughout this section of this report, with the details provided in the Gannet Bycatch Reduction Evidence Report ([G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#)) (submitted at Deadline 1) and the Roadmap ([G5.18 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Roadmap](#)) (submitted at Deadline 5)).
- 4.1.1.6 Should this compensation measure be deemed necessary, the next steps required to implement it by the Applicant are set out in a Gannet Bycatch Reduction Roadmap ([G5.18 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Roadmap](#)) (submitted at Deadline 5)).

4.2 Evidence

- 4.2.1.1 The impact of bycatch from commercial fishing activity on global seabird populations is an acknowledged concern (Žydelis *et al.*, 2013; Anderson *et al.*, 2011; Miles *et al.*, 2020). Dias *et al.* (2019) reports that seabird bycatch is one of the top three threats to global seabird numbers, affecting just under 100 species globally and being responsible for the greatest average impact on seabird numbers. Despite this, bycatch monitoring and reporting is vastly underestimated, with low onboard observer monitoring coverage compared to the scale of commercial fishing (Pott and Wiedenfeld, 2017). Many estimates of bycatch mortality are derived from incidental recordings of bycatch. There are few monitoring programmes of long-term datasets available and fewer from dedicated bycatch monitoring programmes (ICES, 2018). Globally, the Report of the Workshop to Review and Advise on Seabird Bycatch (ICES, 2013) found gannet to be a likely or known bycaught species of the following types of gear; trammel nets and set gillnets, set longlines, purse seines, bottom otter trawls, and pelagic trawls.
- 4.2.1.2 In the UK, a preliminary assessment (running since 1996) has focused on quantifying protected species bycatch, through an at-sea observer data collection programme under the UK Bycatch Monitoring Programme (BMP). The UK BMP have collected data from over 21,000 monitored fishing operations from around the UK and adjacent waters with the aim to collect operational, environmental, and catch/bycatch data, to estimate bycatch rates of several protected species. Between 1996 and 2018, bycatch was measured for three gear types: static net (set gillnet), midwater trawl and longline. Recent analysis of the data collected by the UK BMP has helped to close some knowledge gaps and identify areas of concern (Northridge *et al.*, 2020; Miles *et al.*, 2020). It was estimated that a few hundred gannet are bycaught in UK fisheries every year (Northridge *et al.*, 2020). The Gannet Bycatch Reduction Evidence Report ([G1.42 Compensation measures for FFC SPA: Gannet Bycatch](#)

Reduction: Ecological Evidence (REP1-064) (submitted at Deadline 1)) provides a detailed and comprehensive review of bycatch evidence and provides further analysis of bycatch estimates relative to gannet. Additionally, foreign vessels also fish within UK waters, therefore, there is potential for bycatch to be even greater than identified by Northridge *et al.* (2020). Moreover, the Gran Sol fishery has been identified (both within the literature and communications with bycatch experts) as a high risk of bycatch from longline fishing for seabirds including gannet.

4.2.1.3 There is therefore the potential to alleviate bycatch for gannet by implementing bycatch reduction techniques within areas of high bycatch. This compensatory measure, therefore, would seek to address the bycatch rate of gannet via the initiation of a bycatch reduction project.

4.3 Objective and Scale

4.3.1.1 The objective of this compensatory measure is to attain a reduction in the rate of bycatch mortality for gannet by the implementation of bycatch reduction techniques. The upper scale of compensation required would be defined in the Secretary of State's Appropriate Assessment.

4.3.1.2 The scale of the implementation would be dependent on the level of existing bycatch at a particular fishery, and the efficiency of reduction bycatch by the chosen bycatch reduction technique. The Applicant has proposed further fisheries identification and bycatch reduction technology selection to increase confidence in the selected technology. This would be discussed with OoEG members and presented within the GCIMP for approval by the Secretary of State.

4.3.1.3 The Applicant is continuing discussions on the level of gannet bycatch and potential reduction techniques within UK waters and within the migratory pathway of gannet (specifically in relation to longline bycatch), this includes, but is not limited to:

- Continuing conversations with bycatch experts (such as BirdLife International, RSPB, the JNCC and other parties including academia) to identify fisheries with high gannet bycatch and potential mitigation solutions;
- Consulting with the National Federation of Fisherman's Organisations to identify bycatch risk areas and potential bycatch reduction delivery partners;
- Undertaking fisher consultation with UK and foreign vessels using a questionnaire approach (noting the Applicant has translated the questionnaires to relevant language to increase accessibility); and
- Considering the undertaking of a bycatch technology selection phase in an active longline fishery or proceed to implementation should it be deemed necessary.

4.3.1.4 The final location(s) and, therefore, scale of this measure would be agreed in line with the Gannet Bycatch Roadmap (**G5:18 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Roadmap** (submitted at Deadline 5)).

4.4 Fisheries Selection

4.4.1.1 The following sections describe the site selection process that would be used to identify fisheries suitable for the bycatch reduction project, with worked examples presented where relevant.

4.4.2 Introduction

4.4.2.1 The Gannet Bycatch Reduction Evidence Report ([G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#) (submitted at Deadline 1)) provides an overview of the gannet bycatch identified within the UK BMP (Northridge *et al.*, 2020) as well as gannet bycatch in non-UK vessels. The report identifies fishing effort and high bycatch "risk-zones", as well as reviewing potential bycatch reduction measures that may aid in reducing bycatch in the selected fisheries.

4.4.3 Fishery Type

4.4.3.1 The likelihood of gannet being caught in fishing gear varies depending on many factors, including gear type (longline, net, trawl, and active/passive), depth in water column (surface, demersal, benthic), net size, and time of day (day/night). Northridge *et al.*, (2020) provides an analysis of the UK BMP dataset for seabird bycatch numbers in different gear types in the UK including gannet. Gannet were observed to be caught within longline and static net fisheries, in estimates of hundreds per year (mostly from longline fisheries). Additionally Danish fishers contacted during fisheries consultation as part of the Hornsea Four fisheries consultation process stated that they observe many gannet diving into trawl nets whilst they are being hauled³.

4.4.3.2 Due to the evidence collated within [G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#) (submitted at Deadline 1), the Applicant will initially focus gannet bycatch reduction within longline fisheries.

