



Hornsea Project Four

Compensation measures for FFC SPA: Fish Habitat Enhancement: Roadmap (Tracked)

Deadline 5, Date: 20 June 2022

Document Reference: B2.8.6

Revision: 04

Prepared GoBe Consultants Ltd, June 2022
Checked Sarah Randall, Orsted, June 2022
Accepted Francesca De Vita, Orsted, June 2022
Approved Julian Carolan, Orsted, June 2022

B2.8.6
Ver. D

Revision Summary

<i>Rev</i>	<i>Date</i>	<i>Prepared by</i>	<i>Checked by</i>	<i>Approved by</i>
01	28/09/2021	GoBe Consultants Ltd., September 2021	Dr Sarah Randall, Orsted, September 2021	Dr Julian Carolan, Orsted. September 2021
02	08/03/2022	GoBe Consultants Ltd., March 2022	Dr Sarah Randall, Orsted, March 2022	Dr Julian Carolan, Orsted, March 2022
03	29/03/2022	GoBe Consultants Ltd., March 2022	Dr Sarah Randall, Orsted, March 2022	Dr Julian Carolan, Orsted, March 2022
04	20/06/2022	GoBe Consultants Ltd., June 2022	Dr Sarah Randall, Orsted, June 2022	Dr Julian Carolan, Orsted, June 2022

Revision Change Log

<i>Rev</i>	<i>Page</i>	<i>Section</i>	<i>Description</i>
01	-	-	Submitted at DCO Application
02	Amended throughout	Amended throughout	Removal of Gannet from the document for Deadline 1
02	6	1	Position on kittiwake AEol conclusion
02	Amended throughout	Amended throughout	Updates on implementation studies for Deadline 1
03	15 - 20	9	Updates on DCO wording
03	Amended throughout	Amended throughout	Changes to implementation and monitoring plan names
04	Amended throughout	Amended throughout	Updated reflecting progress for Deadline 5 submission.
04	Updated throughout	Updated throughout	Updated regarding strategic compensation and Marine Recovery Fund.

Table of Contents

1	Introduction.....	7
2	Description and scope.....	7
3	Next Steps.....	9
4	Indicative timescale for delivery and implementation.....	10
5	Consultation.....	12
5.2	Post-application.....	12
5.3	Post-consent.....	13
6	Design of the restoration project, site selection and further research.....	14
6.2	Further Research.....	14
7	Monitoring and adaptive management.....	21
7.1	Monitoring.....	21
7.2	Adaptive management.....	22
8	Securing key consents and legal agreement(s).....	22
8.2	Legal agreements.....	23
9	Draft DCO Wording.....	24
10	Funding.....	36
11	Conclusion.....	36
12	References.....	38

List of Tables

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

List of Figures

Figure 1:	Seagrass restoration at Spurn Point, Humber Estuary. 'Orsted 21' illustrates the 2 ha planted in 2021-2022 for Hornsea Four and 'To be planted' is the remaining area to be planted in 2022-2023 to total 4 ha of seagrass restoration.	10
Figure 2:	Fyke net survey locations.....	16
Figure 3:	Nearshore Mamou survey locations.....	17
Figure 4:	Setting of otter trawl during HML survey.....	19
Figure 5:	Fish connectivity survey stations within the Humber Estuary and the wider North Sea.....	20

Appendices

Appendix	Heading
A	Letter of comfort from Project Seagrass
B	Letter of comfort from Yorkshire Wildlife Trust
C	Letter of comfort from Ocean Conservation Trust

Glossary

Term	Definition
Compensation/ Compensatory Measures	If an Adverse Effect on the Integrity on a designated site is determined during the Secretary of State's Appropriate Assessment, compensatory measures for the impacted site (and relevant features) will be required. The term compensatory measures is not defined in the Habitats Regulations. Compensatory measures are however, considered to comprise those measures which are independent of the project, including any associated mitigation measures, and are intended to offset the negative effects of the plan or project so that the overall ecological coherence of the national site network is maintained.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Projects (NSIP).
Habitats Regulations	The Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017.
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 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.
Offshore Ornithology Engagement Group (OOEG)	The Hornsea Four OOEG means the group that will assist, through consultation the undertaker in relation to the delivery of each compensation measures as identified in the gannet and kittiwake compensation plan, the gannet compensation plan and the razorbill and 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 razorbill and guillemot and razorbill compensation plan.
Planning Inspectorate (PINS)	The agency responsible for operating the planning process for NSIPs.
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".
Ramsar	Wetlands of international importance designated under the Ramsar Convention.

Report to Inform Appropriate Assessment (RIAA)	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), Part 2 (REP2-005) , Part 3 (AS-016) , Part 4 (REP1-012) , Part 5-12 (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
CfD	Contracts for Difference
DCO	Development Consent Order
FFC	Flamborough and Filey Coast
FID	Final Investment Decision
GRCIMP	Guillemot and Razorbill Compensation Implementation and Monitoring Plan
KCIMP	Kittiwake Compensation Implementation and Monitoring Plan
HRA	Habitats Regulations Assessment
H4 OOEG	Hornsea Four Offshore Ornithology Engagement Group
MMO	Marine Management Organisation
OEL	Ocean Ecology Limited
OOEG	Offshore Ornithology Engagement Group
RIAA	Report to Inform Appropriate Assessment
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SNCB	Statutory Nature Conservation Bodies
SoS	Secretary of State
SPA	Special Protection Area
<u>SU</u>	<u>Swansea University</u>
UK	United Kingdom
<u>UoH</u>	<u>University of Hull</u>
<u>YWT</u>	<u>Yorkshire Wildlife Trust</u>
YWT	Yorkshire Wildlife Trust

1 Introduction

- 1.1.1.1 This Fish Habitat Enhancement Roadmap (~~APP-199~~) document provides an overview of the anticipated next steps for implementation of fish habitat enhancement as a resilience measure for Hornsea Four, if deemed necessary by the Secretary of State (SoS) following the Appropriate Assessment. It should be noted that this document will be updated as necessary and should compensation be required it will be added to and revised as the Development Consent Order (DCO) application for Hornsea Four progresses. This resilience measure is feasible and can be secured, and this Roadmap sets out the approach that will be followed.
- 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. 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.
- 1.1.1.3 In the DCO Application the Applicant's proposed without prejudice compensatory measures for gannet and kittiwake were presented together in a single **Gannet and Kittiwake Compensation Plan (APP-186)**. However, as set out in the Applicant's position paper (**G1.5 Kittiwake Adverse Effects on Integrity (AEol) Conclusion (AS-023)**), the Applicant is updating the Report to Inform Appropriate Assessment (RIAA) (**B2.2 RP Volume B2 Chapter 2 Report to Inform Appropriate Assessment Part 1 (as submitted at Deadline 5) and Part 4 (REP1-012)**) and its derogation case (**B2.5 RP Volume B2 Chapter 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. (see **Kittiwake Adverse Effects on Integrity (AEol) Conclusion (AS-023)**).
- 1.1.1.4 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 Roadmaps, 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. This Roadmap has been updated to reflect this change and relates to all species, kittiwake, gannet, guillemot and razorbill.

2 Description and scope

~~1.1.1.5~~ 2.1.1.1 Fish habitat enhancement is being pursued as a 'without prejudice' resilience measure for:

- black-legged kittiwake (*Rissa tridactyla*);
- northern gannet (*Morus bassanus*);
- common guillemot (*Urea aalge*); and
- razorbill (*Alca torda*).

~~1.1.1.6~~ 2.1.1.2 Fish habitat enhancement seeks to improve vital habitats for fish species, such as those that provide spawning or nursery grounds, to increase the productivity of key prey species for seabirds. Marine habitats that support fish populations such as seagrass, biogenic reef and mudflats have been considered for restoration in the United Kingdom (UK) to increase biodiversity (ABPmer 2017; MMO 2019). There is substantial evidence that these types of

structured habitats enhance the density, growth, and survival of juvenile fishes and invertebrates (Lefcheck et al., 2019).

~~1.1.1.7~~2.1.1.3 Seagrass meadows are amongst the most productive marine habitats in the UK. Seagrass provides rich nursery habitat for a fifth of the world's most fished species including pollock, herring and whiting, meaning their restoration can improve prey availability (Unsworth et al., 2021). Seagrass meadows provide shelter and food for juvenile fish, stabilise the sediment, reduce erosion, improve water quality, absorb excess nutrients and improve nutrient cycling, produce oxygen and store significant amounts of carbon. Prey forage fish for seabird species, kittiwake, gannet, guillemot and razorbill, include planktivorous pelagic species (e.g. sandeel, sprat, herring). While seabirds such as kittiwake, gannet, guillemot and razorbill often feed miles away from any seagrass, the species that they prey on, such as gadoids and clupeoids, often utilise seagrass as nursery habitats (Bertelli and Unsworth 2014; Lefcheck et al., 2019; Lilley and Unsworth 2014; McDevitt-Irwin et al., 2016). 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 resilience measure and supports it as a likely successful resilience measure.

~~1.1.1.8~~2.1.1.4 The fish habitat enhancement measures will provide resilience to the compensation measures for the predicted impact of Hornsea Four as part of a suite of measures. The suite of compensation measures will increase the biogeographic population of each species as required to compensation for Hornsea Four's impact (see **Table 2** of Revision 2 of B2.6 RP Volume B2 Chapter 6 Compensation measures for FFC SPA Overview (APP-183), **B2.2: Report to Inform Appropriate Assessment Part 1** (submitted at Deadline 5), Revision 2 of B2.7 FFC SPA: Kittiwake and Gannet Compensation Plan (APP-186) (submitted at Deadline 5) and Revision 2 of B2.8 FFC SPA Gannet, Guillemot and Razorbill Compensation Plan (APP-193) (updates to be provided submitted at Deadline 5) for further details on the suite of compensation measures).

~~1.1.1.9~~2.1.1.5 Kittiwake will be compensated through a suite of compensation measures which includes:

- Artificial nesting structures; and
- Fish habitat enhancement (as a resilience measure).

~~1.1.1.10~~2.1.1.6 Guillemot and razorbill will be sufficiently compensated through a suite of compensation measures (should it be deemed necessary by SoS) which includes:

- Bycatch reduction measures;
- Predator eradication; and
- Fish habitat enhancement (as a resilience measure).

~~1.1.1.11~~2.1.1.7 Gannet will be compensated through a suite of compensation measures (should it be deemed necessary by SoS) which includes:

- Artificial nesting structures;
- Bycatch reduction measures; and
- Fish habitat enhancement (as a resilience measure).

~~1.1.1.12~~2.1.1.8 The increased resilience to seabird populations through the implementation of the fish habitat enhancement measures collectively with the predator eradication and bycatch reduction measures and artificial nesting structures for gannet and kittiwake will provide further resilience to the compensation measures, in addition to the considerable

compensation levels secured by the other compensation measures. The Applicant is confident that the measure of extensive large-scale seagrass restoration (up to a total of 30 ha) will provide resilience to the compensation measures and compensate as part of a package for Hornsea Four.

~~1.1.1.13~~ 2.1.1.9 Hornsea Four is expected to operate for 35 years following construction. If required, the accepted measure(s) will be implemented and monitored throughout the operational lifespan of the Hornsea Four.

3 Next Steps

~~1.1.1.14~~ 3.1.1.1 Prior to obtaining consent of Hornsea Four, the Applicant has explored suitable locations and selected the area deemed most suitable for seagrass restoration to provide resilience for the Hornsea Four compensation measures. The refined area for seagrass restoration is Spurn Point in the Humber Estuary and the Applicant has commenced seagrass restoration efforts with a trial scheme. It should be noted that the trials, methodologies and exploration of potential broad areas for large scale seagrass restoration is ongoing and advice has been received and discussions have been held with a number of stakeholders, including academics and experts in the field (see Appendices A and B). Evidence of the most suitable seagrass restoration site will be provided through a detailed site implementation study and results of planting/trial studies. The goal of the trial studies is to restore seagrass habitat and determine success at a smaller scale, prior to planting at a larger scale, in order to maximise likelihood of success and monitor prey fish responses. The Applicant has entered into a supply contract for the collection of seed and planting of an area of 2 ha for seagrass restoration. This pilot trial planting scheme is in a partnership with the Yorkshire Wildlife Trust (YWT) and the University of Hull (UoH). Seed collection commenced in September 2021, with 2 ha planted in Q1 2022 in October 2021 and March 2022. and this work commenced (September 2021), with the seeds collected and some planting and will be completed in Q1 2022 and a further 2 ha of seagrass restoration are proposed have been commissioned to commence planting be planted in autumn 2022-2023 (see). In total the Applicant has contracted the YWT to restore 4 ha of seagrass beds and has an agreement in place to deliver the full large-scale restoration of a further 30 ha following SoS decision. The Applicant is also undertaking a UK site implementation study for proposed adaptive management measures (see [Section 7.2](#)).

3.1.1.2 The trial seagrass restoration efforts within the Humber Estuary including seed collection and planting of intertidal seagrass (*Zostera noltii*) are being and has been undertaken by the YWT. ~~Further studies of the seagrass restoration scheme are being conducted by the University of Hull, these aim to monitor the success of the restoration effort, effects on fish assemblages and abundance and demonstrate fish connectivity to wider North Sea populations through stable isotope analysis.~~ The methodology for trial planting, includes the use of hessian sacks filled with substrate and seagrass seeds, which are deposited into the intertidal area using a tree planting tool (pottiputki), with 1000 seeds planted in a half-acre area. It should be noted that the restoration works, are being carried out by an external provider, the YWT, and as such the methodology has been devised and any licences or permits required to restore seagrass within the Humber Estuary have been obtained by the YWT. The area within which the trial planting is taking place is Spurn Point, this location was selected by the YWT and the Applicant being adjacent to remnant seagrass beds and as YWT as they own the foreshore and have a byelaw in place to protect the area. Further studies of the seagrass restoration scheme are being conducted by the YWT and the UoH, these aim to monitor the success of the restoration effort.

effects on fish assemblages and abundance and demonstrate fish connectivity to wider North Sea populations through stable isotope analysis.

