

Morecambe Offshore Windfarm: Generation Assets Development Consent Order Documents

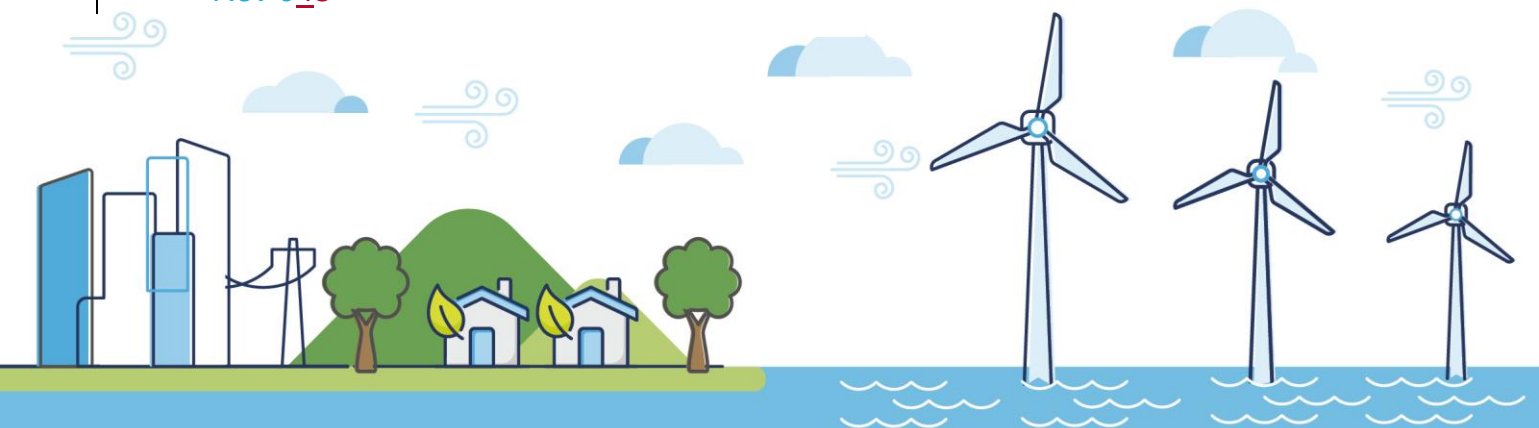
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Habitats Regulations Assessment Without Prejudice Derogation Case (Tracked)

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Glossary of Acronyms

AA	Appropriate Assessment
AfL	Agreement for Lease
BEIS	Department for Business, Energy and Industrial Strategy ¹
CCC	Committee on Climate Change
CCRA	Climate Change Risk Assessment
CI	Confidence Interval
CfD	Contracts for Difference
CNP	Critical National Priority
COP	Conference of the Parties
COWSC	Collaboration on Offshore Wind Strategic Compensation
cSAC	Candidate Special Area of Conservation
DCO	Development Consent Order
DECC	Department for Energy and Climate Change ¹
Defra	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
EC	European Commission
EIA	Environmental Impact Assessment
ES	Environmental Statement
ESO	Electricity System Operator
ETG	Expert Topic Group
EU	European Union
ExA	Examining Authority
GHG	Greenhouse gas
GVA	Gross Value Added
HAT	Highest Astronomical Tide
HM	His Majesty's
HRA	Habitats Regulations Assessment
IROPI	Imperative Reasons of Overriding Public Interest

¹ The Department of Energy and Climate Change (DECC) was disbanded and merged with the Department for Business, Innovation and Skills to form the Department for Business, Energy and Industrial Strategy (BEIS) in 2016. As of February 2023, BEIS is known as the Department for Energy Security and Net Zero (DESNZ).

JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
LSHTM	London School of Hygiene and Tropical Medicine
MCZ	Marine Conservation Zone
MGN	Marine Guidance Note
MPA	Marine Protected Area
MSL	Mean Sea Level
NASA	National Aeronautics and Space Administration
NOAA	National Oceanographic and Atmospheric Administration
NNR	National Nature Reserve
NPS	National Policy Statement
ORE	Offshore Renewable Energy
OSP	Offshore substation platform
OTNR	Offshore Transmission Network Review
PEIR	Preliminary Environmental Information Report
REPD	UK Government Renewable Energy Planning Database
RIAA	Report to Inform Appropriate Assessment
SAC	Special Area of Conservation
SEANSE	Strategic Environmental Assessment North Sea Energy
SoS	Secretary of State
SNCB	Statutory Nature Conservation Body
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TCE	The Crown Estate
UK	United Kingdom
UNEP-CCC	United Nations Environment Programme Copenhagen Climate Centre
WMO	World Meteorological Organisation
WTG	Wind turbine generator

Glossary of Unit Terms

GW	Gigawatt
km	kilometre
km ²	square kilometre
m	metre
m ²	square metre
MW	Megawatt

Glossary of Terminology

Applicant	Morecambe Offshore Windfarm Ltd
Critical National Priority	The UK Government's energy objectives define nationally significant low carbon infrastructure as a Critical National Priority (CNP).
European sites	Designated nature conservation sites which include the National Site Network (designated within the UK) and Natura 2000 sites (designated in any European Union (EU) country). This includes candidate Special Areas of Conservation (cSAC), Sites of Community Importance, Special Areas of Conservation (SAC), and Special Protection Areas (SPA).
Generation Assets (the Project)	Generation assets associated with the Morecambe Offshore Windfarm. This is infrastructure in connection with electricity production, namely the fixed foundation wind turbine generators (WTGs), inter-array cables, offshore substation platform(s) (OSP(s)) and possible platform link cables to connect OSP(s).
Inter-array cables	Cables which link the WTGs to each other and the OSP(s).
Landfall	Where the offshore export cables would come ashore.
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The transmission assets for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm. This includes the OSP(s)², interconnector cables, Morgan offshore booster station, offshore export cables, landfall site, onshore export cables, onshore substations, 400kV cables and associated grid connection infrastructure such as circuit breaker infrastructure. Also referred to in this document as the Transmission Assets, for ease of reading.
National Site Network	The network of SACs and SPAs in the UK. These were formerly referred to as European Sites, but since the UK's exit from the EU these sites no longer form part of the EU's 'Natura 2000' ecological network. The Conservation of Habitats and Species Regulations 2017 were therefore amended in 2019 to refer to the new National Site Network.
Offshore export cables	The cables which would bring electricity from the offshore substation platform(s) to the landfall.

² At the time of writing the Environmental Statement, a decision had been taken that the offshore substation platforms (OSP(s)) would remain solely within the Generation Assets application and would not be included within the Development Consent Order (DCO) application for the Transmission Assets. This decision post-dated the Preliminary Environmental Information Report (PEIR) that was prepared for the Transmission Assets. The OSP(s) are still included in the description of the Transmission Assets for the purposes of this document as the in-combination effects assessment carried out in respect of the Generation/Transmission Assets is based on the information available from the Transmission Assets PEIR and associated Habitats Regulation documentation.

Offshore substation platform(s)	A fixed structure located within the windfarm site, containing electrical equipment to aggregate the power from the WTGs and convert it into a more suitable form for export to shore.
Onshore export cables	The cables which would bring electricity from landfall to the onshore project substation and from the onshore project substation to a National Grid substation.
Onshore project substation	Part of an electrical transmission and distribution system. Substations transform voltage from high to low, or the reverse by means of electrical transformers.
Platform link cable	An electrical cable which links one or more OSP(s).
Wind turbine generator (WTG)	The area within which the WTGs, inter-array cables, OSP(s) and platform link cables will be present.
Windfarm site	The area within which the WTGs, inter-array cables, OSP(s) and platform link cables will be present.



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1 Introduction

1.1 Project background

1. This Without Prejudice Habitats Regulations Derogation: Provision of Evidence forms part of a set of documents that supports the Development Consent Order (DCO) application submitted by Morecambe Offshore Windfarm Ltd (the Applicant) for the Morecambe Offshore Windfarm Generation Assets (the Project).
2. Morecambe Offshore Windfarm Ltd ('the Applicant') is applying for a DCO for the Morecambe Offshore Wind Farm Generation Assets Project (hereafter 'the Project'). The Project was one of six projects selected by The Crown Estate (TCE) in its Offshore Wind Leasing Round 4 in 2021. The Agreement for Lease (AfL) for the Project was received in 2023.
3. The Project includes the Generation Assets to be located within the offshore windfarm site (wind turbine generators (WTGs), inter-array cables, offshore substation platform(s) (OSP(s)) and possible platform link cables to connect OSPs).
4. A separate DCO consent for the Morgan and Morecambe Offshore Wind Farms: Transmission Assets associated with the Morecambe Offshore Windfarm and the Morgan Offshore Wind Project Generation Assets (another proposed Round 4 windfarm to be located in the Irish Sea) would be sought, as explained below.
5. Both the Morecambe Offshore Windfarm and the Morgan Offshore Wind Project Generation Assets have been scoped into the Pathways to 2030 workstream, under the Offshore Transmission Network Review (OTNR). Under the OTNR, the National Grid Electricity System Operator (ESO) is responsible for conducting a Holistic Network Design Review to assess options to improve the coordination of offshore wind generation connections and transmission networks. In July 2022, the United Kingdom (UK) Government published the Pathway to 2030 Holistic Network Design documents, which set out the approach to connecting 50 Gigawatts (GW) of offshore wind to the UK electricity network (National Grid ESO, 2022). The output of this process concluded that the Morecambe Offshore Windfarm and the Morgan Offshore Wind Project Generation Assets would both connect to the National Grid at Penwortham in Lancashire, and as such the developers are working collaboratively.
6. Consequently, effects from the Transmission Assets of the Morecambe Offshore Windfarm and the Morgan Offshore Wind Project Generation Assets have been screened and assessed separately, as part of a joint Transmission Assets Environmental Impact Assessment (EIA), Habitats Regulations

Assessment (HRA) process and subsequent DCO application, to be submitted by Morecambe Offshore Windfarm Ltd and Morgan Offshore Wind Limited (the latter being the developer of the Morgan Offshore Wind Project Generation Assets). The separation of assessment has not impacted the conclusions drawn in the Project Report to Inform the Appropriate Assessment (RIAA) (Document Reference 4.9).