4.4.4 Fishery Location

4.4.4.1 Within UK fisheries, the highest bycatch locations for longline fisheries were within Scotland and off the southwest coast of the UK (see [G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#) (submitted at Deadline 1) and Northridge *et al.* (2020)). As foreign vessels also fish within UK waters, there is potential for fishing effort hotspots (and therefore high bycatch risk zones) to occur in other locations. Additionally, the Gran Sol fishery has been identified (both within the literature and communications with bycatch experts) as a high risk of bycatch from longline fishing for seabirds including gannet, with potentially the highest bycatch rate of any world fishery included within Anderson *et al.*, (2011). The Applicant is currently undertaking further consultation to attempt to assess the level of bycatch within this fishery, to the west of Cornwall (and others).

4.4.4.2 Further fisheries identification is proposed by the Applicant to increase confidence in the selected fishery. This would be discussed with OoEG members and presented within the relevant GCIMP for approval by the Secretary of State.

³ Stated during a telephone conversation between Danish fishers and Orsted fishery liaisons.

4.4.5 Bycatch Reduction Technique Selection

4.4.5.1 An extensive literature search of bycatch reduction technology was undertaken to identify a suitable technology to reduce gannet bycatch (see [Appendices B and C](#) in [G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#) (submitted at Deadline 1)). Potential bycatch reduction techniques were identified for longline and trawl fisheries (noting the decision to focus on longline bycatch reduction ([Section 4.4.3](#)) with positive results from species with similar foraging ecology to gannet. The techniques short-listed are:

- Longline:
 - Lumo leads (line weighting);
 - Side setting with bird scaring lines; and
 - Hook shielding (e.g., Hookpod/ Smart Tuna Hook).
- Midwater Trawl:
 - Tori-lines; and
 - Cones.

4.4.5.2 The most promising technique identified for longline bycatch reduction was the Hookpod (hook shielding), with evidence showing reduction of seabird bycatch by 95% in longline fisheries (see [Appendix B](#) in [G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#) (submitted at Deadline 1)). The Hookpod covers the baited hook until it reaches a certain depth and can therefore be set beyond the depth range for diving gannet. Hook shielding is independent of seabird behavioural responses as it removes the risk factor (the hook) and therefore the bycatch risk for the majority of seabird species, allowing evidence of mitigation success using such techniques from other seabird species, such as albatross, to act as proxy for gannet.

4.5 Implementation of the Bycatch Reduction Project

4.5.1 Implementation Criteria and Monitoring

4.5.1.1 The primary aim of the scheme is to reduce the bycatch of gannet to offset the impacts of Hornsea Four. As highlighted in [Section 1.2](#), and set out in full within the Gannet Bycatch Reduction Evidence Report ([G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#) (submitted at Deadline 1)) the scale would be dependent on the final impact derived from the Secretary of State's Appropriate Assessment. However, based on the Applicant's position presented in the Hornsea Four RIAA, the number of possible mortalities as a result of displacement by Hornsea Four per annum is presented in [Table 2](#) of Revision [B2.6: Compensation Measures for FFC SPA Overview](#) (updated revision submitted at Deadline 5).

4.5.1.2 The number of vessels required to deliver the compensation measure will be calculated based on the level of bycatch within the target fishery, and will be discussed with the OoEG and set out within the relevant GCIMP.

4.5.2 Monitoring

- 4.5.2.1 A monitoring package would be designed with the delivery partner and the OOEG. Monitoring would focus on the progress and confirmation of a reduction in bycatch numbers for gannet. This would be developed with experienced stakeholders from both a conservation and fisheries background to ensure monitoring requirements are met.
- 4.5.2.2 Monitoring would continue for the operational phase of the project, at a frequency to be detailed in the GCIMP. It is envisaged that the delivery partner would lead the monitoring component of this measure.
- 4.5.2.3 It is also important to note the Hornsea Four Outline Ornithological Monitoring Plan report ([F2.19: Outline Ornithological Monitoring Plan \(APP-254\)](#)) which outlines the proposed approach and objectives of any ornithological monitoring required by the DMLs prior to the granting of development consent. The report considers gannet along with other seabird species (including guillemot, razorbill and kittiwake).

4.5.3 Adaptive Management

- 4.5.3.1 Adaptive management is an iterative, post-consent process which combines management measures and subsequent monitoring with the aim of improving effectiveness, whilst also updating knowledge and improving decision making over time. An adaptive management plan would be produced and outlined in the GCIMP which would list a set of options to ensure the long-term resilience of the measure if monitoring indicates that the bycatch reduction measures are performing unfavourably or failing to be implemented by fisheries. This process would be developed in consultation with the OOEG.
- 4.5.3.2 Measures presented by the Applicant (presented in [Table 1](#) have been developed to be scalable and therefore can be increased as necessary to respond to feedback or requirements identified by the adaptive management process.
- 4.5.3.3 An alternative approach than that outlined in paragraph 4.5.3.1 is for the Applicant to contribute to a fund as an adaptive management measure. Reference can be made to the Marine Net Gain - Consultation on the principles of marine net gain dated 7th June 2022 (Defra, 2022), which includes reference to the newly announced Marine Recovery Fund (MRF). The MRF proposes a "contributions based approach" to net gain requirements, but has been given a broad application to be used to develop strategic compensation. The MRF forms part of the Offshore Wind Environmental Improvement Package of the BESS. The Applicant has proposed some wording below in [Section 6](#) in relation to the option to contribute to the MRF for adaptive management.

4.6 Outline Timeline

- 4.6.1.1 The activities required to carry out the actions set out above (and would be outlined in the GCIMP) are well understood due to a strong relationship between the Applicant and the commercial fishing industry. The measure could be implemented relatively quickly following consent decision and would be in place prior to operation of the wind turbine generators. As the measure will prevent the direct mortality of gannets, no lead in time is required before the compensation would be deemed as functioning.