1.1.1.15

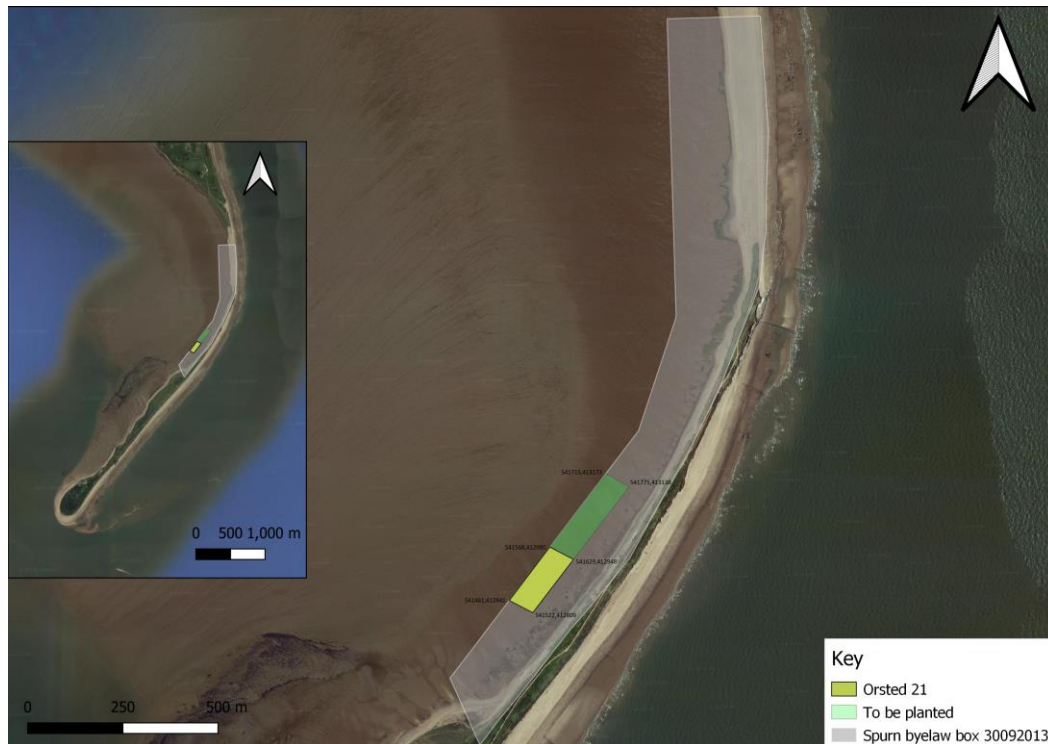


Figure 1: Seagrass restoration at Spurn Point, Humber Estuary. 'Orsted 21' illustrates the 2 ha planted in 2021-2022 for Hornsea Four and 'To be planted' is the remaining area to be planted in 2022-2023 to total 4 ha of seagrass restoration.

~~Figure 1: Seagrass restoration at Spurn Point, Humber Estuary. 'Orsted 21' illustrates the 2 ha planted into the area planted in 2021-2022 for Hornsea Four and 'To be planted' is the remaining area to be planted in 2022-2023 to total 4 ha of seagrass restoration.~~

~~1.1.1.16~~ 3.1.1.3 The UK site implementation study is being undertaken in parallel with the seagrass restoration implementation study and will appraise the suitability of the trial study area to support expansion to a large-scale restoration site. The UK site implementation study will also inform adaptive management. The external provider responsible for the UK-wide site implementation study is Ocean Ecology Limited (OEL) in collaboration with seagrass restoration experts from Project Seagrass and Swansea University (SU). Further information on the restoration works is provided in [Section 6](#).

4 Indicative timescale for delivery and implementation

~~1.1.1.17~~ 4.1.1.1 The high-level programme presented below ([Table 1](#)) is applicable to the implementation and delivery of the fish habitat enhancement resilience measure. Implementation of the resilience measure will be subject to successful progression of the Hornsea Four project. The timing of implementation of the seagrass restoration 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 resilience measure. The large-scale seagrass restoration will commence in 2023 and planting extent in subsequent each year will be dependent upon the quantity of seed collection, seedling propagation and consent requirements to avoid bird disturbance during planting.

Table 4.11: Indicative timescale for delivery and implementation

Activity	From	2021	2022	2023	2024	2025	2026	2027	2028
Desk-based implementation study and research studies and surveys	2021 – 2022	█	█						
Humber 2 ha Seagrass Restoration	2021 – 2022	█	█						
Humber 2 ha Seagrass Restoration	2022 – 2023		█	█					
Anticipated Hornsea Four DCO Granted	2023			█					
Compensation Implementation ¹	2023/ 2024 - TBC			█					
Further ground-truthing and surveys	2024 - 2025				█	█			
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								█

5 Consultation

5.1.1.185.1.1.1 Stakeholder engagement is considered important for seagrass restoration projects and stakeholder engagement will be required throughout the restoration project development, implementation and monitoring.

5.1.5.2 Post-application

5.2.1.1 The Applicant has continued to engage with stakeholders during the post-application period prior to the close of Examination. The Applicant provided an update to Natural England on the seagrass restoration project undertaken to date and outlined further work which will be completed during the Examination period. Engagement will continue and

¹ Due to the uncertainty regarding Allocation Round Five of the Contracts for Difference (CfD) scheme the date cannot be confirmed at this time.

updates on the results of the pilot restoration project and associated research will also be provided to stakeholders. ~~I Should t~~ the pilot studies have been and continue to be successful, therefore following review after the winter 2022/2023 the area of seagrass restoration effort will be expanded to a full 30 ha following SoS decision. ~~Any future increase in T~~ the Applicant seagrass restoration site will ~~include~~ continue further consultation and engagement with local stakeholders and advisory bodies regarding the seagrass restoration site.

5.25.3 Post-consent

~~1.1.1.20~~ 5.3.1.1 A steering group named the Offshore Ornithology Engagement Group (OOEG) will be convened by the Applicant to advise on implementation, reporting and any necessary adaptive management of the resilience measure (adaptive management for the resilience measure being limited to achieving the spatial target for seagrass restored). The OOEG core members will be the relevant Statutory Nature Conservation Bodies (SNCB(s)) and the Marine Management Organisation (MMO). The Royal Society for the Protection of Birds (RSPB) and National Federation of Fishermen's Organisations (NFFO) will also be invited to form part of the OOEG as advisory members. The purpose of this group will be to help shape and inform the nature and delivery of the compensation post consent, as agreed by the Applicant.

~~1.1.1.21~~ 5.3.1.2 A Guillemot and Razorbill Compensation Implementation and Monitoring Plan (GRCIMP) will be produced (following the content in Revision 2 of B2.8.7 Outline Gannet, Guillemot and Razorbill Compensation Implementation and Monitoring Plan (submitted at Deadline 5) ~~(APP-200)~~ noting that gannet alone documents are being prepared by the Applicant for submission at Deadline 5 which will result in the removal of gannet from guillemot and razorbill (and kittiwake in reference to below) document(s), the Kittiwake Compensation Implementation and Monitoring Plan (KCIMP), will be produced (following the content in the outline GKIMP (B2.7.6 Outline Gannet and Kittiwake Compensation Implementation and Monitoring Plan (APP-192) submitted with the DCO application) and for gannet alone, a G5.15 Outline Gannet Compensation Implementation and Monitoring Plan: Bycatch (submitted at Deadline 5) ~~Gannet Compensation Implementation and Monitoring Plan Bycatch~~ and G5.16 Outline Gannet Compensation Implementation and Monitoring Plan: Artificial Nesting Structure (submitted at Deadline 5) ~~Gannet Compensation Implementation and Monitoring Plan Artificial Nesting Structure~~ will both be produced (following the content in G5.17 FFC SPA: Gannet Compensation Plan which will be submitted at Deadline 5).

~~1.1.1.22~~ 5.3.1.3 The documents outlined above will document all of the proposed compensation measures for kittiwake, gannet, guillemot and razorbill (including mechanisms and programme for delivery, monitoring, adaptive management, reporting). The OOEG will be consulted during development of the implementation and monitoring plans for relevant species. All implementation and monitoring plans will be submitted to the SoS for approval following consent award and prior to the commencement of the offshore foundation construction of the authorised project.

~~1.1.1.23~~ 5.3.1.4 Following approval of the implementation and monitoring plans for each species by the SoS, the Applicant will carry out restoration of the site(s) using methods described in the implementation and monitoring plans. This is likely to be initiated by a pilot trial (unless already completed), particularly for any new restoration location(s).

~~1.1.1.24~~ 5.3.1.5 The seagrass restoration will be monitored to report on how the measure is delivering as agreed in the implementation and monitoring plans. The details of the monitoring

phase of the resilience measure will be discussed with the OoEG. Reporting of the results of implementation of the resilience measure will be carried out according to timescales set out in the implementation and monitoring plans.

6 Design of the restoration project, site selection and further research

~~1.1.1.25~~ 6.1.1.1 The Applicant is undertaking a new seagrass restoration project with some of this work being undertaken before the consent decision. Specifically, the Applicant has completed trial planting of 2 ha of seagrass in October 2021 and March 2022, with a further 2 ha to ~~be planted~~ commence planting in 2022 ~~2023~~ in the Humber Estuary. Following successful completion of the seagrass restoration implementation study, the project will be scaled-up to restore a large area of seagrass at Spurn Point within the Humber Estuary.

~~1.1.1.26~~ 6.1.1.2 The Applicant has sought to take advantage of the successful restoration work completed to date by the YWT and make use of existing consents and logistical arrangements by selecting an area within the Humber Estuary. As noted above in paragraph 6.1.1.1 ~~in paragraph 6.1.1.1~~, this area will be considered ~~in the first instance~~ as the location for expansion of the pilot scheme into a large scale established seagrass meadow. This is considered further as part of the legal requirements detailed below ([Section 8](#)).

~~6.1.6.2~~ Further Research

~~1.1.1.27~~ 6.2.1.1 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 ([B2.8.5 Compensation measures for FFC SPA: Fish Habitat Enhancement: Ecological Evidence \(APP-198\)](#)). 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 ~~is~~ 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). 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.

~~1.1.1.28~~ 6.2.1.2 A key component of the fish habitat enhancement resilience measure will be research to gather evidence to ~~contribute towards~~ further understanding the links between seagrass and target seabird species. The Applicant has identified a number of research topics to be undertaken (in addition to the implementation studies). As part of the seagrass restoration efforts in the Humber Estuary the University of Hull UoH and the YWT have or is are undertaking several studies for the Applicant including:

- Desktop feasibility study;
- ~~Area/site specific surveys to determine the use of seagrass by key prey species. This will include~~ Fish nursery assessment; and
- Fish cConnectivity assessment surveys; ~~which will include fish samples in Humber and near/in Hornsea Four and Stable Isotope Analysis to determine connectivity.~~

6.2.2 Desktop feasibility study

6.2.2.1 The YWT and the UoH have ~~will be undertaken~~ing a desktop feasibility study. The YWT have reviewed the historic extent of seagrass within the Humber Estuary with recorded references from ten core sources dating back to 1888 demonstrating the historic legacy and extent of seagrass beds in the Humber Estuary. ~~reviewing the historic extent of the seagrass bed, and building a knowledge base of the Outer Humber environmental conditions and parameters. In addition, geomorphological mapping of the site will be undertaken to inform the assessment of the influence of seagrass restoration on sediment and current dynamics.~~ A geomorphological and suspended sediment analysis of the Humber Estuary at Spurn Point has been undertaken by the UoH for Hornsea Four. The analysis of the proposed restoration site at Spurn Point is considered by UoH to be stable and appears suitable for replanting seagrass, 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 undertaken at Deadline 6 when further survey data will be available.

6.2.3 Fish nursery assessment

6.2.3.1 The YWT and the UoH have begun ~~bi-monthly bird monitoring surveys along the west coast of Spurn Head and~~ intertidal fish nursery surveys along the south-west coast of Spurn Head on behalf of the Applicant. The fish nursery surveys include fyke netting, water quality surveys and quarterly nearshore WFD beam and Mamou trawl surveys. The purpose of these surveys is to identify fish species present in the vicinity of the restored seagrass meadow and potential benefits in providing important nursery habitats with a particular focus on forage fish species. Fyke netting surveys that have already been undertaken in Q1 and Q2 2022 have identified forage fish species that include herring and sandeel.

6.2.3.2 The bi-monthly intertidal fyke netting surveys are undertaken using 3 x fyke nets (7 hoop large double D fyke nets (10mm & 14mm mesh) – 100cm x (2x5.3m) with a 10m leader specification). The nets are deployed at high (H), medium (M) and low (L) tide stations along the south-west coast of Spurn Head. The stations are shown in below. The Fyke netting operations take place

over a period encompassing two low tides and one high tide to ensure that surveys sample across one full tidal cycle and to align with Natural England permissions.



Figure 2: Fyke net survey locations

~~Figure : Fyke net survey locations~~

6.2.3.3 Quarterly WFD beam and Mamou trawl surveys ~~are also proposed~~ in the nearshore, to assess finfish abundance will. ~~These are proposed to~~ commence in Q2 2022 for the Applicant. The Mamou Trawl is designed as a floating surface trawl which can be set to fish at a specific depth in the water column. The sampling stations are shown in below. These surveys are part of the

fish nursery assessment and will aid in detailing the juvenile finfish composition, abundance, biodiversity, seasonality, and biometrics.



Figure 3: Nearshore Mamou survey locations

Figure : Nearshore Mamou survey locations

These surveys are part of the fish nursery assessment and will aid in detailing the juvenile finfish composition, abundance, biodiversity, seasonality, and biometrics.

6.2.4 Fish connectivity assessment

6.2.4.1 Initial fish connectivity studies will commenced in Q2 2022 (Table 26.1) to determine if fish from the Humber Estuary and in particular from areas of seagrass habitat are being recruited into the wider North Sea fish populations. Analysis of otolith microchemistry and destructive stable isotope analysis will be used to identify site-specific seagrass markers and determine if, and when the fish may have used inshore estuarine and seagrass habitats. This study aims to demonstrate the potential for connectivity between prey fish species that may travel to or use the Humber Estuary as a nursery ground before traveling out into the wider North Sea.

6.2.4.2 Specimens will be collected using a scientific otter trawl () off the RV Humber Guardian and specimens will be euthanized and frozen onboard. The surveys will aim to capture fish samples (approximately 400) at a variety of locations from within the outer Humber eEstuary (Table 6.2) to the stations that have been strategically placed within the outer Humber estuary and then in a northeast direction following prevailing currents towards the Hornsea Four site, following the likely path of migration of juvenile fish and wider areas within the North Sea to establish an understanding on the extent of connectivity. Of these six sampling locations, a few are located

~~in the wider North Sea and located at or near areas of other compensation measures.~~ Figure 4 below shows the fish connectivity survey locations in and around the Humber Estuary and the wider North Sea.:

6.2.4.3 Three species in particular (cod, whiting and sandeel) are considered as viable candidates for the ~~trial~~ study based on their common local occurrence and importance to seabird ecology as well as preexisting knowledge of otolith microchemistry research for each species. Initial scoping of estuarine fish surveys in the Humber Estuary has shown that juvenile whiting are consistently placed in the three most abundant species of all surveys at all times of year. Juvenile cod are present in the Humber Estuary immediately following settlement to a benthic lifeform, at 3-6 months age. Cod generally present among the top ten most abundant species in the Estuary according to preliminary analysis of past surveys. Sandeel are distributed widely in the North Sea. Larval sandeel move with the prevailing currents and settle on the seabed and then remain benthic, emerging to feed and spawn. Sandeel form a major part of the diet for many larger species including seabirds (e.g., kittiwake), marine mammals and fish.

~~1.1.1.1 Specimens will be collected using a scientific otter trawl (Figure 5) off the RV Humber Guardian and specimens will be euthanized and frozen onboard. The surveys will aim to capture fish samples (approximately 400) at a variety of locations from the outer Humber estuary (Table 6.2) to the stations that have been strategically placed within the outer Humber estuary and then in a northeast direction following prevailing currents towards the Hornsea Four site, following the likely path of migration of juvenile fish. Of these six sampling locations, a few are located in the wider North Sea and located at or near areas of other compensation measures.~~

6.2.4.4 Fish specimens' body weight and length will be recorded, and a ~~muscle tissue~~ sample taken and freeze dried ready for stable isotope analysis. Otolith samples will be ~~cleaned and prepared for~~ transportation to Cefas laboratories for testing. Trace elements will be analysed and compared to known standards and will be expressed relative to calcium ion concentration.

Statistical analysis of the results will focus on spatial differences in the ratios of minor elements amongst inshore and offshore samples.

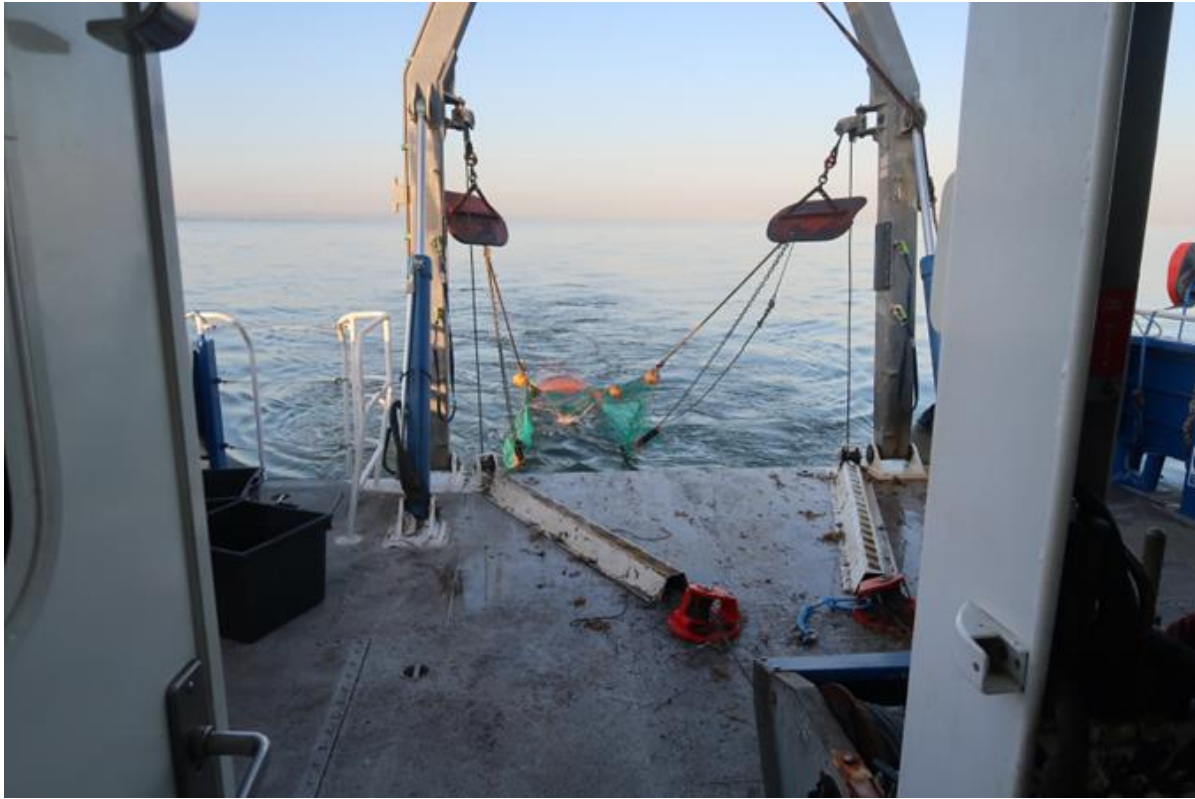


Figure 4: Setting of otter trawl during HML survey on RV Mersey Guardian

Figure 5: Setting of otter trawl during HML survey on RV Mersey Guardian.

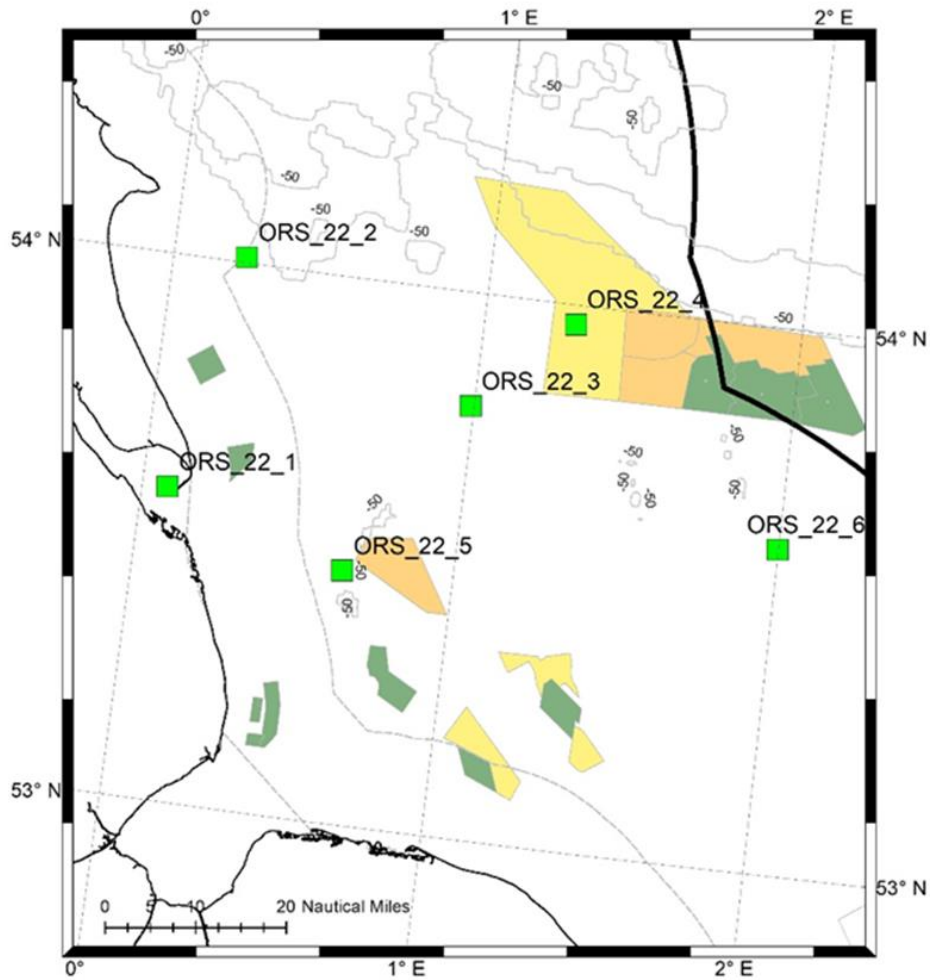


Figure 5: Fish connectivity survey stations within the Humber Estuary and the wider North Sea

Figure 4: Fish connectivity survey stations in the Humber Estuary.

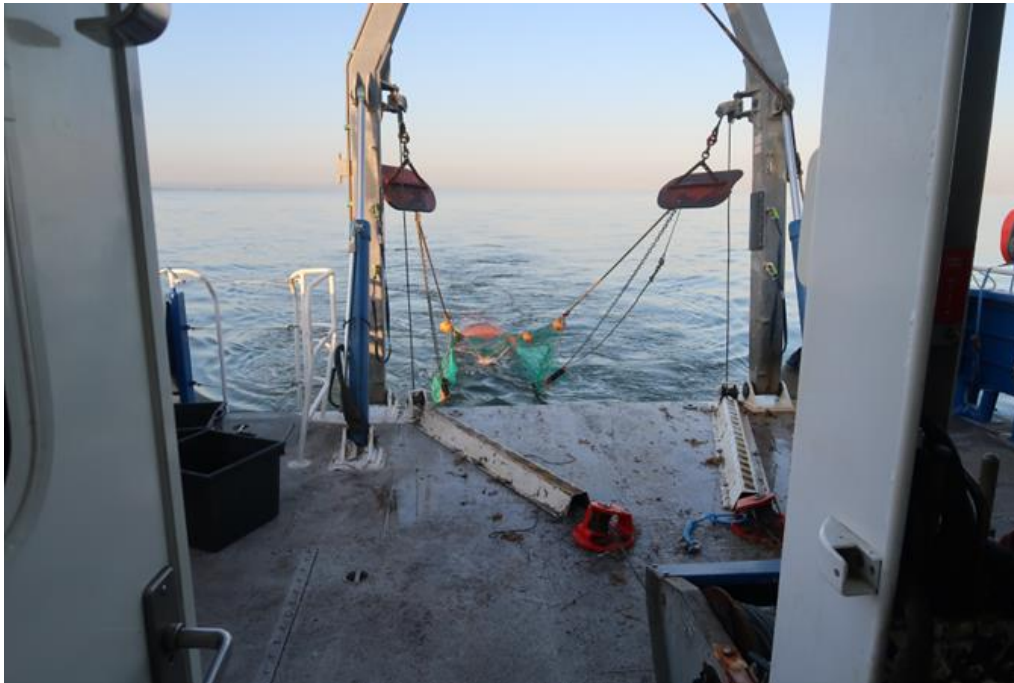


Figure 5: Setting of otter trawl during HML survey on RV Mersey Guardian.

~~1.1.1.29~~ These research topics will be explored in greater detail and a research programme will be devised to support the measures these projects starting in 2022. Any site/region specific data collected by organisation such as the YWT or OEL and Project Seagrass, will be utilised where possible to support the implementation studies either through specific data or methodologically approaches.

Table 6.1 Timings of fish connectivity surveys.

Table 2: Timings of fish connectivity surveys

<u>Timing</u>	<u>Survey Stage</u>
<u>May 2022</u>	<u>Project scope and logistics planning; applications for trawl dispensations from appropriate authorities; ethical approval.</u>
<u>June 2022</u>	<u>collection of samples</u>
<u>July 2022</u>	<u>Processing of otoliths and elemental analysis; further sampling of inshore community at ORS_22_1</u>
<u>August 2022</u>	<u>Initial statistical analysis reporting; possibility of additional sampling of fish at stations ORS_22_2 and ORS_22_4 with scientific otter trawl survey of RV Cefas Endeavour.</u>

7 Monitoring and adaptive management

7.1 Monitoring

~~1.1.1.30~~ 7.1.1.1 _____ To ensure long-term establishment of a restoration site, a monitoring strategy ~~will be~~ has been developed. Long-term monitoring of seagrass ~~is likely to~~ includes recording the rates and patterns of growth/loss in the restoration site and general monitoring of success. As a result, this information can confirm the efficacy of seagrass restoration methods and can also be used to make adaptive management decisions. Monitoring of the initial 2 ha of

~~seagrass is planned for Q3~~ restoration has already commenced and this will continue for the lifetime of the project ~~2022~~.

~~1.1.1.31~~ 7.1.1.2 The success of the resilience measures will be monitored to ensure that the fish habitat enhancement project is being implemented as agreed via each species implementation and monitoring plans. The details of the monitoring phase of the resilience measure will be discussed with the OoEG and will be set out within each species implementation and monitoring plans for approval by the SoS.

7.2 Adaptive management

7.2.1.1 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. The implementation studies and ongoing monitoring will inform any adaptive management required by the resilience measure and will be discussed with OoEG members before implementation. The Applicant is undertaking a UK site implementation study for proposed adaptive management measures. This study is being undertaken by OEL with experts from Project Seagrass and SU. The study is seeking input from the marine scientific community, industry and other key stakeholders to identify a selection of locations that represent the most suitable sites for large scale seagrass restoration. The study will also include development of a Habitat Suitability Model (HSM) to determine appropriate locations for seagrass restoration and consideration of potential opportunities and carry out site refinement for locations that could be considered for adaptive management. The Fish Habitat Enhancement: Implementation Study and Fish Connectivity Survey Summary will provide further details on the analysis undertaken at Deadline 6.

~~1.1.1.32~~

~~1.1.1.33~~ 7.2.1.2 Adaptive management will be used as a method to address unforeseen issues or deviations from expected timescales. Adaptive management will be seagrass specific and will be used as a method to address unforeseen issues or deviations from expected time scales (i.e. additional infill planting required). This will be continued until Hornsea Four is no longer operational or a determination is made by the SoS following consultation with the relevant statutory nature conservation body, that compensation is no longer required.

8 Securing key consents and legal agreement(s)

~~1.1.1.34~~ 8.1.1.1 It is understood that due to the location of potential seagrass restoration a number of consents are likely to be required including a marine licence and consent under section 28E(3)(a) of the Wildlife and Countryside Act 1981 (as amended) if the area is designated as a SSSI in addition to any land agreements. The seagrass restoration project will need to be assessed to ensure that there will be no AEoI on a site designated as a Special Area of Conservation (SAC), (SPA) or a Ramsar site under the Conservation of Habitats and Species Regulations 2017. The Applicant has submitted the reports **B2.2.2 RP-Volume-B2-Annex-2.2 Habitat Regulations Assessment Compensation Measures Part 1 (APP-179)** (Revision 2 to be submitted at Deadline 5) and **B2.2.2 RP-Volume-B2-Annex-2.2 Habitat Regulations Assessment Compensation Measures Part 2 (APP-180)**, which sets out the information necessary for the competent authority to undertake a Habitats Regulations Assessment (HRA) to determine if there is any AEoI on the national site network. Existing seagrass restoration and enhancement

projects that the Applicant has been exploring have obtained consents for the seagrass restoration and the Applicant will not anticipate a consent risk for future seagrass restoration. YWT have secured a rolling consent from Natural England at Spurn Point in the Humber Estuary for the seagrass restoration. The byelaw protecting the site provides added security for the seagrass restoration.

8.1.8.2 Legal agreements

8.1.1.8.2.1 Trial scheme(s):

~~1.1.1.35~~8.2.1.1 YWT have been commissioned to undertake the collection of seagrass seed, research and planting across a pilot area comprising a total of 4 ha, with further expansion at the Spurn Point site in the Humber Estuary. Additionally, as detailed in paragraph 3.1.1.3 ~~paragraph 3.1.1.3~~, OEL ~~with~~and Project Seagrass ~~and SU~~ have been commissioned to undertake a site implementation study, in parallel, to identify additional areas within which will be suitable for adaptive management if required.

~~1.1.1.36~~8.2.1.2 In relation to the specific site where the Applicant is undertaking the trial the necessary consents pursuant to section 28E(3)(a) of the Wildlife and Countryside Act 1981 (as amended) have been obtained. As detailed earlier in ~~paragraph 3.1.1.3~~paragraph 3.1.1.2, the YWT own the seabed where the seagrass planting is being undertaken in the Humber Estuary.

8.1.2.8.2.2 Long Term Implementation:

~~1.1.1.37~~8.2.2.1 A legally binding agreement has been made with YWT as a delivery partner to govern the allocation of tasks, funding arrangements and long-term monitoring of the resilience measure. The agreement covers management arrangements put in place for the large-scale seagrass restoration, monitoring and maintenance of the resilience measure. The YWT are the owners of the seabed and therefore separate permission is not required, YWT have had confirmation from MMO that a Marine Licence is not required and YWT have agreed a suite of rolling permissions and consents with ~~from~~ Natural England to undertake the seagrass restoration and accompanying survey works, including seagrass seed collection and; two methods of seagrass planting. Permissions have also been sought from relevant organisations ~~obtained to undertake a suite of, and benthic, environmental and fisheries surveys.~~ Therefore, the Applicant is confident the large-scale seagrass restoration as a fish habitat enhancement resilience compensation measure can be secured and delivered.

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;

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.

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 of Schedule 16 makes provision for compensatory measures for kittiwake.

Part 2 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. These adopt the drafting for kittiwake compensation specified in the draft DCO submitted at Deadline 2, with necessary amendments to apply to gannet, guillemot and razorbill compensation.

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—

“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.);~~

~~“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).~~

~~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~~

~~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—~~

~~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);~~

~~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;~~

~~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;~~

~~details of the maintenance schedule for the artificial nesting structure;~~

~~details for the proposed ongoing monitoring of the measure including—~~

~~survey methods;~~

~~survey programmes; and~~

~~colony and productivity counts;~~

~~recording of H4 OoEG consultations;~~

~~details of any adaptive management measures, with details of the factors used to trigger any such measures; and~~

~~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.~~

~~The undertaker must construct the artificial nesting structure as set out in the KCIMP approved by the Secretary of State.~~

~~The undertaker must notify the Secretary of State of completion of construction of the artificial nesting structure as set out in the KCIMP.~~

~~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.~~

~~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

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 4

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-~~
 1. ~~survey methods;~~
 2. ~~survey programmes; and~~
 3. ~~colony and productivity counts;~~
 - vi. ~~recording of H4 OoEG consultations;~~
 - vii. ~~details of any adaptive management measures, with details of the factors used to trigger any such measures; and~~
 - viii. ~~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;~~
 - 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.~~
2. ~~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.~~

- ~~3. 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.~~
- ~~4. 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.~~
- ~~5. 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 5

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:
 - ~~1. survey methods;~~
 - ~~2. survey programmes;~~
 - ~~3. productivity rates;~~
 - ~~4. breeding population; and~~
 - ~~5. distribution of breeding birds;~~~~
 - ~~v. recording of H4 OOEG consultations;~~
 - ~~vi. details of any adaptive management measures, with details of the factors used to trigger any such measures; and~~
 - ~~vii. 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.~~~~
 - ~~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 OEG 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.~~
- ~~2. 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.~~
- ~~3. 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.~~
- ~~4. 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

~~1.1.1.38~~10.1.1.1 The Applicant has identified the costs associated with the development, implementation and ongoing monitoring of the proposed resilience measure. These costs have been included within a detailed Funding Statement (**E1.1 CA Volume E1.1 Funding Statement (APP-224)**). 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) 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 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

~~1.1.1.39~~11.1.1.1 The Applicant is confident that the resilience compensation measure is viable, will be effective and can be delivered. The Applicant will continue stakeholder engagement to demonstrate the suitability of the site selection and development of the

seagrass restoration programme and ensure the resilience measure can be readily achieved and secured.

12 References

ABPmer (2017). UK Marine Habitat Creation Schemes – A summary of completed managed realignment and regulated tidal exchange projects (1991–2016). White Paper. Ref. 2781.

Bertelli, C.M. and Unsworth, R.K.F. (2014). Protecting the hand that feeds us: Seagrass (*Zostera marina*) serves as commercial juvenile fish habitat. *Marine Pollution Bulletin*, 83, 425-429.

Kritzer, J.P., DeLucia, M.-B., Greene, E., Shumway, C., Topolski, M.F., Thomas-Blate, J., Chiarella, L.A., Davy, K.B. and Smith, K. (2016). The Importance of Benthic Habitats for Coastal Fisheries. *BioScience*, 66, 274-284.

Lefcheck, J.S., Hughes, B.B., Johnson, A.J., Pfirrmann, B.W., Rasher, D.B., Smyth, A.R., Williams, B.L., Beck, M.W., Orth, R.J. (2019). Are coastal habitats important nurseries? A meta-analysis. *Conservation Letters*, 12, e12645.

Lilley, R.J. and Unsworth, R.K.F. (2014). Atlantic Cod (*Gadus morhua*) benefits from the availability of seagrass (*Zostera marina*) nursery habitat. *Global Ecology and Conservation*, 2, 367-377.

McDevitt-Irwin, J.M., Iacarella, J.C. and Baum, J.K. (2016). Reassessing the nursery role of seagrass habitats from temperate to tropical regions: a meta-analysis. *Marine Ecology Progress Series*, 557, 133-143.

MMO (2019). Identifying sites suitable for marine habitat restoration or creation. A report produced for the Marine Management Organisation by ABPmer and AER, MMO Project No: 1135, February 2019, 93pp.

Orth, R.J., Lefcheck, J.S., McGlathery, K.S., Aoki, L., Luckenbach, M.W. Moore, K.A., Oreska, M.P.J., Snyder, R., Wilcox, D.J. and Lusk, B. (2020). Restoration of seagrass habitat leads to rapid recovery of coastal ecosystem services. *Science Advances*, 6(41), eabc6434.

Peters, J.R., McCloskey, R.M., Hinder, S.L. and Unsworth, R.K.F. (2015). Motile fauna of sub-tidal *Zostera marina* meadows in England and Wales. *Marine Biodiversity*, 45(4), 647-654.

Unsworth R.K.F., Bertelli C.M., Esteban, N.E., Rees S.R. and Nuuttila H.K. (2019). Methodological trials for the restoration of the seagrass *Zostera marina* in SW Wales. SEACAMS Report SC2-R&DS07.

Unsworth R.K.F. & Butterworth E. (2021). Project Seagrass - Potential sites for seagrass restoration to benefit target seabird species.

Unsworth, R.K.F., Butterworth, E., Freeman, S., Fox, E. and Priscott, K. (2021). The ecosystem service role of UK Seagrass meadows. Project Seagrass.

Appendix A Letter of comfort from Project Seagrass



Project Seagrass
PO Box 412
Bridgend, CF31 9RL
United Kingdom

19th September 2021

Dr. Sarah Randall
Environment Manager & Derogation Lead
UK Consents, Development
Orsted

Re: Hornsea Four Compensation Measures

Dear Dr Sarah Randall,

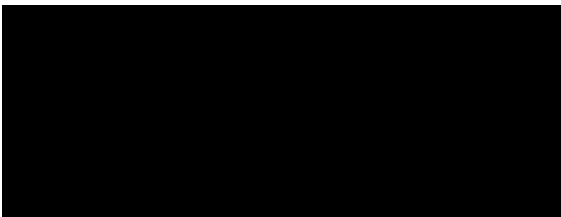
Seagrass ecosystems are globally endangered and declining at rapid rates, but their ecosystem service value is critical for the well-being of coastal human populations.

Project Seagrass is the only globally focused charity totally dedicated to seagrass conservation. Project Seagrass is an environmental charity devoted to the conservation of seagrass ecosystems through education, influence, research and action.

Our four key principles define how we act. As such, we're passionate about:

- educating the wider community on the presence and importance of seagrass ecosystems, the services they provide and current seagrass management issues
- building the capacity of local stakeholders in the use of standardised scientific methodologies,
- promoting and assisting with long-term monitoring of seagrass condition,
- assisting with scientific research and supporting conservation measures that help facilitate the long-term resilience of seagrass ecosystems.

We believe that in the right circumstances seagrass restoration offers an opportunity to enhance biodiversity in the coastal environment. Consequently I undersigned *Richard Unsworth*, in my capacity as director of Project Seagrass would like to confirm our willingness to collaborate with Orsted Power (UK) with respect to their proposed compensation measures for the Hornsey Four development. I confirm that we have no in-principle objection to the proposed compensation measure. We believe that through the planting of seagrass their exists the potential to enhance coastal biodiversity, such a strategy could be used as part of these compensation packages.



Director Project Seagrass
Associate Professor in Marine Biology, Swansea University

Appendix B Letter of comfort from Yorkshire Wildlife Trust



Yorkshire
Wildlife Trust



Dr Sarah Randall
Environment Manager & Derogation Lead,
UK Consents, Development.
Orsted
5 Howick Place
London
SW1P 1WG

13th August 2021

Dear Sarah,
Ref: Humber Seagrass Meadow Restoration

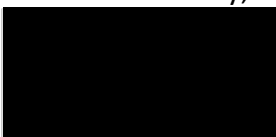
Thank you for your letter of support and our discussions over a potential partnership to support wider restoration of seagrass meadows in the Humber Estuary.

We note your specific references to the Hornsea Four Offshore Windfarm and potential for seagrass restoration to be included as part of a package of without prejudice secondary compensatory measures for the project. Seagrass meadows have numerous well documented benefits for a variety of marine life, and in the Humber support a number of SPA features.

Yorkshire Wildlife Trust agree that this letter can be placed on the public record as part of the examination of the Hornsea Project Four to demonstrate support for collaboration on seagrass restoration.

On the basis of our discussions we have provided an outline of our existing programme which could be scaled to this projects ambition in Annex One.

Yours Sincerely,



Dr James Wood
North Sea Fisheries and Research Manager
Yorkshire Wildlife Trust

www.ywt.org.uk

Love Yorkshire, Love Wildlife

Yorkshire Wildlife Trust is registered in England No. 409650 and is a registered charity No. 210807

1 St. George's Place,
York, YO24 1GN

T 01904 659570

F 01904 613467

E info@ywt.org.uk

VAT No. 170 3914 75



Yorkshire Wildlife Trust

Annex One

Yorkshire Wildlife Trust

- The Trust operates throughout the traditional county of Yorkshire from the Humber to the Pennines and from the Dales and Moors to the urban conurbations of the south. It is the second oldest of the 47 Wildlife Trusts which work in partnership together covering the whole of the UK. Our purpose is to lead the way in achieving our vision of a Yorkshire rich in wildlife for everyone through pursuing our mission of creating Living Landscapes and securing Living Seas in Yorkshire. We will do this by being passionate leaders and natural partners whose objectives are to:
 - demonstrate how nature works
 - inspire people and communities to value and take action for wildlife
 - champion wildlife and our work

Employing 160 staff and drawing on support from our 45,000 members, The Trust manages 106 nature reserves covering more than 2,500 hectares, also engaging in a portfolio of projects including river and wetland management, community development, environmental education activities, campaigning and specialist technical programmes including peatland and marine.

- The vision for our 'Living Seas' marine programme is: "A thriving, productive, wildlife rich North Sea, resilient to a changing climate and increasing human demands by 2040. We want the North Sea to be full of once abundant animals again and recognised for its beauty and diverse nature by the public. We want the North Sea to be an area where all activities are managed to allow wildlife to thrive and recover with those that benefit from its many goods and services contributing towards its sustainable use."
- To deliver this vision, Yorkshire Wildlife Trust has targeted investment into its marine programme and hosts the largest team of marine practitioners in the Trust movement, supporting 7 specialist technical staff. Encompassing focused workstreams of advocacy, education, marine pollution, fisheries and restoration, our remit is significant, but has achieved demonstrable impact and innovation.



Humber Seagrass Restoration Context and Pilot

- References to seagrass presence in the Humber Estuary have been recorded since 1888, with records of significant meadows located within Spurn Head and at Horseshoe Point. In 1936 a more comprehensive assessment and review within this locality mapped the known extent of these beds, where Philips¹ identified an extensive bed spanning 400 to 500 hectares noting aggregations of seagrass within and surrounding the saline pools and intertidal mudflats ranging over 10km from Skeffling to Spurn. Significant loss was then recorded on a periodic basis attributed to declining water quality and wider anthropogenic impacts.
- In 2010 to 2012 a series of baseline surveys associated with the Defra commissioned UK review into European Marine Site management (EMS)² qualified a smaller and less extensive bed remaining within Spurn Bight ranging just 2km and widely dispersed. As a consequence a new protected area byelaw was introduced, designating a 100 hectare area for seagrass encompassed within an area of foreshore privately owned by Yorkshire Wildlife Trust. Seagrass coverage within this protected areas equates to approximately 50 acres, leaving considerable scope for restoration of the remaining 200 acres which are currently sparsely or un-colonised.
- In 2020 the Trust secured funding from the Green Recovery Challenge Fund for a restoration pilot for 2 acres of seagrass, matched by support from an external donor funding a further 2 acres. Supporting staffing resource and capacity building, these funds have allowed the Trust to bring into a post a dedicated technical seagrass restoration officer until March 2022 and have also funded the capital purchase of our specialist nursery system and development of a restoration facility onsite at Spurn Point.

Consents and Permissions

- As Spurn Point Nature Reserve is encompassed within the Humber Estuary European Marine Site, carrying multiple designations including SAC, SPA, SSSI and Ramsar, any activities require authorisation from multiple statutory agencies. The Trust has worked closely with the relevant regulators and agencies, in particular Natural England, to agree a suite of rolling permissions and consents for our restoration and accompanying survey works, including seagrass seed collection, two methods of seagrass planting, and a suite of technical surveys ranging from benthic, environmental to fisheries.

¹ Philip G (1936) An enhalid plant association in the Humber estuary. J. Ecol. **24**:205-219

² <http://publications.naturalengland.org.uk/publication/36006>



Yorkshire Wildlife Trust

- The seagrass protection box was designed and designated through a working group comprising of North Eastern IFCA, Natural England and Wildlife Trust officers, and protected through a jointly designed IFCA byelaw. The box was designated to protect the remaining seagrass fragments from disturbance and support its longterm restoration.
- The Trust engaged these partners and agreed our existing consents and authorisation programme for the pilot restoration, and have also now sought confirmation to formalise our agreed longterm approach for restoration of the full protected seagrass box.
- Spurn Point Nature Reserve is a former military base which covered both terrestrial and marine areas. Upon purchase the Trust acquired both sets of rights, and therefore uniquely holds the freehold to Spurn's beaches and a significant intertidal expanse of mudflats which includes the remaining seagrass bed.
- Spurn Point operates under a longterm management plan agreed with Natural England for our general operations and a series of site works and maintenance. Vehicular access, management and maintenance of the estate, public access management and functions such as boundary marking are all preapproved activities.
- The Trust sought guidance and advice on required permissions from the Local Authority, Marine Management Organisation, CEFAS / Fish Health Inspectorate, DEFRA, Environment Agency and North Eastern IFCA, either confirming no consent was necessary, or discharging requirements through self-service notification of exemptions prior to initiating our restoration works at Spurn.
- All evaluation and survey works undertaken by the Trust and University of Hull staff have been approved through an ethics review and health safety panel process.

Appendix C Letter of comfort from Ocean Conservation Trust

Dr. Sarah Randall
Orsted Hornsea Project Four Ltd.
5 Howick Place
Westminster
London
SW1P 1WG

27th September 2021

Ref. HOW04 OCT Letter of Comfort

Hornsea Four Letter of Support – OCT Seagrass Restoration Project

Dear Sarah.

I'm writing in support of Orsted Power (UK) Ltd planned efforts to restore subtidal seagrass habitat to contribute towards biodiversity gain with the aim of supporting the function of seagrass as a nursery habitat for seabird prey species. Seagrasses are evidenced to be one of the most valuable habitats on the planet providing ecosystems services through fisheries and nutrient sequestration. Recover of subtidal seagrasses needs to form part of the U.K climate emergency strategy and the OCT is at the forefront of understanding how to achieve this aim.

The Ocean Conservation Trust is currently undertaking the largest seagrass restoration trials in the British Isles in support of the E.U Life Recreational ReMEDIES project led by Natural England. The project is targeting 8 ha of lost subtidal *Zostera marina* habitat within Special Areas of Conservation to restore and return valuable ecosystems services. The OCT is placed to offer support to Orsted with expertise developed through the delivery of this project to grow success and expand seagrass restoration to other geographical locations around Britain.

As leaders in the field of seagrass research and restoration the Ocean Conservation Trust can support in principal the merits of a proposed compensation measure of restoring seagrasses. When required the researchers and staff at the OCT would be happy to discuss collaborating in the delivery of large-scale restoration with the Hornsea Project Four.

I wish you all the best with the development and am happy to answer further questions when required.

Kind Regards

Mark Parry

OCT Development Officer