1.2 Purpose of this document

7. This document provides evidence to support a 'Without Prejudice' Stage 3 (Derogation) of the HRA Process (see **Section 3**) in relation to the lesser black-backed gull feature of the Morecambe Bay and Duddon Estuary Special Protection Area (SPA) and Ramsar site and the lesser black-backed gull feature of the Ribble and Alt Estuaries SPA and Ramsar site.
8. This document is informed by the Project RIAA. The RIAA concludes for the lesser black-backed gull feature of the Morecambe Bay and Duddon Estuary SPA and Ramsar site and the Ribble and Alt Estuaries SPA and Ramsar site that an adverse effect on site integrity would not occur for the Project-alone and that the Project is below the threshold that would make any measurable contribution to in-combination values. In addition, the Round 4 Plan Level HRA (TCE), 2022) concluded that:
 - *"the Round 4 Plan would not adversely affect the integrity to Morecambe Bay Ramsar, Duddon Estuary Ramsar & Morecambe Bay and Duddon Estuary SPA, alone or in-combination with other plans and projects"*
 - *"there will be no significant or adverse effect on the ability of the site (Ribble & Alt Estuaries Ramsar & SPA) and its features to achieve its conservation objectives and favourable conservation status from the Round 4 Plan either alone, or in combination with other plans and projects. The Primary Assessment for lesser black-backed gull found that, with the exception of collision risk, all screened in pressures would lead to a negligible impact on this species at any population scale. The Secondary Assessment concluded that for lesser black-backed gull the impact in terms of collision risk from the Round 4 Plan alone is considered to be negligible, and in view of the Primary Assessment any additional impact from the Round 4 Plan alone would not make an appreciable difference to any in-combination impact"*
9. However, in response to feedback from consultation undertaken during the pre-application period, and through discussions with the Offshore Ornithology Expert Topic Group (ETG) on the in-combination assessment, a 'without prejudice' derogation case (this document) has been provided with respect to the lesser black-backed gull feature of the Morecambe Bay and Duddon

Estuary SPA and Ramsar site and the Ribble and Alt Estuaries SPA and Ramsar site.

10. This approach is in accordance with the Overarching National Policy Statement for Energy (National Policy Statement (NPS) EN-1) (Department for Energy Security and Net Zero (DESNZ), 2023a), the NPS for Renewable Energy (NPS EN-3) (DESNZ, 2023b) and statements from the Secretary of State (SoS) on Offshore Windfarm Project decisions including Sheringham and Dudgeon Extension Projects, Hornsea Project Three, Hornsea Project Four, East Anglia ONE North, East Anglia TWO, Norfolk Boreas, and Norfolk Vanguard (**Section 2.2**).
11. For all other sites and features assessed in the RIAA, a conclusion of no adverse effect on site integrity is reached, and there is no identified need for a 'without prejudice' derogation case.
12. This document includes the Applicant's submission in relation to:
 - Legislative and Policy Context (**Section 2**)
 - The HRA Process (**Section 3**)
 - Alternative Solutions (**Section 4**) and information on the relevant designated sites and interest features
 - Imperative Reasons of Overriding Public Interest (IROPI) (**Section 5**)
 - Proposed compensatory measures in respect of the lesser black-backed gull feature of the Morecambe Bay and Duddon Estuary SPA and the Ribble and Alt Estuaries SPA (**Section 6** and **Appendices 1 and 2**).

2 Legislative and policy context

2.1 Legislation

13. This section presents the international and national planning policy and legislative context which is of relevance to the Project ‘without prejudice’ derogation case and compensation proposals.

2.1.1 The Habitats Directive

14. The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) (the Habitats Directive) provides a framework for the conservation and management of certain habitats and species in Europe. Its aim is to maintain or restore those habitats and species at a favourable conservation status and protect them from the potential adverse effects of plans and projects. The relevant provision of the Directive is the procedure for the protection of Special Areas of Conservation (SACs) (Article 6). SACs are identified and designated based on the presence of the natural habitat types listed in Annex I and populations of the species listed in Annex II.
15. The EU Directive on the Conservation of Wild Birds (2009/147/EC) (the Birds Directive) provides a framework for the conservation and management of certain wild birds in Europe and the identification and designation of SPAs.
16. The Habitats Directive and the Birds Directive provided the foundations for the UK Habitats Regulations, although they no longer form part of UK legislation. As set out in **Section 2.1.2**, in the UK, the Habitats Directive was transposed into UK legislation and implemented via the Habitats Regulations and the Marine Habitats Regulations which continue to apply as current legislation and have been amended by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, to reflect the UK’s departure from the EU. This has, amongst other changes, replaced the provisions which gave a role to the European Commission (EC) in relation to derogations in certain scenarios.
17. Article 6(3) of the Habitats Directive (see **Table 2.1**) sets out the approval procedure associated with a plan or project for which there is a Likely Significant Effect (LSE) on European sites³. Such plans or projects are subject to an Appropriate Assessment (AA) (see **Section 3**).

³ Designated nature conservation sites which include the National Site Network (designated within the UK) and Natura 2000 sites (designated in any European Union country). This includes candidate Special Areas of Conservation (cSAC), Sites of Community Importance and Special Protection Areas (SPA).

18. Article 6(4) of the Habitats Directive (see Table 2.1~~Table 2.1~~) provides the HRA derogation procedure, where an adverse effect on the integrity of a habitats site cannot be ruled out as a result of a plan or project.

Table 2.1 Relevant articles

Article	Requirement
Habitats Directive Article 6(3)	<i>“Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in-combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”</i>
Habitats Directive Article 6(4)	<i>“If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.</i> <i>Where the site concerned hosts a priority natural habitat type and/or a priority species, the only considerations which may be raised are those relating to human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest.”</i>

2.1.2 UK Legislation

19. In England and Wales, the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations') and the Conservation of Offshore Marine Habitats and Species Regulations 2017 ('the Marine Habitats Regulations') (which applies outside of 12nm) transposed the European Habitats Directive (92/43/EEC) and Birds Directive (2009/147/EC) into UK law.
20. The Project is located outside of 12nm, so the Marine Habitats Regulations are applicable.
21. Regulation 63 of the Habitats Regulations, and Regulation 28 of the Marine Habitats Regulations, provide the requirement for AA and align with Article 6(3) of the Habitats Directive (**Table 2.2Table 2.2**).
22. Regulations 64 and 68 of the Habitats Regulations, and Regulations 29 and 36 of the Marine Habitats Regulations, provide the HRA derogation procedure and are aligned with the requirements of Article 6(4) of the Habitats Directive (**Table 2.2Table 2.2**).
23. It is noted that, in May 2021, the Environment Secretary signalled the Government's intention to reform the Habitats Regulations to ensure that legislation supports the Government's nature recovery targets. The Government convened an HRA working group and released a summary of its findings in 2022 (Department for Environment, Food and Rural Affairs (Defra), 2022a). Additionally, the Nature Recovery Green Paper: Protected Sites and Species (Defra, 2022b), which outlines the recommendations of the HRA working group and proposes changes to existing legislation, was consulted upon from March – May 2022. The Environmental Improvement Plan was published in 2023 and focuses on EIA, with reference to Environmental Outcome Reports. Reforms to improve the effectiveness of the HRA process is expected to follow, but with no details available/applicable for the Project at the time of writing.
24. The Applicant has prepared the Application for the Project based upon legislation in place at the time of the DCO Application submission.

Table 2.2 Relevant regulations

Regulation	Requirement
Regulations transposing Article 6(3) of the Habitats Directive	
Habitats Regulations, Regulation 63	<i>“(1) A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which—</i> <i>(a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in-combination with other plans or projects), and</i> <i>(b) is not directly connected with or necessary to the management of that site,</i> <i>must make an appropriate assessment of the implications of the plan or project for that site in view of that site's conservation objectives.</i> <i>(2) A person applying for any such consent, permission or other authorisation must provide such information as the competent authority may reasonably require for the purposes of the assessment or to enable it to determine whether an appropriate assessment is required.</i> <i>(3) The competent authority must for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority specifies.</i> <i>(4) It must also, if it considers it appropriate, take the opinion of the general public, and if it does so, it must take such steps for that purpose as it considers appropriate.</i> <i>(5) In the light of the conclusions of the assessment, and subject to regulation 64, the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).</i> <i>(6) In considering whether a plan or project will adversely affect the integrity of the site, the competent authority must have regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which it proposes that the consent, permission or other authorisation should be given....</i> <i>...(8) Where a plan or project requires an appropriate assessment both under this regulation and under the Offshore Marine Conservation Regulations, the assessment required by this regulation need not identify those effects of the plan or project that are specifically attributable to that part of it that is to be carried out in</i>

Regulation	Requirement
	<i>the United Kingdom, provided that an assessment made for the purpose of this regulation and the Offshore Marine Conservation Regulations assesses the effects of the plan or project as a whole.”</i>
Marine Habitats Regulations, Regulation 28	<i>“(1) Before deciding to undertake, or give any consent, permission or other authorisation for, a relevant plan or project, a competent authority must make an appropriate assessment of the implications of the plan or project for the site in view of that site’s conservation objectives.</i> <i>(2) In paragraph (1), a “relevant plan or project” is a plan or project which—</i> <i>(a) is to be carried out on or in any part of the waters or on or in any part of the seabed or subsoil comprising the offshore marine area, or on or in relation to an offshore marine installation;</i> <i>(b) is likely to have a significant effect on a European offshore marine site or a European site (either alone or in-combination with other plans or projects); and</i> <i>(c) is not directly connected with or necessary to the management of the site.</i> <i>(3) A person applying to a competent authority for any consent, permission or other authorisation for a plan or project in the offshore marine area must provide such information as the competent authority may reasonably require—</i> <i>(a) to enable it to determine whether an assessment under paragraph (1) is required; or</i> <i>(b) for the purposes of an assessment under paragraph (1).</i> <i>(4) The competent authority must for the purposes of the assessment—</i> <i>(a) where it relates to a European offshore marine site, consult the Joint Committee;</i> <i>(b) where it relates to a European site in England, consult Natural England;...</i> <i>...(f) if it considers it appropriate, take the opinion of the general public and if it does so, take such steps for that purpose as it considers appropriate.</i> <i>(5) In the light of the conclusions of the assessment, and subject to regulation 29, the competent authority may agree to the plan or project only if it has ascertained that it will not adversely affect the integrity of the European offshore marine site or European site (as the case may be).</i> <i>(6) In considering whether a plan or project will adversely affect the integrity of a site, the competent authority must have regard to the manner in which it is proposed to be carried out and to any conditions or restrictions</i>

Regulation	Requirement
	<i>subject to which the competent authority proposes that the consent, permission or other authorisation should be given."</i>
Regulations transposing Article 6(4) of the Habitats Directive	
Habitats Regulations, Regulation 64	<i>"(1) If the competent authority is satisfied that, there being no alternative solutions, the plan or project must be carried out for imperative reasons of overriding public interest (which, subject to paragraph (2), may be of a social or economic nature), it may agree to the plan or project notwithstanding a negative assessment of the implications for the European site or the European offshore marine site (as the case may be).</i> <i>(2) Where the site concerned hosts a priority natural habitat type or a priority species, the reasons referred to in paragraph (1) must be either—</i> <i>(a) reasons relating to human health, public safety or beneficial consequences of primary importance to the environment; or</i> <i>(b) any other reasons which the competent authority, having due regard to the opinion of the appropriate authority, considers to be imperative reasons of overriding public interest.</i> <i>(3) Where a competent authority other than the Secretary of State or the Welsh Ministers desires to obtain the opinion of the appropriate authority as to whether reasons are to be considered imperative reasons of overriding public interest, it may submit a written request to the appropriate authority—</i> <i>(a) identifying the matter on which an opinion is sought; and</i> <i>(b) accompanied by any documents or information which may be required.</i> <i>(4) In giving its opinion as to whether the reasons are imperative reasons of overriding public interest, the appropriate authority must have regard to the national interest, and provide its opinion to the competent authority.</i> <i>(4A) Before giving its opinion as to whether the reasons are imperative reasons of overriding public interest, the appropriate authority must consult the following, and have regard to their opinion—</i> <i>(a) the Joint Nature Conservation Committee;</i> <i>(b) where the appropriate authority is the Secretary of State, the devolved administrations;</i>

Regulation	Requirement
	(c) where the appropriate authority is the Welsh Ministers, the Secretary of State, and the other devolved administrations; and (d) any other person the appropriate authority considers appropriate. (5) Where a competent authority other than the Secretary of State or the Welsh Ministers proposes to agree to a plan or project under this regulation notwithstanding a negative assessment of the implications for the site concerned— (a) it must notify the appropriate authority; and (b) it must not agree to the plan or project before the end of the period of 21 days beginning with the day notified by the appropriate authority as that on which its notification was received, unless the appropriate authority notifies it that it may do so. (6) Without prejudice to any other power, the appropriate authority may give directions to the competent authority in any such case prohibiting it from agreeing to the plan or project, either indefinitely or during such period as may be specified in the direction.”
Habitats Regulations, Regulation 68	“Where in accordance with regulation 64— (a) a plan or project is agreed to, notwithstanding a negative assessment of the implications for a European site or a European offshore marine site, or (b) a decision, or a consent, permission or other authorisation, is affirmed on review, notwithstanding such an assessment, the appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of Natura 2000 is protected.”
Marine Habitats Regulations, Regulation 29	“(1) If it is satisfied that, there being no alternative solutions, the plan or project referred to in regulation 28(1) must be carried out for imperative reasons of overriding public interest (which, subject to paragraph (2), may be of a social or economic nature), the competent authority may agree to the plan or project notwithstanding a negative assessment of the implications for the site. (2) Where the site concerned hosts a priority natural habitat type or a priority species, the reasons referred to in paragraph (1) must be either—

Regulation	Requirement
	(a) reasons relating to human health, public safety or beneficial consequences of primary importance to the environment; or (b) any other imperative reasons of overriding public interest. (3) A competent authority other than the relevant administration may not agree to a plan or project under paragraph (1) for any reason referred to in paragraph (2)(b) unless it has had due regard to the opinion of the relevant administration in satisfying itself that there are such reasons. (4) Where a competent authority other than the relevant administration desires to obtain the opinion of the relevant administration as to whether reasons are to be considered imperative reasons of overriding public interest, it must submit a request to the relevant administration — (a) identifying the matter on which an opinion is sought; and (b) accompanied by any documents or information that may be required. (5) In giving its opinion as to whether the reasons are imperative reasons of overriding public interest, the relevant administration must have regard to the national interest, and provide its opinion to the competent authority. (6) Before giving its opinion as to whether the reasons are imperative reasons of overriding public interest, the relevant administration must consult the following, and have regard to their opinion— (a) the Joint Nature Conservation Committee; (b) where the relevant administration is the Secretary of State, the devolved administrations; (c) where the relevant administration is a devolved administration, the Secretary of State and the other devolved administrations; and (d) any other person the relevant administration considers appropriate. (7) In this regulation, "the relevant administration" means— (a) in relation to a plan or project relating to an activity other than one specified in regulation 55(16)— (i) where the plan or project is to be carried out in the Scottish offshore region, the Scottish Ministers; and (ii) where the plan or project is to be carried out in the Welsh offshore region, the Welsh Ministers; and

Regulation	Requirement
	<i>(b) in relation to a plan or project relating to an activity specified in regulation 55(16), or in any case not falling within sub-paragraph (a)(i) or (ii), the Secretary of State.”</i>
Marine Habitats Regulations, Regulation 36	<i>“(1) This regulation applies where, notwithstanding a negative assessment of the implications for a European offshore marine site or European site—</i> <i>(a) a plan or project is agreed to in accordance with regulation 29; or</i> <i>(b) a decision, or a consent, permission or other authorisation, is affirmed on review in accordance with regulations 29 and 34(3).</i> <i>(2) The appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of Natura 2000 is protected.”</i>

2.2 Policy

2.2.1 National Policy Statements

25. The Overarching NPS for Energy (NPS EN-1) (DESNZ, 2023a) and NPS for Renewable Energy (NPS EN-3) (DESNZ, 2023b) outline the requirements for Applicants to provide evidence to support an HRA derogation case at the application stage, where the Statutory Nature Conservation Body (SNCB) has advised that it may not be possible to rule out an adverse effect on site integrity (**Table 2.3**).
26. The need for information to be provided at the application stage was also stated by the SoS in the Hornsea Project Three, Hornsea Four, East Anglia ONE North, East Anglia TWO, and Norfolk Boreas (Department for Business, Energy & Industrial Strategy (BEIS), 2021a) decision letters: *“in order to maintain the efficient functioning of the development consenting regime, he may not always request post-examination representations on such matters [HRA], indeed it should be assumed that he will not do so, and he may therefore make decisions on such evidence as is in front of him following his receipt of the ExA’s⁴ Report”*.
27. NPS EN-1 and EN-3 highlight the urgent need to meet the UK Government’s energy objectives by defining nationally significant low carbon infrastructure as a Critical National Priority (CNP). The CNP policy explains how the SoS will consider the HRA derogation case, in light of the need for CNP infrastructure projects.

Table 2.3 Relevant Policies of the NPS EN-1 and NPS EN-3

Paragraph	Policy
NPS EN-1 paragraph 4.2.11	<i>“Applicants must apply the mitigation hierarchy and demonstrate that it has been applied. They should also seek the advice of the appropriate Statutory Nature Conservation Bodies (SNCB) or other relevant statutory body when undertaking this process. Applicants should demonstrate that all residual impacts are those that cannot be avoided, reduced or mitigated.”</i>
NPS EN-1 paragraph 4.2.12	<i>“Applicants should set out how residual impacts will be compensated for as far as possible. Applicants should also set out how any mitigation or compensation measures will be monitored, and reporting agreed to ensure success and that action is taken. Changes to measures may be needed e.g., adaptive management. The cumulative impacts of multiple developments with residual impacts should also be considered.”</i>

⁴ Examining Authority

Paragraph	Policy
NPS EN-1 paragraph 4.2.13	<i>“Where residual impacts relate to HRA or Marine Conservation Zone (MCZ) then the Applicant must provide a derogation case, if required, in the normal way in compliance with the relevant legislation and guidance.”</i>
NPS EN-1 paragraph 4.2.19	<i>“Where, following Appropriate Assessment, CNP Infrastructure has residual adverse impacts on the integrity of sites forming part of the UK national site network, either alone or in combination with other plans or projects, the Secretary of State will consider making a derogation under the Habitats Regulations.”</i>
NPS EN-1 paragraph 4.2.21	<i>“...the Secretary of State will consider the particular circumstances of any plan or project, but starting from the position that energy security and decarbonising the power sector to combat climate change:</i> ▪ <i>requires a significant number of deliverable locations for CNP Infrastructure and for each location to maximise its capacity. This NPS imposes no limit on the number of CNP infrastructure projects that may be consented. Therefore, the fact that there are other potential plans or projects in different locations that can help meet the need for CNP Infrastructure is unlikely to be treated as an alternative solution. Further, the existence of another way of developing the proposed plan or project which results in a significantly lower generation capacity is unlikely to meet the objectives and therefore be treated as an alternative solution; and</i> ▪ <i>are capable of amounting to imperative reasons of overriding public interest (IROPI) for HRAs, and, for MCZ assessments, the benefit to the public is capable of outweighing the risk of environmental damage, for CNP Infrastructure.</i>
NPS EN-1 paragraph 4.2.22	<i>“For HRAs, where an applicant has shown there are no deliverable alternative solutions, and that there are IROPI, compensatory measures must be secured by the Secretary of State as the competent authority, to offset the adverse effects to site integrity as part of a derogation.”</i>
NPS EN-1 paragraph 5.4.26	<i>“If, during the pre-application stage, the SNCB indicate that the proposed development is likely to adversely impact the integrity of habitat sites, the applicant must include with their application such information as may reasonably be required to assess a potential derogation under the Habitats Regulations.”</i>
NPS EN-1 paragraph 5.4.27	<i>“If the SNCB gives such an indication at a later stage in the development consent process, the applicant must provide this information as soon as is reasonably possible and before the close of the examination. This information must include</i>

Paragraph	Policy
	<i>assessment of alternative solutions, a case for Imperative Reasons of Overriding Public Interest (IROPI) and appropriate environmental compensation.”</i>
NPS EN-1 paragraph 5.4.28	<i>“Provision of such information will not be taken as an acceptance of adverse impacts and if an applicant disputes the likelihood of adverse impacts, it can provide this information as part of its application ‘without prejudice’ to the Secretary of State’s final decision on the impacts of the potential development. If, in these circumstances, an applicant does not supply information required for the assessment of a potential derogation, there will be no expectation that the Secretary of State will allow the applicant the opportunity to provide such information following the examination.”</i>
NPS EN-1 paragraph 5.4.29	<i>“It is vital that applicants consider the need for compensation as early as possible in the design process as ‘retrofitting’ compensatory measures will introduce delays and uncertainty to the consenting process.”</i>
NPS EN-1 paragraph 5.4.30	<i>“Applicants should work closely at an early stage in the pre-application process with SNCB and Department for Environment, Food and Rural Affairs (Defra)/Welsh Government to develop a compensation plan for all protected sites adversely affected by the development. Applicants should engage with the relevant Local Planning Authority at an early stage regarding the proposed location of compensatory measures. Applicants should also take account of any strategic plan level compensation plans in developing project level compensation plans.”</i>
NPS EN-1 paragraph 5.4.31	<i>“Before submitting an application, applicants should seek the views of the SNCB and Defra/Welsh Government as to the suitability, securability and effectiveness of the compensation plan to ensure the development will not hinder the achievement of the conservation objectives for the protected site. In cases where such views are provided, the applicant should include a copy of this information with the compensation plan in their application for further consideration by the Examining Authority.”</i>
NPS EN-3 paragraph 2.8.265	<i>“With increasing deployment of offshore wind farms and offshore transmission, environmental impacts upon SACs SPAs, and Ramsar sites and MCZs (individually and as part of a network) may not be addressed by avoidance, reduction, or mitigation alone, therefore compensatory measures (through derogation for SACs SPAs, Ramsar sites, and MCZs) may be required at a plan or project level where adverse effects on site integrity and/or on conservation objectives cannot be ruled out.”</i>

Paragraph	Policy
NPS EN-3 paragraph 2.8.266	<i>“For many receptors, the scale of offshore wind and offshore transmission developments, and potential in-combination effects, means compensation could be required and applicants must refer to the latest Defra compensation guidance when making their assessments.”</i>
NPS EN-3 paragraph 2.8.267	<i>“If, during the pre-application stage, SNCBs indicate that the proposed development is likely adversely to impact a protected site, the applicant should include with their application such information as may reasonably be required to assess potential derogations under the Habitats Regulations or the Marine and Coastal Access Act 2009.”</i>
NPS EN-3 paragraph 2.8.268	<i>“Where such an indication is given later in the development consent process, the applicant should share this information as soon as reasonably practical.”</i>
NPS EN-3 paragraph 2.8.269	<i>“This information includes: assessment of alternative solutions, showing the relevant tests on alternatives have been met; a case showing that the relevant tests for IROPI or Measures of Equivalent Environmental Benefit have been met; and appropriate securable environmental compensation, which will ensure no net loss to the Marine Protected Areas (MPA) network and help ensure that the MPA target (including any interim target) set under the Environment Act 2021 targets can be met.”</i>
NPS EN-3 paragraph 2.8.270	<i>“Provision of such information will not be taken as an acceptance of adverse impacts, and if applicants dispute the likelihood of adverse effects they can provide this information as part of their application, ‘without prejudice’ to the Secretary of State’s final decision on the impacts of the potential development.”</i>
NPS EN-3 paragraph 2.8.271	<i>“If, in these circumstances, an applicant does not supply information required for the assessment of a potential derogation, consent may be refused as there will be no expectation that the Secretary of State will allow the applicant the opportunity to provide such information following the examination.”</i>
NPS EN-3 paragraph 2.8.272	<i>“It is vital that applicants consider the need for compensation as early as possible in the design process, as ‘retrofitting’ compensatory measures will introduce delays and uncertainty to the consenting process. Applicants are encouraged to include all compensatory measures considered, with reasoning for why they have been discounted.”</i>
NPS EN-3 paragraph 2.8.273	<i>“Applicants should work closely at an early stage in the pre-application process with SNCBs, and Defra, in conjunction with the relevant regulators, Local Planning Authorities, National Park</i>

Paragraph	Policy
	<i>Authorities, landowners and other relevant stakeholders to develop a compensation plan for all protected sites adversely affected by the development.”</i>
NPS EN-3 paragraph 2.8.274	<i>“Before submitting an application, applicants should seek the views of the SNCB and Defra, as to the suitability, securability and effectiveness of the compensation plan to ensure that the overall coherence of the National Site Network for the impacted SAC/SPA/MCZ feature is protected. Consultation should also take place throughout the pre-application phase with key stakeholders (e.g., via the evidence plan process and use of expert topic groups).”</i>
NPS EN-3 paragraph 2.8.275	<i>“In cases where such views are provided, the applicant should include a copy of this information with the compensation plan in their application for further consideration by the Examining Authority and Secretary of State.”</i>
NPS EN-3 paragraph 2.8.276	<i>“The British Energy Security Strategy contains a commitment to introduce mechanisms to support strategic compensatory measures, to compensate for environmental impacts and reduce delays to individual projects.”</i>
NPS EN-3 paragraph 2.8.277	<i>“Strategic compensation is defined as a measure or a series of measures that can be delivered at scale and/or extended timeframes, which cannot be delivered by individual offshore wind and/ or offshore transmission project developers in isolation. Any measure(s) would usually be led and delivered by a range of organisations, including Government, industry and relevant stakeholders. Strategic compensation measures would normally be identified at a plan level and applied across multiple offshore wind projects to provide ecologically meaningful compensation to designated site habitats and species adversely impacted, ensuring the coherence of the MPA network.”</i>
NPS EN-3 paragraph 2.8.278	<i>“This may include central coordination for measures delivered across a series of projects or biogeographic region.”</i>
NPS EN-3 paragraph 2.8.279	<i>“Applicants will be able to access tools and mechanisms to support identification of suitable compensation and facilitate delivery of strategic compensation measures where appropriate.”</i>

Paragraph	Policy
NPS EN-3 paragraph 2.8.280	<i>“The government is still developing its policies on strategic compensation through the Collaboration on Offshore Wind Strategic Compensation (COWSC) programme, and guidance will be published in due course.”</i>
NPS EN-3 paragraph 2.8.281	<i>“The government will work collaboratively with industry and stakeholders to develop strategic compensation for projects currently in the consenting process (where possible) as well as for future developments.”</i>
NPS EN-3 paragraph 2.8.282	<i>“Not every impact for every project will initially fall within the strategic compensation proposals, so applicants should continue to discuss with SNCBs and Defra the need for site specific or strategic compensation at the earliest opportunity.”</i>
NPS EN-3 paragraph 2.8.283	<i>“Applicants should also coordinate with other marine industry sectors, e.g., oil and gas, who might also need to find compensatory measures. This will ensure compensatory measures are complementary and/or take advantage of opportunities to join together to deliver strategic compensation. Applicants should demonstrate they have consulted with those industries/stakeholders who are affected by any proposed compensation measures.”</i>

2.2.2 Consultation

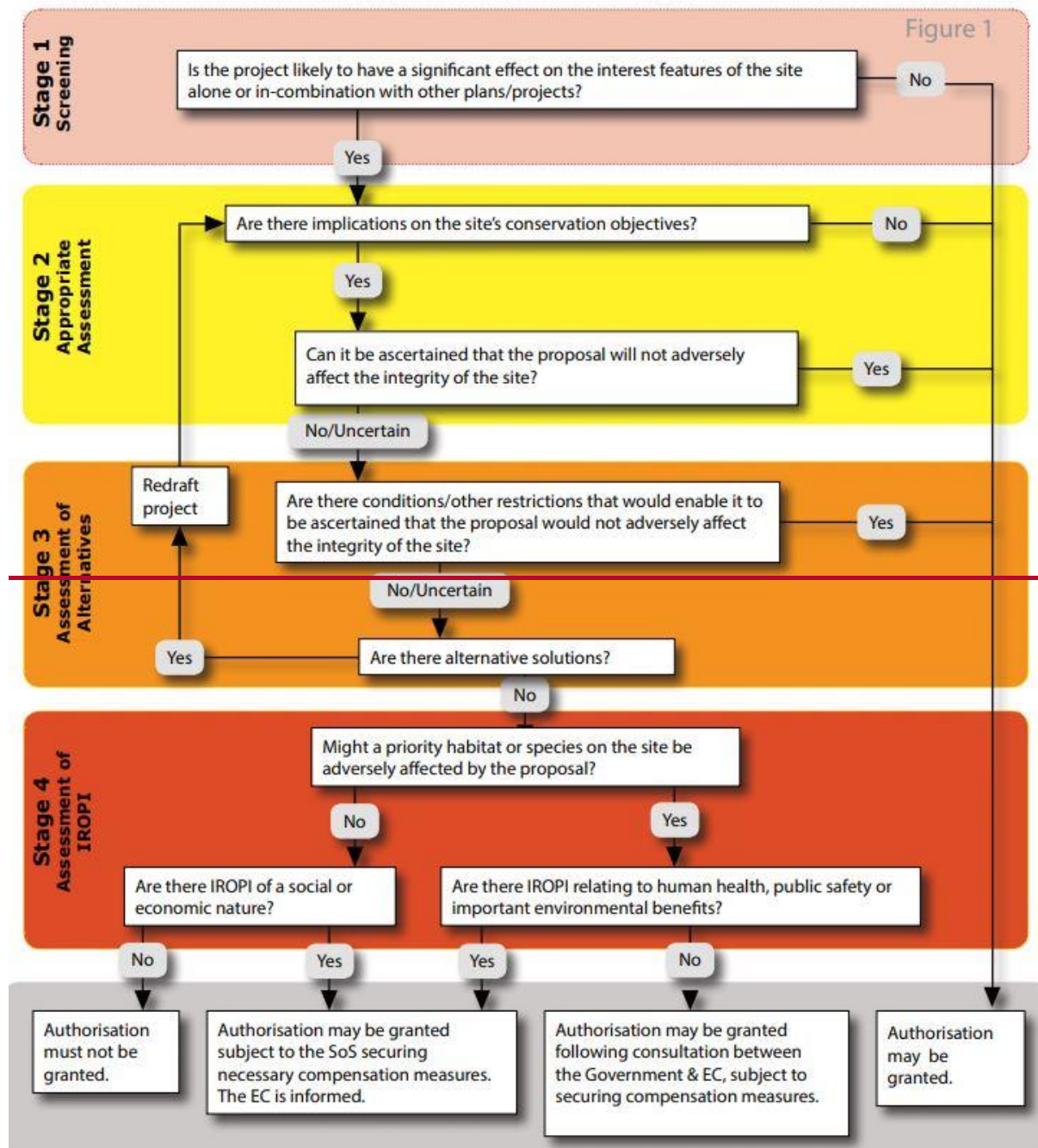
28. In accordance with NPS EN-1 paragraphs 5.4.29 and 5.4.30, the Applicant has undertaken consultation on potential compensation measures throughout the pre-application stage. This has included:

- Offshore Ornithology ETG meetings with Natural England and the Royal Society for the Protection of Birds (RSPB) to discuss the range of options for compensation
- Offshore Ornithology ETG meeting with Natural England and the RSPB to agree the short list of compensation measures
- Meetings with Defra, the RSPB and Natural England, as well as other relevant stakeholders such as Cumbria Wildlife Trust and landowners regarding site selection options for compensatory measures

3 Habitats Regulations Assessment Process

29. Under the Habitats Regulations and the Marine Habitats Regulations, the relevant competent authority must consider whether a plan or project has the potential to have an adverse effect on site integrity of a habitats site. HRA derogation under the above Regulations (see **Table 2.2**) can only apply after the AA has concluded that an adverse effect on site integrity cannot be ruled out.
30. The following UK Guidance addresses the regulations in the Habitats Regulations and Marine Habitats Regulations applicable to Article 6(4) of the Habitats Directive (**Table 2.2**):
- Department for Environment, Food & Rural Affairs (Defra) *et al.*, (2021) Habitats Regulations Assessments: protecting a European site, published February 2021
 - Defra (2021a) Best practice guidance for developing compensatory measures in relation to Marine Protected Areas. Draft for consultation
 - Natural England (2022) Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards. Phase III: Expectations for data analysis and presentation at examination for offshore wind applications
31. **Plate 3.1** provides an outline of the sequential HRA process, as summarised below:
- Stage 1 – Screening: The process of identifying relevant European sites (when within the UK now referred to as sites within the National Site Network) and if the Project has a LSE on qualifying features (alone and in-combination)
 - Stage 2 – AA: The assessment of the risk of the Project (alone or in-combination) causing an adverse effect on integrity (AEoI) for each feature screened in during Stage 1 in relation to conservation objectives
 - Stage 3 and 4 – Derogation: If Stage 2 concludes there is a risk of AEoI the following are required:
 - Assessment of alternatives
 - IROPI
 - Compensatory measures

32. This HRA 'without prejudice' derogation document provides information relating to Stage 3 and Stage 4, albeit with a summary of the assessment undertaken in relation to Stage 2. A RIAA for the Project is provided with the DCO Application, which supports Stages 1 and 2 of the HRA process.
33. A summary of the conclusions of the RIAA is provided in **Section 4.3**.
34. The Applicant's RIAA concludes that there would be no adverse effect on the integrity of any SPA as a result of the Project. Given the conclusions of SNCBs may not be the same as the Applicant in regard to contribution to in-combination effects, the Applicant has prepared this 'without prejudice' derogation and compensation document. It should be noted that the approach to the development of compensatory measures is the same regardless of whether they are being provided on a 'without prejudice' basis or not.
35. Stage 3 of the HRA process entails the Assessment of Alternatives. Essentially this stage requires the Applicant to provide evidence that alternatives in terms of location, scale/size, design, methods (e.g. construction), and timing:
- do not achieve the same overall objective as the original proposal
 - are not financially, legally and technically feasible
 - are not less damaging to the European site and have an adverse effect on the integrity of this or any other European site
36. Stage 4 of the HRA process entails the assessment of IROPI. Primarily this stage requires the Applicant to evidence that the project is:
- Essential for public interest reasons
 - Is in the public interest and benefits the public, not just private interests
 - Is overriding and as such the public interest outweighs the harm, or risk of harm, to the integrity of the European site(s) being considered



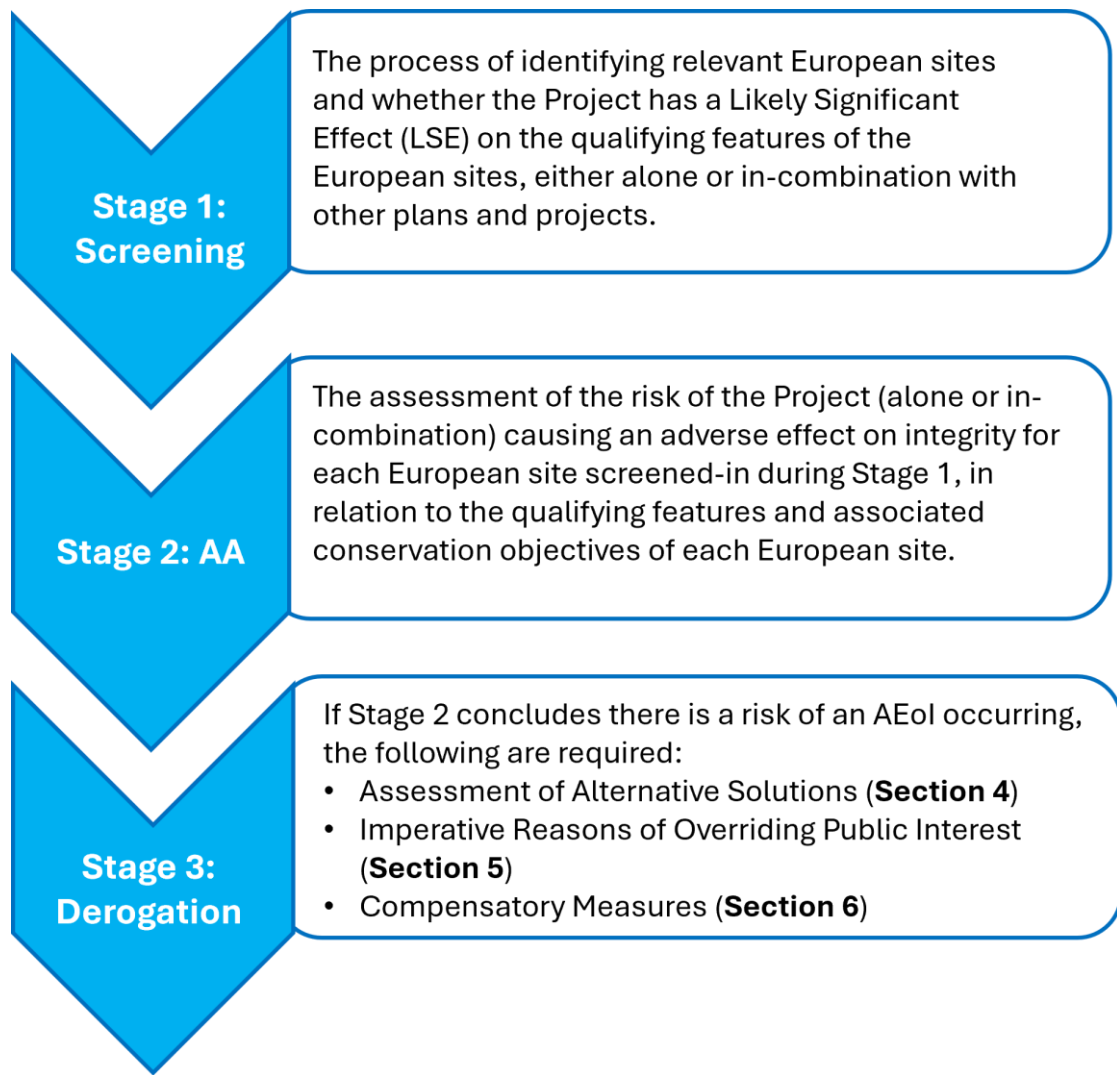


Plate 3.1 HRA process

4 Assessment of Alternative Solutions

4.1 Approach

37. This assessment applies a sequential process to the consideration of alternatives, first by identifying the objectives of the Project, then the potential harm to protected sites, followed by consideration of alternative solutions and their feasibility. Whilst it is acknowledged that the SoS need not constrain themselves solely to alternatives delivered by the Applicant, the fact that there are other potential plans or projects deliverable in different locations to meet the need for CNP Infrastructure is unlikely to be treated as an alternative solution (EN-1 paragraph 4.2.21).
38. Defra *et al.* (2021) provides guidance on the approach to the consideration of alternative solutions under the HRA derogation tests. Of relevance to an offshore windfarm array, the guidance states that the assessment of alternative solutions must consider:
- Alternative location
 - Alternative size/scale
 - Alternative design
 - Alternative method
 - Alternative timing
39. In order to assess the alternative solutions, Defra *et al.* (2021) stated:
- “An alternative solution is acceptable if it:*
- achieves the same overall objective as the original proposal*
- is financially, legally and technically feasible*
- is less damaging to the European site and does not have an adverse effect on the integrity of this or any other European site”*
40. It is noted that in terms of considering less damaging solutions, the Hornsea Four decision noted that alternatives are only considered where there is an appreciable reduction in predicted impacts to protected sites.
41. Defra *et al.* (2021) established that the consideration of alternative solutions need not go beyond the form of energy generation proposed, in order to deliver the objectives of renewable energy production:
- “Examples of alternatives that may not meet the original objective include a proposal that:*
- offers nuclear instead of offshore wind energy”*

42. The Government policy in NPS EN-1 imposes no limits on the number of CNP projects, “therefore the fact that there are other potential plans or projects deliverable in different locations to meet the need for CNP infrastructure is unlikely to be treated as an alternative solution” (paragraph 4.2.21; NPS EN-1, 2023).
43. Furthermore, the NPS EN-1 also states that “*the existence of another way of developing the proposed plan or project which results in a significantly lower generation capacity is unlikely to meet the objectives and therefore be treated as an alternative solution*” (paragraph 4.2.21; NPS EN-1, 2023).
44. It was also noted that “*where an applicant has shown there are no deliverable alternative solutions, and that there are IROPI, compensatory measures must be secured by the Secretary of State as the competent authority, to offset the adverse effects to site integrity as part of a derogation*” (paragraph 4.2.22; NPS EN-1, 2023).
45. Defra (2021a) compensatory measures guidance advised that a “do nothing” option should also be considered.
46. The methodology adopted to assess alternative solutions has been developed based on former and current guidance from a range of sources, including:
 - EC (2001). Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC
 - EC (2011). Guidelines on the Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones; with particular attention to port development and dredging
 - Defra (2012). Habitats and Wild Birds Directives: guidance on the application of Article 6(4) Alternative solutions, IROPI and compensatory measures
 - EC (2012). Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Clarification of the concepts of: Alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission
 - The Planning Inspectorate (2017). Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects
 - EC (2018). Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC
 - Defra et al., (2021). Habitats regulations assessments: protecting a European site; How a competent authority must decide if a plan or project proposal that affects a European site can go ahead

- Defra (2021a) Best practice guidance for developing compensatory measures in relation to Marine Protected Areas. Draft for consultation
 - Defra (2021b) Policy paper Changes to the Habitats Regulations 2017.
47. The approach to this ‘without prejudice’ derogation case has also been developed through consideration of UK precedents, namely:
- The Rampion OWF HRA produced by the SoS (Department for Energy and Climate Change (DECC), 2014)
 - The Hornsea Project Three HRA produced by the SoS (BEIS, 2020a)
 - The Hornsea Four HRA produced by the SoS (DESNZ, 2023c)
 - The Norfolk Boreas HRA produced by the SoS (BEIS, 2021a)
 - The East Anglia ONE North and East Anglia TWO HRA produced by the SoS (BEIS, 2022a; 2022b)
 - The Norfolk Vanguard HRA produced by the SoS (BEIS 2022c)
48. The methodology adopted herein follows the below steps, each of which is detailed and evidenced within the following subsections of this document:
- Step 1 – summarise the Project need and objectives, in order to allow the assessment (Step 3) to determine whether the alternative solution(s) achieve the same overall objective(s) – see **Section 1.1** of this document
 - Step 2 – identify the risk of harm to the integrity of the relevant European site in order to allow the assessment (Step 5) to determine whether the alternative solution(s) is less damaging to the European site and does not have an adverse effect on the integrity of this or any other European site – see **Section 4.3** of this document
 - Step 3 – produce a long list of potential alternative solutions and screen these in terms of whether they meet the objectives of the Project, to thereafter produce a short list of alternative solutions that meet the Project objectives – see **Section 4.4** of this document
 - Step 4 – consider whether any short-listed potential alternative solutions identified in Step 3 are feasible (financially, legally and technically) – see **Section 4.5** of this document
 - Step 5 – consider whether any feasible alternative solutions identified in Step 4 would have a lesser effect on the integrity of the National Site Network – see **Section 4.6** of this document

4.2 Step 1: Project Need and Objectives

4.2.1 The need for the Project

49. The key drivers underpinning the need for offshore wind power that would be met by the Project in line with National Policy (DESNZ, 2023a) are set out in full in the Planning Development Consent and Need Statement (Document Reference 4.8).
50. There is a clear and urgent need for the development of the Project since it will help to meet the decarbonisation objective and achieve the UK Government target of Net Zero emissions by 2050. Additionally, offshore wind is expected to produce more than 50GW of electricity by 2030, and the Project is positioned to contribute to this target.
51. The Project would also support the objectives on security of energy supply, sustainable development, affordability and coordination set out in the Overarching Energy NPS EN-1. With a planned generation capacity of around 480MW of renewable energy, the Project would make a substantial contribution to the achievement of national renewable energy targets towards Net Zero and to the UK's contribution to global efforts to reduce the effects of climate change.
52. The Project would provide secure, reliable and affordable renewable energy supply in the UK for over 500,000 homes. The Project would help the UK meet its Net Zero targets and significantly contribute to the economy, by providing substantial investment locally and nationally, as well as employment and new energy infrastructure during all phases of the Project. This would enhance the sustainable development of the local community.

4.2.2 Project objectives

53. The Project objectives are presented in **Table 4.1**.

Table 4.1 Project Objectives

ID	Objective	Basis for the Objective (emphasis added)
1	Decarbonisation: Generate around 480MW of low carbon electricity from an offshore windfarm, in support of the Net-Zero by 2050 target and UK Government ambition to deliver 50GW of offshore wind by 2030	National UK policy set out in section 2.2, <i>Net Zero by 2050</i>, of NPS EN-1 is that “2.2.1 In June 2019 the UK became the first major economy to legislate for a 2050 Net Zero Greenhouse Gases (‘GHG’) emissions target through the Climate Change Act 2008 (2050 Target Amendment) Order 2019..... In April 2021, the Government legislated for the sixth carbon budget (CB6), which requires the UK to reduce GHG emissions by 78 per cent by 2035 compared to 1990 levels” and that “2.3.2 In October 2021 the Government published the Net Zero Strategy”. On the basis of the need to deliver the project by 2030 national policy in section 4.2 “The critical national priority for low carbon infrastructure” is that “4.2.2..... Our energy security and net zero ambitions will only be delivered if we can enable the development of new low carbon sources of energy at speed and scale” and that “4.2.4 Government has therefore concluded that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure”.

ID	Objective	Basis for the Objective (emphasis added)
2	Security of supply: Provide significant electricity generation capacity within the UK to support commitments for offshore wind generation and security of supply	National UK policy set out in section 2.5, <i>Security of Supplies</i>, of NPS EN-1 is that: “2.5.1 Given the vital role of energy to economic prosperity and social well-being, it is important that our supplies of energy remain secure, reliable and affordable” and that “2.5.6 The British Energy Security Strategy emphasises the importance of addressing our underlying vulnerability to international energy prices by reducing our dependence on imported oil and gas, improving energy efficiency, remaining open minded about our onshore reserves including shale gas, and accelerating deployment of renewables, nuclear, hydrogen, CCUS, and related network infrastructure, so as to ensure a domestic supply of clean, affordable, and secure power as we transition to net zero” and that “3.3.21 As part of delivering this, UK government announced in the British Energy Security Strategy an ambition to deliver up to 50 gigawatts (GW) of offshore wind by 2030”.

ID	Objective	Basis for the Objective (emphasis added)
3	Affordability: Maximise generation capacity at low cost to the consumer from viable developable seabed within the constraints of available sites and grid infrastructure	National UK policy set out in section 3.3, <i>The need for new nationally significant electricity infrastructure</i>, of NPS EN-1 is that: <i>“3.3.13 The Net Zero Strategy sets out the Government’s ambition for increasing the deployment of low carbon energy infrastructure consistent with delivering our carbon budgets and the 2050 net zero target. This made clear the commitment that the cost of the transition to net zero should be fair and affordable”</i> and that: <i>“3.3.16 If demand for electricity doubles by 2050, we will need a fourfold increase in low carbon generation and significant expansion of the networks that transport power to where it is needed. In addition, we committed in the Net Zero Strategy to take action so that by 2035, all our electricity will come from low carbon sources, subject to security of supply, whilst meeting a 40-60 per cent increase in electricity demand. This means that the majority of new generating capacity needs to be low carbon”</i> and that <i>“3.3.20 Wind and solar are the lowest cost ways of generating electricity, helping reduce costs and providing a clean and secure source of electricity supply (as they are not reliant on fuel for generation). Our analysis shows that a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar.”</i>
4	Coordination: Coordinate and coexist with other activities, developers and operators to use previously developed seabed to deliver the Project and its skills, employment and investment benefits in the Local Economic Area.	National UK policy set out in section 3.3, <i>The need for new nationally significant electricity infrastructure</i>, of NPS EN-1 is that: <i>“3.3.71....For regions with multiple windfarms or offshore transmission projects it is expected that a more coordinated approach will be delivered. For these areas, this approach is likely to reduce the network infrastructure costs as well as the cumulative environmental impacts and impacts on coastal communities by installing a smaller number of larger</i>

ID	Objective	Basis for the Objective (emphasis added)
		connections, each taking power from multiple windfarms instead of individual point-to-point connections for each windfarm” And in section 4.1 <i>General Policies and Considerations</i> that “4.1.5 <i>In considering any proposed development, in particular when weighing its adverse impacts against its benefits, the Secretary of State should take into account:</i> • <i>its potential benefits including its contribution to meeting the need for energy infrastructure, job creation, reduction of geographical disparities, environmental enhancements, and any long-term or wider benefits”</i> And within section 4.2 “HRA derogations and MCZ assessments for CNP Infrastructure” that “4.2.21 <i>For both derogations, the Secretary of State will consider the particular circumstances of any plan or project, but starting from the position that energy security and decarbonising the power sector to combat climate change:</i> • <i>requires a significant number of deliverable locations for CNP Infrastructure and for each location to maximise its capacity. This NPS imposes no limit on the number of CNP infrastructure projects that may be consented. Therefore, the fact that there are other potential plans or projects deliverable in different locations to meet the need for CNP Infrastructure is unlikely to be treated as an alternative solution”.</i> National UK policy set out in section 2.8 <i>Offshore Wind</i> of NPS EN-3 is that: “2.8.48 <i>Applicants are encouraged to work collaboratively with those other developers and sea users on co-existence/co-location opportunities, shared mitigation, compensation and monitoring where appropriate. Where applicable, the creation of statements of common</i>

ID	Objective	Basis for the Objective (emphasis added)
		ground between developers is recommended. Work is ongoing between government and industry to support effective collaboration and find solutions to facilitate to greater co-existence/co-location”. National policy set out in 5.13 Socio-economic impacts of NPS EN-1 is that: “5.13.11 The Secretary of State should consider any relevant positive provisions the applicant has made or is proposing to make to mitigate impacts (for example through planning obligations) and any legacy benefits that may arise as well as any options for phasing development in relation to the socio-economic impacts. 5.13.12 The Secretary of State may wish to include a requirement that specifies the approval by the local authority of an employment and skills plan detailing arrangements to promote local employment and skills development opportunities, including apprenticeships, education, engagement with local schools and colleges and training programmes to be enacted”

4.3 Step 2: Define the potential for harm

4.3.1 Overview

54. **Table 4.2** lists the sites and features relevant to this ‘without prejudice’ derogation case, and which have been considered within this assessment of alternatives. Further information on the quantification of these effects is provided in the following sections.
55. As discussed in **Section 1.2**, the RIAA concluded that no Project-alone adverse effect on the integrity of European Sites is expected, and the Project does not make any measurable contribution to in-combination values. However, the conclusions of SNCBs may not be the same as the Applicant with regard to contribution to in-combination values on lesser black-backed gull features of the Morecambe Bay and Duddon Estuary SPA and/or the Ribble and Alt Estuaries SPA as a result of collisions with the WTGs during operation.

Table 4.2 Relevant impacts

Site	Feature	Impact
Morecambe Bay and Duddon Estuary SPA	Lesser black-backed gull	Collision
Ribble and Alt Estuaries SPA	Lesser black-backed gull	Collision

4.3.2 Morecambe Bay and Duddon Estuary SPA and Ramsar sites – Lesser Black-backed Gull

4.3.2.1 Overview of the Morecambe Bay and Duddon Estuary SPA

56. The Morecambe Bay and Duddon Estuary SPA site is located approximately 26km from the Project windfarm site. It was designated in 2017, when two separate SPAs (Morecambe Bay SPA and Duddon Estuary SPA) were amalgamated and extended. Morecambe Bay and Duddon Estuary are also designated as Ramsar sites⁵.
57. The SPA extends between Rossall Point, in Lancashire, and Drigg Dunes, in Cumbria. The SPA site includes the former Morecambe Bay SPA and the Duddon Estuary SPA area, with the SPA extension including the Ravenglass Estuary and intervening coast and the shallow offshore area off the southwest Cumbrian coast.

⁵ Ramsar sites are wetlands of international importance designated under the Ramsar Convention. Government policy gives Ramsar sites broad equivalence to European designated sites and are therefore also considered within Habitats Regulations Assessment.

58. Morecambe Bay is the second largest embayment in Britain after The Wash, at over 310km². The rivers Wyre, Lune, Kent and Leven drain into the Bay. It contains the largest continuous area of intertidal mudflats and sandflats in the UK.
59. The qualifying features of the SPA are:
- Breeding species:
 - Little tern
 - Sandwich tern
 - Common tern
 - Lesser black-backed gull
 - Herring gull
 - Non-breeding species:
 - Whooper swan
 - Little egret
 - Golden plover
 - Bar-tailed godwit
 - Ruff
 - Mediterranean gull
 - Pink-footed goose
 - Shelduck
 - Pintail
 - Lesser black-backed gull
 - Oystercatcher
 - Grey plover
 - Ringed plover
 - Curlew
 - Black-tailed godwit
 - Turnstone
 - Knot
 - Sanderling
 - Dunlin
 - Redshank

- Waterbird assemblage
- Seabird assemblage

4.3.2.2 Conservation Objectives

60. The site's conservation objectives are to: *'Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:*

- *The extent and distribution of the habitats of the qualifying features*
- *The structure and function of the habitats of the qualifying features*
- *The supporting processes on which the habitats of the qualifying features rely*
- *The populations of each of the qualifying features, and*
- *The distribution of qualifying features within the site'*

4.3.2.3 Summary of the assessment of effects on Lesser Black-backed Gull

4.3.2.3.1 Project-alone

61. Based on the mean collision rates, the maximum (assuming that only birds from coastal breeding colonies are apportioned to the SPA) annual total of breeding adult lesser black backed gulls from the Morecambe Bay and Duddon Estuary SPA at risk of collision as a result of the Project is 0.33 (95% Confidence Interval (CI) of 0.00 – 1.11). This would increase the existing mortality of the SPA breeding population by 0.16% (95% CI of 0.00% - 0.56%) (see the Offshore Ornithology Technical Note 2 (HRA) Rev 02 (Offshore Ornithology Technical Note 2 (HRA)_Rev 02 Clean (Document Reference 9.23)).

4.3.2.3.2 In-combination with other offshore windfarm projects

62. It is the Applicant's position that the predicted Project-alone lesser black-backed gull mortality is below the threshold that would make any measurable contribution to in-combination values. Nonetheless, in order to provide context to the assessment, an estimation of in-combination mortality has been presented within the RIAA. This estimates a total annual mortality for all relevant plans and projects of 22.52 birds.

63. Based on the Morecambe Bay and Duddon Estuary SPA breeding population of 1,724 birds, and a background mortality of 0.115 (122 birds per annum), an increase in mortality of 22.52 birds would increase background mortality by 11.52%. This exceeds the 1% threshold where a detectable effect on the SPA population could occur, and, therefore, it could be concluded that an in-combination adverse effect on site integrity is possible. However, such an

effect is considered unlikely as evidence from tracking studies suggests that birds from the SPA are unlikely to regularly occur at the windfarm site, and, therefore, the apportioned Project-alone and in-combination collision values are likely to be a significant overestimate.

64. The Project contribution is very small (i.e., significantly below one bird/<1% increase in background mortality), and below the threshold that would be detectable against natural variation. For the reasons set out above, the Project contribution is considered to be a significant overestimate (i.e., precautionary). Even at this level it represents less than 2% of all predicted collisions apportioned to the SPA.

4.3.3 Ribble and Alt Estuaries SPA and Ramsar site – Lesser Black-backed Gull

4.3.3.1 Overview of the Ribble and Alt Estuaries SPA

65. The Ribble and Alt Estuaries SPA and Ramsar site is located approximately 27km from the Project windfarm site.
66. The Ribble and Alt Estuaries SPA lies on the coast of Lancashire and Sefton, in northwest England. The SPA and Ramsar site encompasses all or parts of Ribble Estuary Site of Special Scientific Interest (SSSI)⁶ and Sefton Coast SSSI. It comprises two estuaries, of which the Ribble is by far the larger, together with an extensive area of sandy foreshore along the Sefton Coast, and forms part of the chain of west coast SPAs that fringe the Irish Sea. There is considerable interchange in the movements of birds between this SPA site and Morecambe Bay, Mersey Estuary, Dee Estuary and Martin Mere. A large proportion of the SPA is within the Ribble Estuary National Nature Reserve (NNR).
67. The site consists of extensive areas of sand and mudflats and, particularly in the Ribble, large areas of saltmarsh. There are also areas of coastal grazing marsh. The intertidal flats are rich in invertebrates, on which waders and some wildfowl feed. The highest densities of feeding birds are on the muddier substrates of the Ribble, though sandy shores throughout are also used. Saltmarshes and coastal grazing marshes support high densities of wildfowl and these, together with intertidal sand and mudflats throughout, are used as high tide roosts.
68. The site supports internationally important populations of waterbirds in winter, including swans, geese, ducks and waders. It is also of major importance

⁶ SSSIs are nationally important nature conservation sites designated under the Wildlife and Countryside Act 1981 (as amended). They are frequently components of European designated sites but are not directly relevant or considered within Habitats Regulations Assessment.

during migration periods, especially for wader populations moving along the west coast of Britain. The larger expanses of saltmarsh and areas of coastal grazing marsh support breeding birds, including large concentrations of gulls and terns. These seabirds feed both offshore and inland, outside the SPA. Several species of waterfowl (notably Pink-footed Goose) utilise feeding areas on agricultural land outside the SPA boundary.

69. The qualifying features of the SPA are:

- Breeding species:
 - Ruff
 - Common tern
 - Lesser black-backed gull
- Passage:
 - Ringed plover
 - Sanderling
 - Redshank
- Non-breeding species:
 - Bewick's swan
 - Whooper swan
 - Golden plover
 - Bar-tailed godwit
 - Pink-footed goose
 - Shelduck
 - Wigeon
 - Teal
 - Pintail
 - Oystercatcher
 - Grey plover
 - Knot
 - Sanderling
 - Dunlin
 - Black-tailed godwit
 - Redshank
- Waterbird assemblage

- Seabird assemblage

4.3.3.2 Conservation Objectives

70. The site's conservation objectives are to: *'Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:*
- *The extent and distribution of the habitats of the qualifying features*
 - *The structure and function of the habitats of the qualifying features*
 - *The supporting processes on which the habitats of the qualifying features rely*
 - *The populations of each of the qualifying features*
 - *The distribution of qualifying features within the site'*

4.3.3.3 Summary of the assessment of effects on Lesser Black-backed Gull

4.3.3.3.1 Project-alone

71. Based on the mean collision rates, the maximum (assuming that only birds from coastal breeding colonies are apportioned to the SPA) annual total of breeding adult lesser black-backed gulls from Ribble and Alt Estuaries SPA at risk of collision, as a result of the Project, is 0.69 (95% CI of 0.00 – 2.32). This would increase the existing mortality of the SPA breeding population by 0.13% (95% CI of 0.00% - 0.43%) (see the Offshore Ornithology Technical Note 2 (HRA) Rev02 (Offshore Ornithology Technical Note 2 (HRA)_Rev 02 Clean (Document Reference 9.23).

4.3.3.3.2 In-combination with other offshore wind farm projects

72. It is the Applicant's position that the predicted Project-alone lesser black-backed gull mortality is below the threshold that would make any measurable contribution to in-combination values. Nonetheless, in order to provide context to the assessment, an estimation of in-combination mortality has been presented within the RIAA. This estimated a total annual mortality for all relevant plans and projects of 36.82 birds.
73. Based on the Ribble and Alt Estuaries SPA breeding population of 4,638 birds, and a background mortality of 0.115 (1,032 birds per annum), an increase in mortality of 36.82 birds would increase background mortality by 6.90%. This exceeds the 1% threshold where a detectable effect on the SPA population could occur, and, therefore, it could be concluded that an in-combination adverse effect on site integrity is possible. However, such an effect is considered unlikely as evidence from tracking studies suggested that birds from the SPA are unlikely to regularly occur at the windfarm site, and,

therefore, the apportioned Project-alone and in-combination collision values are likely to be a significant overestimate.

74. It should be noted that the Project contribution to the in-combination total is very small (i.e., below one bird/0.1% increase in background mortality), and below the threshold that would be detectable against natural variation. For the reasons set out above, the Project contribution is considered to be a significant overestimate (i.e., precautionary), but even at this level represents only 1.9% of all predicted collisions apportioned to the SPA.

4.3.4 Relevant design parameters

75. The Project's design parameters that are of relevance to the impacts outlined above, and considered in the assessment of alternatives, are detailed in **Table 4.3**. The worst-case scenario, reflecting the fact the design envelope encompasses a number of WTGs sizes (up to 30 larger WTGs or up to 35 smaller WTGs), used in collision modelling is detailed in **Chapter 12 Ornithology** of the Environmental Statement (ES) (Document Reference 5.1.12). This reflects the largest number of smaller WTGs.

Table 4.3 Design parameters for WTGs relevant to collision risk

Parameter	Value
Collision risk parameters	
Number of WTGs	35
Rotor diameter (m)	260
Total rotor swept area for Project site (km ²)	1.86
Rotor clearance (air gap) above sea level (m above HAT ⁷)	25 ⁸

76. Changes (i.e. alternatives) to these parameters are considered in **Section 4.5** and **Section 4.6**. Any other element of the Project design parameters would have no bearing on collision risk for these features and cannot be alternative solutions.

⁷ Highest Astronomical Tide

⁸ Equivalent to 34.56m above Lowest Astronomical Tide; 26.07m above Mean High Water Springs; 29.82m above mean sea level (MSL).

4.4 Step 3: Long List of Alternative Solutions

4.4.1 Do Nothing Scenario

77. While the Defra (2021a) compensatory measures guidance advised that the "do nothing" option should be considered, it acknowledges this would rarely be a true alternative:

"It is unlikely in most cases that the 'do nothing' option (i.e. no proposed activity) would be an acceptable alternative, as it would not deliver the same overall objective as 'the activity'. However, it is useful to provide a comparison for other alternatives and to act as a baseline against which public benefits can be assessed. Where it is most likely to be an option is where no or limited tangible public benefit can be demonstrated."

78. The "do nothing" option is also considered and ruled out in the Round 4 plan-level HRA (TCE, 2022):

"The do nothing alternative solution would fail to meet the objectives of the Round 4 Plan and would erode the ability of the UK Government to meet its 50GW by 2030 target, achieve its ambition that over half our renewable generation capacity will be from wind by 2030 and decarbonise power generation and reduce greenhouse gas emissions by 78% by 2035."

79. The "do nothing" scenario would not enable the Project to contribute to the range of Government legislation and policy which promotes the importance of developing offshore windfarms. There remain significant challenges in achieving the 50GW target by 2030 and Net Zero by 2050.
80. Of particular note is the opportunity for Round 4 projects to deliver at least 8GW of offshore wind power in England and Wales and to contribute to the target of 50GW by 2030 and of Net Zero emissions by 2050. **Table 4.4** shows there was, at the time of writing, c. 14GW of operational offshore windfarms in the UK and c. 7GW in construction (UK Government Renewable Energy Planning Database (REPD), 2024). The Policy requirement in the 2011 NPS EN-1 to increase generation capacity in general, and from renewables and low carbon sources in particular, in order to reduce carbon emissions, is far from having been achieved. The 2011 NPS EN-1 set a minimum target for renewables generation to rise to 39GW by 2025, from 6GW in 2009. In fact, generation capacity had increased to only 24GW by 2022 (DESNZ 2023e), such that achievement of 39GW of generating capacity from renewables by 2025 was almost certainly unachievable by the time of designation of the new NPS EN-1 in 2024.
81. Offshore wind generation capacity increased from 1.45GW in 2011, to 13.33GW in 2022. NPS EN-1 (DESNZ, 2023a) states that the ambition for the UK to achieve 50GW of offshore wind generation by 2030 will not be met on

these rates of deployment. Even with capacity increases in 2023-24, subsequent increases in the rate of deployment will need to follow an exponentially upward curve of significant steepness if the 50GW target is to be achieved. Such rates of deployment, necessary to meet the NPS EN-1 electricity demand scenario and offshore wind ambition, would mean the maximum number of projects would need to be consented, including this Project.

82. It is also noted that in establishing the urgent need for offshore wind, the NPSs do not impose a cap, for example paragraph 3.2.4 of NPS EN-1 states: *“It is not the government’s intention in presenting any of the figures or targets in this NPS to propose limits on any new infrastructure that can be consented in accordance with the energy NPSs.”* Specifically in relation to a derogation case, NPS EN-1 explains that the starting point for SoS decision making is that energy security and decarbonising the power sector to combat climate change: *“requires a significant number of deliverable locations for CNP Infrastructure and for each location to maximise its capacity. This NPS imposes no limit on the number of CNP infrastructure projects that may be consented. Therefore, the fact that there are other potential plans or projects deliverable in different locations to meet the need for CNP Infrastructure is unlikely to be treated as an alternative solution.”*

Table 4.4 Status of UK offshore windfarms

Project Status	Number of Projects	Capacity (GW)
Operational	47	14.679
Under construction	7	7.742

Source: UK REPD 2024

83. Given the need for the Project, as set out in **Section 4.2.1** and expanded in the IROPI case (**Section 5**), the alternative of not developing an offshore windfarm would clearly not satisfy the Project objectives or NPS EN-1. The “do nothing” scenario is, therefore, not considered further.

4.4.2 Alternative offshore wind farm locations

84. As set out above, in accordance with NPS EN-1, decarbonising the power sector by 2035 requires a significant number of deliverable locations for CNP infrastructure and for each location to maximise its capacity: *“the fact that there are other potential plans or projects deliverable in different locations to meet the need for CNP Infrastructure is unlikely to be treated as an alternative solution”* (DESNZ, 2023a).
85. 2024 DEFRA consultation on policies to inform updated guidance for MPA assessments reiterated the EN-1 statement that meeting Net Zero and

delivering energy security is considered to “*require a significant number of deliverable locations for CNP infrastructure and for each location to maximise its capacity*”. It states that the SoS will therefore start from the position that the fact that there are other potential plans or projects deliverable in different locations to meet the need for CNP infrastructure, or existence of another way of developing the proposed plan or project which results in a significantly lower generation capacity, is unlikely to meet the objectives and therefore be treated as an alternative solution.

86. The development of offshore wind farms in the UK is constrained by the requirement to secure an AfL from TCE. This process is undertaken through prescribed leasing rounds in line with Marine Plans and informed by Strategic Environmental Assessment and plan-level HRA.
87. The Project was one of six projects selected by TCE in its Offshore Wind Leasing Round 4 in 2021. Subsequently, The Crown Estate undertook a plan level HRA which determined the Project would be awarded an AfL.
88. Key criteria were set by TCE’s Round 4 process which influenced the site selection process of the Project. Areas of seabed that were offered by TCE were stated as the least constrained (most technically favourable) areas for offshore wind development following extensive spatial analysis and stakeholder engagement.
89. **Chapter 4 Site Selection and Assessment of Alternatives** of the ES (Document Reference 5.1.4) describes the process that led to the identification of the Project location and the Round 4 process.
90. As described in **Paragraph 42**, the Project is defined as a CNP, of which multiple locations are needed. Further, given the constraints of the leasing process and constraints associated with the ability to safely co-exist with existing sea users, there are no feasible alternative locations that meet the Project objectives and satisfy NPS EN-1.

4.4.3 Alternative scale

91. In accordance with the approach outlined in **Section 4.1**, an assessment of alternative scale/size of development is considered in relation to deployment of fewer WTGs to reduce collision risk (**Section 4.3**), and smaller or alternative windfarm site areas to increase distance from the Morecambe Bay and Duddon Estuary SPA and the Ribble and Alt Estuaries SPA.
92. Given the clarification in the new NPS EN-1 (DESNZ, 2023a) and as described in **Paragraph 43**, a reduction in capacity is not considered as an alternative which meets the Project’s objectives. The maximum number of projects will be required to achieve Net Zero and the 50GW by 2030 target.

93. Following stakeholder feedback, the Project windfarm site array area has been significantly reduced during the pre-application stage from 125km² to 87km² to help facilitate co-existence with other marine users.
94. Due to the reduction in the array area discussed above, the maximum number of WTGs has also reduced during the pre-application process, from 40 to 35 of the smallest WTGs in the design envelope (or 30 of the largest WTGs).
95. Any further reduction in scale would not meet the Project objectives. The alternative scale scenario is therefore not considered further.

4.4.4 Alternative design

96. In accordance with the approach outlined in **Section 4.1**, an assessment of alternative design options in relation to the relevant design parameters outlined in **Section 4.3.4** is provided in the following sections. Alternative design options include:
 - