



Hornsea Project Four

Compensation measures for FFC SPA: Guillemot and Razorbill Bycatch Reduction: Roadmap

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Table of Contents

1	Introduction.....	7
2	Description and scope.....	7
2.1	Background.....	7
2.2	Strategic Compensation.....	11
3	Indicative timescale for delivery and implementation.....	12
4	Consultation.....	13
4.1	Pre-examination.....	13
4.2	Post-consent.....	13
5	Design and implementation of the bycatch reduction project – Initial technology selection phase 14	
5.2	Implementation of the Bycatch Reduction Technology.....	15
6	Monitoring and adaptive management.....	15
6.2	Monitoring.....	15
6.3	Adaptive Management.....	16
7	Legal agreement(s).....	16
9	Draft DCO wording.....	18
10	Funding.....	24
11	Conclusion.....	24
12	References.....	25

List of Tables

Table 1: Indicative timescale for delivery and implementation.....	12
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Glossary

Term	Definition
Compensation / Compensatory Measures	If an Adverse Effect on the Integrity of 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.
Hornsea Project Four Offshore Wind Farm	The proposed Hornsea Project Four Offshore Wind Farm project. 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.
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".
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 kittiwake compensation plan, the gannet compensation plan and the guillemot and razorbill 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 kittiwake compensation plan, the gannet compensation plan and the guillemot and razorbill compensation plan.
Orsted Hornsea Project Four Ltd.	The Applicant for the proposed Hornsea Project Four Offshore Wind Farm Development Consent Order (DCO).
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Ramsar	Wetlands of international importance designated under the Ramsar Convention.
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.

Term	Definition
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.
Black-legged kittiwake biogeographic population	The east Atlantic breeding population of kittiwake which includes individuals from the Flamborough and Filey Coast SPA (Stroud <i>et al.</i> , 2016). Proposed compensation measures will be undertaken within this populations breeding and migratory range.

Acronyms

Acronym	Definition
AEol	Adverse Effect on Integrity
BEIS	Business, Energy and Industrial Strategy
CfD	Contracts for Difference
DCO	Development Consent Order
DML	Deemed Marine License
FFC	Flamborough and Filey Coast
FID	Final Investment Decision
GRCIMP	Guillemot and Razorbill Compensation Implementation and Monitoring Plan
LEB	Looming Eyes Buoy
MMO	Marine Management Organisation
MoU	Memorandum of Understanding
NFFO	National Federation of Fisheries Organisation
NGO	Non-Governmental Organisation
OoEG	Offshore Ornithology Engagement Group
PINS	Planning Inspectorate
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SoS	Secretary of State
SPA	Special Protection Area
UK	United Kingdom

1 Introduction

- 1.1.1.1 This Guillemot and Razorbill Bycatch Reduction Roadmap document provides an overview of the next steps for implementation of bycatch reduction as a compensation measure for Hornsea Four, if deemed necessary by the Secretary of State (SoS) following the Appropriate Assessment. It should be noted that this is a 'live' document and, should compensation be required, it will be added to or revised as the Development Consent Order (DCO) application for Hornsea Four progresses. This Roadmap sets out a clear pathway to demonstrate that the compensation measure can be secured and that the mechanism for delivery of the compensation measure can be implemented.
- 1.1.1.2 Following the Applicant's submission, the Applicant has revisited its conclusion of no potential for an 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. It is important to note however that the Applicant maintains its position of no AEol alone or in combination for all other qualifying species of the FFC SPA and for all other European sites. In light of the Applicant's updated position on kittiwake the Applicant has separated the compensatory measures for gannet and kittiwake into separate Roadmaps, Compensation Plans (and consequently separate Implementation and Monitoring plans). Upon reflection the Applicant has also separated the Roadmaps, Compensation Plans (and consequently the Implementation and Monitoring Plans) for the auk species (guillemot and razorbill) and gannet. All of the compensation measures remain "without prejudice" but this Roadmap has been updated to focus solely on guillemot and razorbill.

2 Description and scope

2.1 Background

- 2.1.1.1 Bycatch reduction forms part of a suite of compensation measures also including predator eradication and fish habitat enhancement to compensate for the number of seabirds, specifically guillemot and razorbill that may be at risk of displacement from the operation of the Hornsea Four Wind Farm. The Applicant proposes to support the overall numbers of these birds through the reduction of bird bycatch in selected UK fisheries within the guillemot and razorbill biogeographic region. Seabirds are at risk from multiple anthropogenic threats, including bycatch in UK fisheries (Miles *et al.*, 2020). Bycatch – the incidental capture of non-target species in fisheries – can present a significant pressure on seabird populations (Miles *et al.*, 2020). Within recent decades, seabird populations have plummeted, largely due to commercial fisheries (direct competition and bycatch) (Croxall *et al.*, 2012). It has been estimated globally that hundreds of thousands of seabirds are killed each year in gillnets (400,000; Žydelis *et al.*, 2013) and longline fisheries (320,000; Anderson *et al.*, 2011). Despite this, monitoring of the issue is lacking with onboard observer monitoring coverage relatively low compared to the scale of commercial fishing (Pott and Wiedenfeld, 2017).
- 2.1.1.2 The reduction of seabird bycatch will be achieved through the use of deterrent equipment attached to fishing nets at regular intervals. There are multiple types of reduction techniques that can be used to reduce the interaction between birds and fishing equipment. The Evidence Report [B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence \(APP-194\)](#) sets out the ecological evidence for bycatch reduction measures and supports likely successful compensation measures. Bycatch reduction

techniques are designed to be suited to specific gear types and bycatch species. Defra and Cefas' joint Clean Catch initiative recommends bird bycatch reduction measures including modifications to fishing gear, changes to fishing and processing techniques, and devices for attachment to fishing gear (Clean Catch UK, 2020). The proposed reduction methods considered as part of a suite of compensation measures are above water deterrents, net lights, and net panels. Above water deterrents are usually fixed to buoys or markers attached to set fishing gear, which work to scare birds away from fishing nets.

- 2.1.1.3 In order to determine the most effective bycatch reduction method, the Applicant commenced a bycatch reduction technology selection phase in 2021, focusing on the use of Looming Eyes Buoys (LEB) within an active gillnet fishery within the biogeographic range of guillemot and razorbill. LEB were selected as they are one of the most developed forms of above water deterrent, which have been developed and trialled by BirdLife International/ RSPB in conjunction with Fishtek Marine (i.e. Rouxel *et al.*, 2021). The LEB is a rotating device (approximately 200 mm wide) with two panels which simulate predator eye patterns mounted on a pole to a fishing buoy. The opposite face of each LEB panel exhibits eyes of a difference size which creates a 'looming' effect when the panels rotate. The LEB is designed to rotate using wind power which provides unpredictable movements and speed rotations, which intensify the likelihood of behavioural responses by seabirds and reduce the chances of habituation (Gregor *et al.*, 2014). Further information is presented within the Applicant's [B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence \(APP-194\)](#).
- 2.1.1.4 The bycatch reduction technology selection phase was completed during the winter of 2021/2022 to further corroborate the substantial evidence already obtained on the efficacy of the LEB. The study was specific to guillemot and razorbill bycatch within a commercial gillnet setting. The technology selection phase has been implemented within an area of high guillemot and razorbill bycatch (determined by Northridge *et al.*, 2020) and bycatch risk mapping undertaken by the Applicant and presented in [B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence \(APP-194\)](#) with results of the bycatch reduction technology selection phase presented within the [G5.13 Bycatch Reduction Technology Selection Phase Summary](#) submitted at Deadline 5. The technology selection phase focused on the non-breeding season when high densities of guillemot and razorbill occur along the south coast of the UK and overlap with high levels of gillnetting activity.
- 2.1.1.5 The Applicant is undertaking the bycatch reduction technology selection phase with two companies:
- 1) FishTek Marine Ltd
 - FishTek are a global leader in developing bycatch reduction techniques, and have previously developed techniques which have successfully aided in reducing bycatch in fisheries (e.g., Hookpod, Lumo lead, pingers). FishTek designed the LEB.
 - 2) SeaScope Fisheries Research
 - SeaScope are an independent consultancy who specialise in fisheries monitoring and research.
- 2.1.1.6 The Applicant secured 10 fishers to take part in the full duration of the bycatch reduction technology selection phase, with all boats being fitted with a dual camera monitoring

system to determine seabird bycatch when fishing with control and experimental nets (i.e., with the LEB deterrent attached). The bycatch reduction technology selection phase took place from November 2021 until March 2022. Due to weather, large use of different gear type and technical failures, one vessel was unable to collect data during the study period relevant to the bycatch reduction technology selection phase, therefore the analysis has been completed using data from the remaining nine fishing vessels. The data has been subsequently analysed by fisheries experts and ornithologists to determine the effectiveness of the LEB as a compensation measure, the findings are presented in [G5.13 Bycatch Reduction Technology Selection Phase Summary](#) submitted at Deadline 5. The Applicant notes that as the bycatch reduction selection phase is being undertaken within the target fishery, the findings will quantify the level of bycatch reduction achieved through using the LEB, and can therefore directly indicate the scale of deployment that the Applicant would be required to deliver to fulfil compensation.

- 2.1.1.7 The preliminary findings from the bycatch reduction technology selection phase using the LEB are promising, with an initial 25% reduction in bycatch of auks identified ([G5.13 Bycatch Reduction Technology Selection Phase Summary](#) submitted at Deadline 5). Due to contractual restrictions, the results of the bycatch reduction technology selection phase can only be disclosed as percentage reductions in bycatch i.e. not specific numbers of birds, without consent from the participating fishers. The results of the bycatch reduction technology selection phase are similar to the results from Rouxel et al., 2021 who provided the first experimental test of the LEB (noting the differences in study species).
- 2.1.1.8 The Applicant has committed to use the LEB on vessels during the non-breeding season 2022/2023 and collect further data from September 2022 to March 2023. For this, the Applicant has so far signed up twenty two fishers. The Applicant is continuing engagement from additional fishers and aims to increase the number of vessels included and is therefore confident in securing the number of vessels required to fulfil compensation. This will also allow the Applicant to improve the technology based on lessons learnt from the bycatch reduction technology selection phase. These lessons learned have been discussed within [G5.13 Bycatch Reduction Technology Selection Phase Summary](#) submitted at Deadline 5.
- 2.1.1.9 The implementation of the bycatch compensation measure is flexible and scalable evidenced by the bycatch reduction technology selection phase ([G5.13 Bycatch Reduction Technology Selection Phase Summary](#) submitted at Deadline 5). Work will be undertaken with local representatives and contacts within the target fishery areas (determined by fisheries consultation, published literature (i.e., Northridge et al., (2020) and bycatch risk mapping undertaken by the Applicant and presented in [B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence \(APP-194\)](#)) to ensure uptake of the bycatch reduction equipment. It is acknowledged by the Applicant that use of the equipment may need to be incentivised to ensure uptake and continued usage.
- 2.1.1.10 To ensure that the equipment continues to be used, a monitoring programme will be required during the operational use of the technology, should they be taken forward as a compensation measure. There are many examples of fishing gear monitoring around the world, which include but are not limited to onboard or coastal observers, gear cameras, self-reporting, blue-tooth tags and equipment trackers. The exact method of monitoring will be decided based upon further evidence gathering and discussion with industry experts. However, due to the high resolution of the camera system used during the bycatch reduction

technology selection phase, the same system may be used at times during the lifetime of the project to complement the other monitoring measures.

- 2.1.1.11 Hornsea Four is expected to operate for 35 years following construction. If required, the accepted measure(s) will be used and monitored throughout the operational lifespan of the Wind Farm. Following the monitoring programme, overall measure uptake and success of the reduction measure, the equipment may continue to be used as a bycatch deterrent.
- 2.1.1.12 Having 12 operational windfarms in UK waters, the Applicant, has a longstanding relationship with the UK fishing industry, especially on the east and west coasts of England where positive and trusting relationships have been built over time. The Applicant also supports local fishing industries, providing good-will funding to fishers, and related organisations, that work within the vicinity of their wind farms which has further encouraged good relationships. The Applicant has a track record of encouraging co-existence between renewable energy development and the fishing industry and are often used as an example of best practice between the industries. The Applicant is positive that their pre-existing relationship with the fishing industry and representatives will aid the future use of the technology and compensation measure implementation.
- 2.1.1.13 The Applicant will continue to enhance connections and relationships with fishers in regions of England, where netting activity is high. The Applicant has a high degree of confidence in the feasibility of delivering the compensation measure. Throughout the development of the technology selection phase and compensation implementation the Applicant will seek to further strengthen fisheries engagement, collaboration and relationships in the Southeast and Southwest.
- 2.1.1.14 The Applicant will take an appropriately precautionary approach for assessment work in order to increase the biogeographic population of adult birds by a sufficient margin to offset the predicted impact of Hornsea Four on an annual basis (see [Table 2 of B2.6 RP Volume B2 Chapter 6 Compensation measures for FFC SPA Overview \(APP-183\)](#)). The bycatch reduction measures will be used to compensate as part of a suite of measures. It is considered that guillemot, and razorbill can be sufficiently compensated through a suite of measures:
- Bycatch reduction;
 - Predator eradication; and
 - Fish habitat enhancement (as a resilience measure).
- 2.1.1.15 Therefore, the bycatch reduction measures, could collectively with the compensation measures, be scaled up to provide a ratio of 1:2. The reduction in mortality through the implementation of the suite of measures collectively are capable of over-compensation for the estimated potential impact to guillemot and razorbills from Hornsea Four (see [Table 2 of B2.6: Compensation Measures for FFC SPA Overview \(APP-183\)](#)).
- 2.1.1.16 From the 25% reduction in the target fishery identified from the bycatch reduction technology selection phase, the identified number of vessels required would be a total of 8 vessels. As noted above, the Applicant is confident they can secure this number of vessels based on currently committed fishers for the use of the LEB in the non-breeding season

2022/2023 (a total of 22 vessels secured to date) and ongoing engagement with the fishing industry.

2.2 Strategic Compensation

- 2.2.1.1 The Policy paper 'British Energy Security Strategy'¹ (BESS) published by BEIS in April 2022 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'. The Applicant refers to [G5.8 Ørsted's approach to strategic ecological compensation](#) (submitted at Deadline 5) which defines strategic compensation including its purpose and the mechanism for funding (the Marine Recovery Fund ("MRF") or equivalent fund). It is considered important that Hornsea Four is able to place reliance upon the delivery of strategic compensation, in addition to the evidence submitted to date for project specific compensation measures.
- 2.2.1.2 Further to this the law and guidance require that the Secretary of State has a rational basis for finding that he has discharged his duty to secure that necessary compensation measures can be delivered post-implementation of the development. The delivery of strategic compensation substantiates the likelihood of delivery of the compensation measure. For example, Hornsea Four will be able to take advantage of the ecological evidence obtained through the delivery of strategic pilots, alongside evolving plans for strategic monitoring (also committed to in the BESS). The ability to develop best practice for the delivery of measures would also be of benefit to those projects in the planning system. Outwith the MRF the Applicant continues to work closely with other developers currently in the planning system who have been tasked with delivering compensation measures to find opportunities for early collaboration. This could for example lead to the sharing of artificial nesting structures on or offshore. The Applicant is therefore open to early collaboration with other developers in the delivery of compensation measures and will, where appropriate, identify opportunities for co-location of measures. This could form an integral part in the discharge of the Applicants obligations but will always be subject to maintaining the projects timescales for delivery to ensure the overarching policy set out in the BESS is achieved.
- 2.2.1.3 The Applicant refers to the Marine Net Gain – Consultation on the principles of marine net gain dated 7 June 2022 (Defra, 2022), which includes reference to the newly announced Marine Recovery Fund (MRF). The Applicant originally committed at para. 3.1.1.7 of the [B2.6 Compensation Measures for FFC SPA Overview \(APP-183\)](#) to contribute to a fund (£100,000 per year for 5 years) to develop further research to support evidence gathering, such as the research led by the Offshore Wind Strategic Monitoring and Research Forum. This commitment is also detailed in the Applicant's [B2.10 Without Prejudice Derogation Funding Statement \(APP-202\)](#) and [B2.6.2 Appendix A Ørsted's Strategic Compensation Approach \(APP-185\)](#). The Applicant has updated their position and now considers the MRF or other equivalent fund to be an appropriate fund for the sums to be paid and has drafted specific wording to include in the DCO.
- 2.2.1.4 The Applicant has taken a further step by committing to pay an agreed sum into the MRF either in substitution for the delivery of one or more of the proposed compensation measures (such sum to be agreed in consultation with the Department for Environment Food and Rural

¹ <https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy>

Affairs (DEFRA) prior to approval of the relevant implementation plans). Alternatively, the contribution could be paid as an adaptive management measure.