- 4.6.1.2 The Policy paper 'British Energy Security Strategy' published by BEIS in April 2022⁴ recognises the even greater need for rapid development of offshore wind farms committing to 'cut the process time by over half' and 'helping to speed up delivery timelines'.
- 4.6.1.3 The GCIMP would be supplied to the Secretary of State prior to the commencement of any wind turbine construction and would be approved by the Secretary of State in consultation with relevant key stakeholders before the commencement of any wind turbine generator.
- 4.6.1.4 Further information is provided within the Gannet Bycatch Roadmap (**G5.18 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Roadmap** (submitted at Deadline 5)).

5 Resilience Measures – Fish Habitat Enhancement and Prey Resource

5.1 Introduction

- 5.1.1.1 Fish habitat restoration is proposed as a resilience measure to support the primary compensation measures for kittiwake, gannet, guillemot and razorbill. The habitat restored (namely, seagrass) would support a number of fish species upon which kittiwake, gannet, guillemot and razorbill (as well as other seabird species) target as prey resource, therefore, this measure serves as a more indirect means to offer resilience to the kittiwake, gannet, guillemot and razorbill populations within the targeted area(s). This resilience measure is feasible and can be secured.
- 5.1.1.2 The Applicant has undertaken an extensive review of the evidence base supporting the use of this measure. The results of this review are presented in the accompanying Fish Habitat Enhancement Evidence Report **B2.8.5 Compensation measures for FFC SPA: Fish Habitat Enhancement: Ecological Evidence (APP-198)**. The Evidence Report covered utilisation of seagrass habitats by key prey fish species associated with guillemot, razorbill, gannet and kittiwake and assessed how enhancing forage fish species may increase seabird prey resource. It highlights the importance of seagrass habitat and provides evidence of seagrass meadows functioning as a nursery for juvenile forage fish species, the importance of this habitat for prey fish species for the four seabird species noted above and seagrass habitat restoration methodology.
- 5.1.1.3 This section should also be read alongside the fish habitat enhancement roadmap (Revision 4 of **B2.8.6 Compensation measures for FFC SPA: Fish Habitat Enhancement: Roadmap** (updated revision submitted at Deadline 5)) which sets out the next steps that will be undertaken should this measure be required.

5.2 Seagrass Restoration Projects

- 5.2.1.1 Seagrass restoration projects have been undertaken for over 50 years (MMO, 2019). For example, in Chesapeake Bay in the US, 3000 hectares of seagrass have been restored since the first survey in 1984 from once lifeless habitats, with rapid recovery of their ecosystem services now being observed (Orth *et al.* 2020). The restored seagrass meadows in Chesapeake Bay have recorded rapidly increasing ecosystem service provision from

⁴ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1069969/british-energy-security-strategy-web-accessible.pdf

maturing restored seagrass meadows that have become indistinguishable from natural meadows (Orth *et al.* 2020).

- 5.2.1.2 In recent years, a number of seagrass restoration projects have been undertaken in the UK. Project Seagrass and Swansea University led the UK's first major restoration project in Dale in West Wales. Several organisations are undertaking research and trials to expand or restore seagrass habitat, with the Yorkshire Wildlife Trust aiming to expand the remaining 20 ha of seagrass at Spurn Point Nature Reserve. As part of this restoration work, the Yorkshire Wildlife Trust are undertaking trials to discover the optimal conditions for gathering and germinating seagrass seeds (Yorkshire Wildlife Trust, 2021).
- 5.2.1.3 In Plymouth Sound and the Solent the largest restoration project began in April 2021, a partnership project led by Ocean Conservation Trust (OCT) and involving Natural England, and numerous other stakeholders and volunteers (OCT, 2021). The project aims to plant seagrass bags across a total of 8 ha of seagrass meadows – 4 ha in Plymouth Sound and 4 ha in the Solent Maritime Special Area of Conservation (SAC). By planting seagrass, the project hopes to create more seagrass meadows which provide homes for juvenile fish and protected creatures like seahorses and stalked jellyfish (OCT, 2021).
- 5.2.1.4 The Applicant is exploring opportunities to expand an existing seagrass restoration project that is already underway that could add resilience to the primary compensation measures. The site selection process has identified the Humber Estuary as the most suitable location (illustrated in [Figure 1](#)) and has already completed the restoration of 2 hectares of seagrass.

5.3 Seagrass Restoration Techniques

- 5.3.1.1 Seagrass restoration has been carried out for over 50 years and the means of doing this can principally be split into two major techniques:
- replanting; and
 - reseeding.
- 5.3.1.2 Both techniques have their relative merits and have exhibited varying levels of success. Reseeding and replanting techniques have sometimes been used together. Using seeds in conjunction with adult plants may in some instances prove more effective (van Katwijk *et al.* 2016). A broad overview of the literature illustrates that although a lot is now known about seagrass restoration, there are research gaps and as a result the success rate of restoration projects can vary, demonstrating that prior to commencement, it is vital that studies are undertaken to assess the feasibility and site selection and ensure the efficacy of the measure (Unsworth and Butterworth, 2021).
- 5.3.1.3 The use of reseeding generally relates to the collection and targeted redistribution (and sometimes processing) of wild seed. Adult shoot replanting normally involves harvesting plants from an existing meadow and transplanting them to the restoration site. The reproductive fronds of wild seed is collected by hand by SCUBA divers. The seeds collected by recent projects have obtained permits/consent from Natural England and Natural Resources Wales. Recent reports from the Environment Agency highlight the need for seagrass restoration to increasingly depend upon nursery grown propagules.
- 5.3.1.4 In most cases, shoot planting involves some means of anchoring the shoots to the bottom until the roots can take hold (root into the bottom). Replanting uses either labour intensive

diving techniques or various mechanistic approaches to planting various sizes and ages of seagrass plants into new localities. Planting of seedlings in the UK is typically undertaken by a team of divers who are transported to the site by boat. Seeds can also be directly deployed from the boat and often hessian bags are used to help anchor the seeds in place during germination. It is expected that up to two vessels would be required for the seagrass restoration at each location.

- 5.3.1.5 Seagrass restoration requires consideration of a range of factors necessary to make it a success. A recent review of the success of restoration projects globally found that success relates to the severity of the habitat degradation (van Katwijk *et al.* 2016). Seeds, adult plants and sods are not significantly different, although seedlings show lower success rates. A short distance to the donor site is also related to success.
- 5.3.1.6 Some seagrass restoration projects particularly the trials of small/medium sized projects have funding secured. The Applicant has looked to fund additional seagrass restoration that does not currently have funding secured and therefore provide additional benefit rather than contribute to projects that are part of normal practice and site/habitat management of the designated sites. Evidence gathering by the Applicant is ongoing and discussions with stakeholders on restoration projects and techniques is continuing. However, currently all types of restoration methods are being considered and may be combined using the best techniques at the time of restoration for the greatest success.

5.4 Location

- 5.4.1.1 The Applicant has commenced seagrass restoration efforts with a trial scheme at Spurn Point in the Humber Estuary with support from the Yorkshire Wildlife Trust (YWT). The trial seagrass restoration planting has determined the success at a small scale, prior to expanding the scheme to 30 hectares which will commence following DCO consent. To date, the YWT has planted 2 hectares of seagrass for Hornsea Four and a further 2 hectares of restoration will commence in 2022. Surveys are being undertaken by the University of Hull to demonstrate the connectivity of seagrass in the Humber Estuary with prey found in the North Sea.
- 5.4.1.2 Exploration of potential broad areas for seagrass restoration if needed for adaptive management is ongoing. The main areas that are being considered consistently support all of the target seabird species and provide options for seagrass restoration as well as supporting other compensation measures, therefore increasing the resilience of the measures. Ocean Ecology Limited (OEL) and Swansea University (SU) are supporting the Applicant by conducting this wider study for seagrass restoration. OEL and SU will provide a detailed site selection assessment which will result in a shortlist of potential sites that are not only suitable for restoration but will also provide suitable resilience to the wider package of compensation measures, if required for adaptive management.

5.5 Implementation, Operation, Monitoring and Adaptive Management

- 5.5.1.1 Prior to any large-scale seagrass restoration commencing, detailed implementation studies have been undertaken to assess the physical parameters for seagrass to be restored and undertake further stakeholder engagement. The Applicant recognises the need for implementation studies to consider site selection and methodology to increase the likelihood of a successful restoration programme and efficacy of the compensation

measure. Factors that have been considered prior to large-scale restoration efforts being initiated to ensure the viability of seagrass restoration included looking for a site:

- being sheltered from wave action;
- with suitable topographical and hydromorphological conditions including sedimentation rates;
- sufficient nutrients and available light;
- good water quality; and
- avoid sites with activities that could cause significant physical disturbance.

5.5.1.2 These factors would also be considered for any site required for adaptive management. For an adaptive management site, surveys may be required to establish the levels of activity at the potential locations.

5.5.1.3 The levels of activity and any potential risks to seagrass restoration were fully understood by YWT and considered in the site selection process. The site was chosen due to the minimal risks and activity in the seagrass bed and surrounding seabed and the ability to manage activities due to the ownership of the seabed by YWT and protective byelaw for seagrass. Planting seagrass at sites previously known to support seagrass and known to have appropriate conditions for seagrass would likely result in increased biodiversity and ecosystem service provision (Unsworth, 2021). Part of the site selection process to determine the chosen site in the Humber Estuary and for any adaptive management locations evidence of previous seagrass locations is a key consideration (Green *et al.*, 2021). At Spurn Point in the Humber Estuary there is an existing seagrass bed covering approximately 20 hectares with a further 2 hectares recently planted for Hornsea Four, therefore providing confidence in the suitable conditions and considerable scope within the remaining protected area which is currently sparsely or un-colonised.

5.5.1.4 For a new restoration project, physical surveys (e.g. particle size, depth, slope, light, temperature, total suspended solids, redox layer) and biological surveys may be conducted as well as habitat mapping at each site, these could involve the use of camera drops and diver surveys to assess the suitability of the potential locations. When undertaking site selection studies the health and/ or nutrient status of the closest seagrass meadows or patch would be examined. A geomorphological and suspended sediment analysis of the Humber Estuary at Spurn Point has been undertaken by the University of Hull for Hornsea Four. The analysis of the proposed restoration site is considered to be stable and appears suitable for replanting, with minimal identified risk of smothering. Levels of surface chlorophyll also remain stable and do not indicate a risk of algal bloom or eutrophication. The Fish Habitat Enhancement: Implementation Study and Fish Connectivity Survey Summary will provide further details on the analysis at Deadline 6. Fish nursery and bird surveys have already commenced at the Humber Estuary for the Hornsea Four seagrass restoration project.

5.5.1.5 It may be necessary, especially with the potential scale of restoration, that for adaptive management potential sites a series of surveys would be needed to identify potential seagrass meadows for future seed collections. This would be conducted in consultation with Natural England and other stakeholders. When planning the restoration project the focus would be on facilitating natural recovery through alleviating recruitment limitation. The

seed collection and planting within the Humber Estuary is consented by Natural England. YWT have been working with Natural England, and have agreed a suite of rolling permissions and consents for the seagrass restoration and accompanying survey works, including seagrass seed collection, two methods of seagrass planting, and benthic, environmental and fisheries surveys.

- 5.5.1.6 The Applicant has considered the most appropriate scale for any resilience. The Applicant recognises the importance of encouraging long-term survival by promoting self-facilitation through implementation at a large-enough scale. The Applicant would ensure that significant contingency, which may include reseeded/replanting, is built into the measure to provide the necessary confidence that it would have sufficient resilience, offset the impact and efficacy as a compensation measure. The Applicant has committed to restore 30 hectares of seagrass following DCO consent, in addition to the 4 hectares being planted as part of the implementation studies in the Humber Estuary (2 hectares of seagrass have already been planted at Spurn Point).
- 5.5.1.7 Engagement with statutory and non-statutory bodies and local stakeholders and landowners would be undertaken to share and discuss our ambitions, plans and to ensure the success of the measures. The Applicant is working with academics and organisations with experience of previous restoration projects in order to ensure that activities build on the outcomes of best practice and lessons learnt.
- 5.5.1.8 For any adaptive management locations, following site suitability surveys, a site selection process (potentially using a decision matrix) would be used to select the optimal site(s) for restoration. Environmental baseline surveys of the site(s) would be undertaken so that change over time can be assessed accordingly. Restoration of the seagrass using replanting and/or reseeded methods would be undertaken following the methodology devised through engagement with academics and stakeholders. A pilot trial planting scheme is likely to be undertaken particularly for any new restoration location. Following the implementation trials to gather further evidence on the efficacy of the seagrass restoration, the site and methods would be selected to take forward.
- 5.5.1.9 There are several seagrass restoration projects being considered by a number of organisations in the UK and it may be that a project has already undertaken the required site selection and trials and is looking for the resource to undertake a larger scale scheme.
- 5.5.1.10 To date, the YWT has planted on behalf of the Applicant 2 hectares of seagrass within the Humber Estuary. The Applicant funded the seed collection in 2021 in order to facilitate this trial scheme in the Humber.
- 5.5.1.11 The Applicant is confident that the measures extensive large-scale seagrass restoration (up to a total of 30 ha) would provide resilience to the measures and compensate as part of a suite of measures for Hornsea Four. Implementation of the trial seagrass restoration project commenced prior to obtaining DCO consent, to allow for monitoring of the trial scheme and to enable further research studies to commence in order to fill some of the evidence gaps highlighted in the **B2.8.5: Compensation measures for FFC SPA: Fish Habitat Enhancement: Ecological Evidence (APP-198)** and increase confidence in the contribution of seagrass restoration as part of the compensation package for Hornsea Four. All necessary

permissions and consents have been obtained for the trial scheme and will be obtained for any further large-scale restoration efforts.

5.5.1.12 It is recognised that there are knowledge gaps on the specific linkages between seagrass in the UK and non-grazing seabirds and the level of the role of seagrass supporting forage fish for seabirds such as razorbill, guillemot, gannet and kittiwake. Nonetheless, there is clear evidence of the ecological benefits of seagrass and for prey species. Whilst the broad understanding of the links between seagrass meadows and fisheries are well understood (Kritzer *et al.* 2016; Unsworth *et al.* 2019), there is currently limited evidence for this role at a UK level, with most data collected from only a handful of sites (Bertelli and Unsworth 2014; Peters *et al.* 2015). Understanding about temporal and spatial variability is also lacking (Unsworth and Butterworth, 2021). Whilst it is known that forage fish species clupeids, gadoids and sand eels all utilise UK seagrass meadows at periods of the life cycle the nature of this role hasn't been quantified (Unsworth and Butterworth, 2021). The Evidence Report (**B2.8.5 Compensation measures for FFC SPA: Fish Habitat Enhancement: Ecological Evidence (APP-198)**) sets out the ecological evidence for fish habitat enhancement as a compensation measure in further detail.

5.5.1.13 A key component of the fish habitat enhancement compensation measure will be research, to gather evidence to contribute towards filling these knowledge gaps. The Applicant has identified a number of research topics to be undertaken (in addition to the implementation studies). As part of the restoration efforts in the Humber Estuary the University of Hull is undertaking several studies including:

- A fish nursery assessment; and
- Connectivity surveys, which will include fish samples in the Humber and near Hornsea Four and the wider North Sea and Stable Isotope Analysis to determine connectivity.

5.5.1.14 These research topics will be explored in greater detail and a research programme will be devised to support of the measures, with many of these projects starting in 2022.

5.5.1.15 Monitoring of the restored seagrass will be essential to demonstrate the efficacy of the compensation measure and if required, the seagrass meadow would be monitored throughout the operational lifespan of Hornsea Four. The exact method of monitoring and frequency would be decided based upon further evidence gathering and discussion with restoration experts and stakeholders. A monitoring programme would be developed, and at key stages the results of the restoration would be shared to improve the knowledge base for seagrass restoration.

5.5.1.16 Adaptive management is an iterative process which combines management measures and subsequent monitoring with the aim of improving effectiveness whilst also updating knowledge and improving decision making over time. Adaptive management would be an important component of the resilience measure and would be used as a method to address unforeseen issues or deviations from expected time scales (i.e. additional infill planting required).

5.6 Summary of Fish Habitat Enhancement Next Steps

5.6.1.1 In summary, the Applicant has commenced seagrass restoration in the Humber Estuary with support from the YWT and the University of Hull. To date, 2 hectares of seagrass have been

planted within the Humber Estuary. Further implementation studies are being conducted by OEL and SU to establish how the resilience measure could be continued and expanded to establish a large-scale restoration site in the Humber Estuary or at other sites within the UK, if required for adaptive management

- 5.6.1.2 The restoration of seagrass is considered an effective, feasible and securable measure that can be implemented prior to the impact occurring and sustainable for the life-time of the project. In designing this compensation measure the Applicant has consulted and worked with Natural England, JNCC, the RSPB, The Wildlife Trusts, other statutory bodies and academics, and other relevant stakeholders to ensure this compensation measure is both robust and deliverable.

6 Draft DCO Wording

Commentary:

Article 40 of the draft DCO currently gives effect to Schedule 16 of the draft DCO:

Compensation provisions

40. Schedule 16 (compensation to protect the coherence of the national site network) has effect.

Part 1 and Part 2 of Schedule 16 makes provision for compensatory measures for kittiwake.

Part 3 of Schedule 16 makes provision for a contribution to the Marine Recovery Fund.

Part 4 of Schedule 16 makes provision for fish habitat enhancement.

If necessary, the Secretary of State could amend Schedule 16 to secure compensatory measures for gannet, guillemot and razorbill, in accordance with the draft provisions set out below.

For the avoidance of doubt, no amendment would be required to article 40, which as noted above already gives effect to the entirety of Schedule 16.

Schedule 16

COMPENSATION TO PROTECT THE COHERENCE OF THE NATIONAL SITE NETWORK

Part 1

OFFSHORE ORNITHOLOGY ENGAGEMENT GROUP

1. In this Schedule—

“Defra” means the Department for the Environment, Food and Rural Affairs.

“the FFC” means the site designated as the Flamborough and Filey Coast Special protection Area; “GCIMP” means the gannet compensation implementation and monitoring plan for

the delivery of measures to compensate for the predicted loss of adult gannet from the FFC as a result of the authorised development;

"GRCIMP" means guillemot and razorbill compensation implementation and monitoring plan for the delivery of measures to compensate for the predicted loss of adult guillemot and razorbill from the FFC as a result of the authorised development;

"KCIMP" means the kittiwake compensation implementation and monitoring plan for the delivery of measures to compensate for the predicted loss of adult kittiwakes from the FFC as a result of the authorised development;

"the gannet compensation plan" means the document certified as the gannet compensation plan by the Secretary of State for the purposes of this Order under article 38 (certification of plans and documents, etc);

"the guillemot and razorbill compensation plan" means the document certified as the guillemot and razorbill compensation plan by the Secretary of State for the purposes of this Order under article 38 (certification of plans and documents, etc);

"the Hornsea Four Offshore Ornithology Engagement Group" or "H4 OOEG" means the group that will assist, through consultation, the undertaker in the delivery of the compensation measures identified in the kittiwake compensation plan, the gannet compensation plan and the guillemot and razorbill compensation plan;

"the kittiwake compensation plan" means the document certified as the kittiwake compensation plan by the Secretary of State for the purposes of this Order under article 38 (certification of plans and documents, etc.);

2. "the Marine Recovery Fund" means the fund operated by Defra pursuant to the Offshore Wind Environmental Improvement Package of the British Energy Security Strategy (April 2022) for the implementation of strategic compensation or any equivalent fund established by a Government body for that purpose.

"the offshore compensation measures" means, as the context requires, bycatch reduction and/or the offshore nesting structure(s); and "the onshore compensation measure" means, as the context requires, predator eradication and/or the onshore nesting structure(s).

3. Work Nos. 1, 2, 3, 4 and 5 together with any associated development offshore may not be commenced until a plan for the work of the H4 OOEG has been submitted to and approved by the Secretary of State, such plan to include—

terms of reference of the H4 OOEG;

details of the membership of the H4 OOEG which must include—

the MMO and the relevant statutory nature conservation body as core members for the offshore compensation measures;

the relevant local planning authority and statutory nature conservation body as core members for the onshore compensation measures;

the RSPB and The Wildlife Trust as advisory members, for both the onshore compensation measures and/or the offshore compensation measures subject to their area of expertise;

details of the proposed schedule of meetings, timetable for preparation of the KCIMP, the GCIMP and the GRCIMP and reporting and review periods;

the dispute resolution mechanism and confidentiality provisions; and

4. the scope of work to be limited to the topics for discussion as identified by the appointed chair to include in relation to the compensation measure, monitoring and adaptive management.

Part 2

KITTIWAKE COMPENSATION

1. Following consultation with the H4 OoEG, the KCIMP must be submitted to the Secretary of State for approval in consultation with the MMO and relevant statutory nature conservation body for the offshore compensation measure (if required), and with the relevant local planning authority and relevant statutory nature conservation body for the onshore compensation measure (if required). The KCIMP must be based on the strategy for kittiwake compensation set out in the kittiwake compensation plan and include—
 - a. details of location where the compensation measure will be delivered, and in the event an onshore structure is required, details of landowner agreement(s) and in the event an offshore structure is required, details of any relevant seabed agreement(s);
 - b. details of the design of the artificial nesting structure; including the projected number of nests that will be accommodated on the structure, and how risks from avian or mammalian predation and for an onshore nesting structure how unauthorised human access will be mitigated;
 - c. an implementation timetable for delivery of the artificial nesting structure, such timetable to ensure that the structure is in place to allow for at least three full kittiwake breeding seasons prior to operation of any turbine forming part of the authorised development. For the purposes of this paragraph each breeding season is assumed to have commenced on 1st April in each year and ended on 31st August;
 - d. details of the maintenance schedule for the artificial nesting structure;
 - e. details for the proposed ongoing monitoring of the measure including—
 - i. survey methods;
 - ii. survey programmes; and
 - iii. colony and productivity counts;
 - f. recording of H4 OoEG consultations;
 - g. details of any adaptive management measures, with details of the factors used to trigger any such measures; and
 - h. provision for reporting to the Secretary of State, to include details of the use of the structure by breeding kittiwake to identify barriers to success and target any adaptive management measures.
 - i. provision for the option to be exercised at the sole discretion of the undertaker to pay a contribution (in addition to the sum stipulated in Part 3 of this Schedule) to the Marine Recovery Fund wholly or partly in substitution for the onshore compensation measure and/or the offshore compensation measure or as an adaptive management measure for the purposes of paragraph 1.g. of this Part of this Schedule. The sum of the contribution to be agreed between the undertaker and Defra in consultation with the OoEG and included in the KCIMP.
2. Paragraphs 3, 4 and 5 of this Part of this Schedule shall not apply to the extent that a contribution to the Marine Recovery Fund has been elected in substitution for the onshore compensation measure and/or the offshore compensation measure for the purposes of paragraph 1(i) of this Part of this Schedule.
3. The undertaker must construct the artificial nesting structure as set out in the KCIMP approved by the Secretary of State.
4. The undertaker must notify the Secretary of State of completion of construction of the artificial nesting structure as set out in the KCIMP.

5. The artificial nesting structure must not be decommissioned without prior written approval of the Secretary of State in consultation with relevant statutory nature conservation body.
6. The KCIMP approved under this Schedule includes any amendments that may subsequently be approved in writing by the Secretary of State. Any amendments to or variations of the approved KCIMP must be in accordance with the principles set out in the kittiwake compensation plan and may only be approved where it has been demonstrated to the satisfaction of the Secretary of State that it is unlikely to give rise to any materially new or materially different environmental effects from those considered in the kittiwake compensation plan.

Part 3

CONTRIBUTION TO MARINE RECOVERY FUND

1. 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.

PART 4

FISH HABITAT ENHANCEMENT

1. No turbine forming part of the authorised development may begin operation until arrangements for the implementation of fish habitat enhancement measures have been put in place in accordance with the principles set out in the KCIMP, the GCIMP and the GRCIMP.

PART 5

GANNET COMPENSATION

1. Following consultation with the H4 OOEG, the GCIMP must be submitted to the Secretary of State for approval in consultation with the MMO and relevant statutory nature conservation body for the offshore compensation measure(s) (if required), and with the relevant local planning authority and relevant statutory nature conservation body for the onshore compensation measure (if required). The GCIMP must be based on the strategy for gannet compensation set out in the gannet compensation plan and must include:
 - a. for the artificial nesting structure measure:
 - i. details of the location where compensation measure will be delivered, and in the event an onshore structure is required, details of landowner agreement(s) and in the event an offshore structure is required, details of any relevant seabed agreement(s);
 - ii. details of the design of the artificial nesting structure; including the projected number of nests that will be accommodated on the structure, and how risks from avian or mammalian predation and for an onshore nesting structure how unauthorised human access will be mitigated;
 - iii. an implementation timetable for delivery of the artificial nesting structure, such timetable to ensure that the structure is in place to allow for at least three full gannet breeding seasons prior to operation of any turbine forming part of the authorised development. For the purposes of this paragraph each breeding season is assumed to have commenced on 1st April in each year and ended on 31st August
 - iv. details of the maintenance schedule for the artificial nesting structure;
 - v. details for the proposed ongoing monitoring of the measure including

- vi. 1. survey methods;
 - vii. 2. survey programmes; and
 - viii. 3. colony and productivity counts;
 - ix. recording of H4 OOEG consultations;
 - x. details of any adaptive management measures, with details of the factors used to trigger any such measures; and
 - xi. provision for reporting to the Secretary of State, to include details of the use of the structure by breeding gannet to identify barriers to success and target any adaptive management measures;
 - xii. provision for the option to be exercised at the sole discretion of the undertaker to pay a contribution (in addition to the sum stipulated in Part 3 of this Schedule) to the Marine Recovery Fund wholly or partly in substitution for the onshore and/or offshore artificial nesting structures or as an adaptive management measure for the purposes of paragraph 1.a.vii of this Part of this Schedule. The sum of the contribution to be agreed between the undertaker and Defra in consultation with OOEG and included in the GCIMP.
 - b. for the bycatch reduction measure:
 - i. details of relevant technology supply agreements and arrangements with fishers to use the bycatch reduction technology that will be or have been secured by the undertaker;
 - ii. an implementation timetable for provision of the bycatch reduction measure, such timetable to ensure that contract(s) are entered into with fishers for the provision and use of bycatch reduction technology no later than one year prior to the operation of any turbine forming part of the authorised development;
 - iii. details for the proposed ongoing monitoring of the measure including collection of data from participating fishers;
 - iv. recording of H4 OOEG consultations;
 - v. details of any adaptive management measures and details of the factors used to trigger any such measures; and
 - vi. provision for annual reporting to the Secretary of State, to identify barriers to success and target any adaptive management measures.
 - vii. provision for the option to be exercised at the sole discretion of the undertaker to pay a contribution (in addition to the sum stipulated in Part 3 of this Schedule) to the Marine Recovery Fund wholly or partly in substitution for the bycatch measures or as an adaptive management measure for the purposes of paragraph 1.b.v of this Part of this Schedule. The sum of the contribution to be agreed between the undertaker and Defra in consultation with OOEG and included in the GCIMP.
2. Paragraphs 3, 4 and 5 of this Part of this Schedule shall not apply to the extent that a contribution to the Marine Recovery Fund has been elected in substitution for the onshore compensation measure and/or the offshore compensation measure and/or the bycatch compensation measure for the purposes of paragraphs 1.a.ix and 1.b.vii of this Part of this Schedule.
 3. The undertaker must construct the artificial nesting structure and enter into contract(s) with fishers for the provision and use of bycatch reduction technology as set out in the GCIMP approved by the Secretary of State.
 4. The undertaker must notify the Secretary of State of completion of construction of the artificial nesting structure and the entering into contract(s) with fishers for the provision and use of bycatch reduction technology as set out in the GCIMP.

5. The artificial nesting structure must not be decommissioned without prior written approval of the Secretary of State in consultation with relevant statutory nature conservation body.
6. The GCIMP approved under this Schedule includes any amendments that may subsequently be approved in writing by the Secretary of State. Any amendments to or variations of the approved GCIMP must be in accordance with the principles set out in the gannet compensation plan and may only be approved where it has been demonstrated to the satisfaction of the Secretary of State that it is unlikely to give rise to any materially new or materially different environmental effects from those considered in the gannet compensation plan.

PART 6

GUILLEMOT AND RAZORBILL COMPENSATION

1. Following consultation with the H4 OOEG, the GRCIMP must be submitted to the Secretary of State for approval in consultation with the MMO and relevant statutory nature conservation body for the offshore compensation measure, and with the relevant statutory nature conservation body and the relevant local planning authority and relevant conservation trusts for the onshore compensation measure. The GRCIMP must be based on the strategy for guillemot and razorbill compensation set out in the guillemot and razorbill compensation plan and include:
 - a. for the predator eradication measure:
 - i. details of the location(s) where the compensation measure will be delivered;
 - ii. details of how any necessary access rights, licences and approvals have or will be obtained and any biosecurity measures will be or have been secured;
 - iii. an implementation timetable for delivery of the predator eradication measure, such timetable to ensure that the predator eradication method has commenced no later than two years prior to operation of any turbine forming part of the authorised development;
 - iv. details for the proposed ongoing monitoring of the measure including:
 - v. 1. survey methods;
 - vi. 2. survey programmes;
 - vii. 3. productivity rates;
 - viii. 4. breeding population; and
 - ix. 5. distribution of breeding birds;
 - x. recording of H4 OOEG consultations;
 - xi. details of any adaptive management measures, with details of the factors used to trigger any such measures; and
 - xii. provision for reporting to the Secretary of State, to include details of the use of the location(s) by breeding guillemot and razorbill to identify barriers to success and target any adaptive management measures.
 - xiii. provision for the option to be exercised at the sole discretion of the undertaker to pay a contribution (in addition to the sum stipulated in Part 3 of this Schedule) to the Marine Recovery Fund wholly or partly in substitution for the predator eradication measures or as an adaptive management measure for the purposes of paragraph 1.a.vi. of this Part of this Schedule] The sum of the contribution to be agreed between the undertaker and Defra in consultation with OOEG and included in the GRCIMP.
 - b. for the bycatch reduction measure:

- i. details of relevant technology supply agreements and arrangements with fishers to use the bycatch reduction technology that will be or have been secured by the undertaker;
 - ii. an implementation timetable for provision of the bycatch reduction measure, such timetable to ensure that contract(s) are entered into with fishers for the provision and use of bycatch reduction technology no later than one year prior to the operation of any turbine forming part of the authorised development;
 - iii. details for the proposed ongoing monitoring of the measure including collection of data from participating fishers;
 - iv. recording of H4 OoEG consultations;
 - v. details of any adaptive management measures and details of the factors used to trigger any such measures; and
 - vi. provision for annual reporting to the Secretary of State, to identify barriers to success and target the adaptive management measures.
 - vii. provision for the option to be exercised at the sole discretion of the undertaker to pay a contribution (in addition to the sum stipulated in Part 3 of this Schedule) to the Marine Recovery Fund wholly or partly in substitution for the bycatch eradication measures or as an adaptive management measure for the purposes of paragraph 1.b.vi of this Part of this Schedule] The sum of the contribution to be agreed between the undertaker and Defra in consultation with OoEG and included in the GRCIMP.
2. Paragraphs 3 and 4 of this Part of this Schedule shall not apply to the extent that a contribution to the Marine Recovery Fund has been elected in substitution for the predator eradication measure and/or the bycatch compensation measure for the purposes of paragraphs 1.a.viii and 1.b.vii of this Part of this Schedule.
3. The undertaker must carry out the predator eradication method and enter into contract(s) with fishers for the provision and use of bycatch reduction technology as set out in the GRCIMP approved by the Secretary of State.
4. The undertaker must notify the Secretary of State of completion of the predator eradication method and entering into contract(s) with fishers for the provision and use of bycatch reduction technology set out in the GRCIMP.
5. The GRCIMP approved under this Schedule includes any amendments that may subsequently be approved in writing by the Secretary of State. Any amendments to or variations of the approved GRCIMP must be in accordance with the principles set out in the guillemot and razorbill compensation plan and may only be approved where it has been demonstrated to the satisfaction of the Secretary of State that it is unlikely to give rise to any materially new or materially different environmental effects from those considered in the guillemot and razorbill compensation plan.

7 Funding

- 7.1.1.1 The Applicant has identified the costs associated with the development, implementation and ongoing monitoring of the proposed measures. These costs have been included within a detailed Funding Statement (**B2.10: The Without Prejudice Derogation Funding Statement (APP-202)**). This statement is supplemental to the Funding Statement submitted as part of the suite of Application documents (**Volume E.1.1 Funding Statement (REP2-018)**). The Without Prejudice Derogation Funding Statement outlines the overall project cost based on the capital expenditure and operational expenditure assumptions in the "Review of Renewable Electricity Generation Cost and Technical Assumptions" (DECC, 2016). The

Without Prejudice Derogation Funding Statement also details the corporate structure and a robust explanation to allow the SoS to conclude that the necessary funding to deliver the measures can be secured.

8 Conclusion

- 8.1.1.1 This document sets out the Compensation Plan for gannet associated with the FFC SPA. Collectively it has been termed the Gannet Compensation Plan. It has been developed in support of Hornsea Four should the Secretary of State disagree with the conclusions of the Applicant's RIAA in relation to the impact and find that adverse effects on the integrity of the FFC SPA cannot be ruled out.
- 8.1.1.2 The proposed compensation measures for gannet are outlined below in [Table 1](#).
- 8.1.1.3 The package of compensation measures for gannet are the provision of an artificial nesting structure and bycatch reduction. The preferred artificial nesting structure would be an offshore repurposed existing structure, but the Applicant has also considered both a new offshore structure and an onshore structure, if required by the Secretary of State (see [Section 3](#)). The Applicant is also proposing the implementation of gannet bycatch reduction as a compensation measure to offset any potential mortalities caused by development. In addition, as part of the package of measures to support gannet (and as outlined within the Kittiwake Compensation Plan and the Guillemot and Razorbill Compensation Plan as well), fish habitat enhancement is being undertaken within the Humber Estuary as a resilience measure. The habitat restored (namely, seagrass) would support a number of fish species upon which gannet (and seabirds more generally including kittiwake, guillemot and razorbill) target as prey resource, therefore, this measure serves as a more indirect means to offer resilience to the gannet populations within the targeted area(s).
- 8.1.1.4 The Applicant is confident that the compensation measures are securable, deliverable and proportionate to the impact on the FFC SPA. The inclusion of a resilience measure provides stakeholders with additional comfort as does the option to discharge the compensation requirements through the delivery of strategic compensation. Hornsea Four have presented detailed reviews of the evidence base supporting each of the compensation measures which can be found in the following documents: ([B2.7.1 Compensation measures for FFC SPA: Offshore Artificial Nesting: Ecological Evidence \(APP-187\)](#)), [B2.7.3 Compensation measures for FFC SPA: Onshore Artificial Nesting: Ecological Evidence \(APP-189\)](#)), [G1.42 Compensation measures for FFC SPA: Gannet Bycatch Reduction: Ecological Evidence \(REP1-064\)](#) (submitted at Deadline 1) and [B2.8.5 Compensation measures for FFC SPA: Fish Habitat Enhancement: Ecological Evidence \(APP-198\)](#)).
- 8.1.1.5 In terms of next steps, for these compensation measures and resilience measure should they be required, a roadmap document has been produced for each measure which details the process that would be undertaken for delivery of the measure. These roadmaps accompany the DCO application and are [G5.19 Compensation measures for FFC SPA: Gannet Artificial Nesting Roadmap](#) (Submitted at Deadline 5), [G5.18 Compensation measures for FFC SPA: Bycatch Reduction: Roadmap](#) (Submitted at Deadline 5), and Revision 4 of [B2.8.6](#)

Compensation measures for FFC SPA: Fish Habitat Enhancement: Roadmap (Submitted at Deadline 5).

- 8.1.1.6 The compensation measures are viable, effective, feasible and can be secured and delivered to successfully compensate for the potential impacts of Hornsea Four.

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