- 2.2.1.5 The proposal to contribute to the MRF has been included as part of the proposed compensation plans upon which each of the implementation plans will be based. The Applicant has also included draft DCO wording confirming that the implementation plans must also include the purpose of the contribution (i.e. as an alternative to the delivery of a specific compensation measure or as an adaptive management measure) and the amount and timing of the contribution (see Section 12).

3 Indicative timescale for delivery and implementation

3.1.1.1 The high-level anticipated programme presented below (

3.1.1.2

3.1.1.3 **Table 1**) is applicable to the implementation and delivery of the bycatch reduction compensation measure. Implementation of compensation measures will be subject to successful progression of the Hornsea Four project and determination of the need for compensation by the SoS. The decision on the requirement for and the scale of the suite of measures and inclusion of the predator eradication measure will be determined by the SoS in 2023. The timing of implementation of the bycatch reduction compensation measure is provisional as the timeframe for Examination, consent award, reaching final investment decision (FID) and Contracts for Difference Allocation Round Five and Six, have not yet been set. The programme has been carefully considered to ensure timely delivery of the compensation measure with the Applicant currently committed to entering into contracts with fishers for the provision and use of bycatch reduction technology no later than one year ahead of operation.

Table 1: Indicative timescale for delivery and implementation

Activity	Year	2021	2022	2023	2024	2025	2026	2027	2028
Design of technology selection phase	2021								
Bycatch technology selection phase & use of LEB	2021 2023								
Scale and package consideration	2023								
Anticipated Hornsea Four DCO Granted	2023								
Compensation Implementation ²	2022/2023-TBC								
Bycatch implementation detailed design	2024								

² Due to the uncertainty regarding Allocation Round 5 and 6 of the Contracts for Difference (CfD) scheme the date cannot be confirmed at this time.

Activity	Year	2021	2022	2023	2024	2025	2026	2027	2028
Establishment of Offshore Ornithology Engagement Group (OOEG)	Following consent award								
Guillemot and Razorbill Compensation Implementation and Monitoring Plan (GRCIMP)	Following consent award								
GRCIMP submitted to SoS	Following consent award								
Offshore Construction of Hornsea Four Foundations	2026								
Offshore Construction of Hornsea Four Offshore Turbines	2027								
First Power (partially operational windfarm)	2028								

4 Consultation

4.1 Pre-examination

4.1.1.1 The bycatch reduction technology selection phase was initiated in November 2021 until the end of March 2022 ([G5.13 Bycatch Reduction Technology Selection Phase Summary](#) submitted at Deadline 5; see [Section 5](#) for further details). This technology selection phase has been designed in consultation with industry experts, the SNCB and the RSPB. Initial advice was sought to influence the methodology of the technology selection phase. Since the bycatch reduction technology selection phase, the Applicant has started the planning and processes for implementation with the use of the LEB in the non-breeding season 2022/2023, which will collect information to aid delivery of compensation and collect further data on bycatch reduction as a result of the LEB.

4.2 Post-consent

4.2.1.1 A steering group named the Offshore Ornithology Engagement Group (OOEG) shall be convened by the Applicant to assist the design, implementation, reporting, any necessary adaptive management and other relevant matters of the compensation measures as determined by the Applicant. The OOEG core members would be the relevant SNCB(s) and the MMO. The RSPB and NFFO would also be invited to form part of the OOEG as advisors. The purpose of this group would be to help shape and inform the nature and delivery of the compensation post consent.

4.2.1.2 A Guillemot and Razorbill Compensation Implementation and Monitoring Plan (GRCIMP) will be produced. The GRCIMP (following the content in the outline GRCIMP ([B2.8.7 Outline Guillemot and Razorbill Compensation Implementation and Monitoring Plan](#) submitted at Deadline 5) will document all of the proposed compensation measures for guillemot and razorbill (including mechanisms and programme for delivery, monitoring, adaptive

management and reporting). The OOEG will be consulted during development of the GRCIMP. The GRCIMP will be submitted to the Secretary of State for approval.

- 4.2.1.3 The implementation phase will involve consultation with stakeholders via the OOEG process to ensure cooperation across the monitoring aspects of the compensation measure. The proposed implementation process described below will be documented in the GRCIMP and will be submitted to the Secretary of State for approval.
- 4.2.1.4 The implementation of the compensation measures will be monitored to ensure that the bycatch reduction method is being applied in accordance with the GRCIMP. The details of the monitoring phase of the compensation measure will be discussed with the OOEG and will be set out within the GRCIMP for approval by the Secretary of State.
- 4.2.1.5 Monitoring will inform any adaptive management required by the compensation measure and will be discussed with OOEG members before implementation. This will be continued until Hornsea Four has been decommissioned or a determination is made by the Secretary of State following consultation with the relevant statutory nature conservation body, that compensation is no longer required.
- 4.2.1.6 Reporting of the results of implementation of the compensation measure will be carried out according to timescales discussed with the OOEG and set out in the GRCIMP.

5 Design and implementation of the bycatch reduction project – Initial technology selection phase

- 5.1.1.1 The Applicant has identified locations with high guillemot and razorbill bycatch along the south coast of England, particularly southeast and southwest. This has been determined by the risk mapping process outlined within the Guillemot and Razorbill Bycatch Evidence Report (**B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence (APP-194)**), consultation with fisheries and other relevant stakeholders. The southeast and southwest locations have formed the basis of the bycatch reduction technology selection phase, and potentially the location of the compensation measure. The scale of compensation relative to the location specific factors (i.e. number of vessels to be included in the bycatch reduction technology selection and implementation) along with the methodology would be defined in consultation with the SNCB, the RSPB and relevant industry stakeholders.
- 5.1.1.2 As mentioned above, the Applicant commenced the bycatch technology selection using the LEB in November 2021. The Applicant had a supply contract for the supply of the LEB equipment, put the necessary contractual arrangements in place for payments to be made to the participating fishers to use the technology, arranged for the advanced camera monitoring during the bycatch technology phase and undertook stakeholder engagement which will continue during the implementation phase. Ten vessels were secured for the bycatch reduction technology selection phase within two months (with most of the fishers signing up within two weeks), demonstrating how rapidly fishers could be secured by the project. Due to weather, large use of different gear type and technical failures, one vessel was unable to collect data during the study period relevant to the bycatch reduction technology selection phase, therefore the analysis has been completed using data from the remaining nine fishing vessels. Nine of the original vessels and fishers with a further 7 vessels have agreed to participate in the use of the LEB during the non-breeding season 2022/2023. Fishers have expressed an interest in long-term implementation of the measure. Such

implementation is currently being secured via contracts between the Applicant and the fishers with the support of a specialist fisheries consultancy.

The Applicant may consider undertaking technology selection of other potentially suitable bycatch reduction techniques, should it be deemed necessary, such as net illumination, visual net modifications (reflective nets and warning panels) and other above water deterrents (as identified in the [Bycatch Evidence Report B2.8.1 Compensation measures for FFC SPA: Bycatch Reduction: Ecological Evidence \(APP-194\)](#)). The LEB currently presents the most promising potential for bycatch reduction in UK waters as identified in [G5.13 Bycatch Reduction Technology Selection Phase Summary](#) submitted at Deadline 5 and through discussions with relevant stakeholders and peer reviewed published research (Rouxel et al., 2021). The bycatch reduction technology selection phase involved at-sea deployment of bycatch reduction technology within an active fishery. This involved control nets as well as experimental nets where the technology is being used. The methodology of the selection phase has been developed in conjunction with delivery partners, advisors (such as NGO's and fisheries stakeholders) and bycatch reduction technology developers to ensure best practice and a robust approach, which does not cause any safety or working implications for fishers.

5.2 Implementation of the Bycatch Reduction Technology

- 5.2.1.1 Following the results of the bycatch reduction technology selection phase indicating a 25% reduction in guillemot bycatch when using the LEB, the LEB will also be used on vessels during the non-breeding season 2022/2023 and monitoring will inform implementation. Members of the OOEG will be consulted on the final fishery/fisheries location. Relevant fisheries stakeholder discussions will also be undertaken.
- 5.2.1.2 The approach taken to the delivery of bycatch reduction will be discussed with the OOEG as part of the development of the GRCIMP, taking into account the considerations of fisheries stakeholders and any relevant additional consideration of location specific issues.
- 5.2.1.3 The implementation of the bycatch reduction compensation measure will be overseen by a suitably qualified delivery partner such as a commercial fisherman/ technical specialist contractor.

6 Monitoring and adaptive management

- 6.1.1.1 A detailed monitoring and adaptive management protocol will be provided in the GRCIMP. This will be produced in consultation with OOEG members and other relevant parties so it is fit for purpose.

6.2 Monitoring

- 6.2.1.1 A monitoring package shall be designed with the delivery partner and the OOEG. Monitoring will focus on the progress and confirmation of a reduction in bycatch numbers for guillemot and razorbill. This would be informed by the bycatch technology selection phase (comparing the bycatch rate in the control nets to the experimental nets). The monitoring of results will be dependent on the implementation method. However, reduction monitoring for bycatch of other taxa is well known and synergies can be drawn and incorporated into the monitoring relevant to guillemot and razorbill. This would be developed with experienced stakeholders

from both a conservation and fisheries background to ensure monitoring requirements are met.

- 6.2.1.2 Monitoring will continue for the operational phase of the compensation measure, at a frequency and method to be detailed in the GRCIMP. It is envisaged that the delivery partner would lead the monitoring component of this measure.

6.3 Adaptive Management

- 6.3.1.1 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 will be produced and outlined in the GRCIMP, which would list a set of options to ensure the long-term resilience of the measure. This process would be developed in consultation with the OOEG. 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 will be implemented to improve effectiveness and another technique or fishery type may be trialled and chosen for bycatch reduction, in consultation with the OOEG.
- 6.3.1.2 The Applicant is heavily involved in advancing the offshore wind industry's strategic compensation outlook. They have initiated and led the composition of strategic compensation groups; drawing together offshore wind developers and government bodies to increase knowledge and develop synergies to deliver compensation which will secure renewable energy and support the Government's ambitious energy targets. The Applicant will ensure it stays abreast of the advancements made by the group and is well placed to support and join any strategic compensation options developed by the fund.
- 6.3.1.3 An alternative approach than that outlined above 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 wording below in [Section 8](#) in relation to the option to contribute to the MRF for adaptive management.

7 Legal agreement(s)

- 7.1.1.1 In order to undertake the bycatch reduction technology selection phase, the Applicant entered into a supply contract with the bycatch reduction technology provider Fishtek Marine and the monitoring technology provider Seascope Fisheries Research Ltd. The agreements include provisions governing the supply and deployment of the technology, intellectual property rights relating to the specific technology, collection and dissemination of the data amongst other obligations to ensure the timely execution of the technology selection phase.
- 7.1.1.2 The contract required the monitoring technology provider Seascope Fisheries Research Ltd to enter into individual agreements with fishers participating in the trial incorporating a

payment and outlining the obligations on both parties to cover monitoring and the collection of data.

- 7.1.1.3 Following the bycatch technology selection phase it is anticipated that the technology that is deemed to have generated the most favourable outcome (the LEB) will form the compensation measure. A long-term supply contract will be entered into to supply the technology and ensure its ongoing maintenance. In addition, the Applicant will enter into long term individual agreements with fishers to pay an annual sum for utilising the technology on their boats and monitoring bycatch.
- 7.1.1.4 The Applicant has confirmed that a marine licence would not be required for the selection phase or future implementation of the technology as the LEB forms part of the fishing equipment used by the fishers, and fishing is an exempted activity from marine licensing.

9 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.

10 Funding

- 10.1.1.1 The Applicant has identified the costs associated with the implementation of the proposed compensation measure. These costs have been included within a detailed Derogation Funding Statement (**B2.10 RP Volume B2 Chapter 10 Without Prejudice Derogation Funding Statement (APP-202)**). This statement is supplemental to the Funding Statement (**E1.1 CA Volume E1.1 Funding Statement (APP-224)**) submitted as part of the suite of Application documents. The Funding Statement(s) outline 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 Funding Statement(s) also detail the corporate structure and a robust explanation to allow the SoS to conclude that the necessary funding to deliver the compensation measure can be secured.

11 Conclusion

- 11.1.1.1 The Applicant is confident that the compensation measure is viable, will be effective and can be delivered. The Applicant will continue stakeholder engagement to demonstrate the design and implementation of the bycatch reduction project and ensure the compensation measure can be readily achieved and secured.

12 References

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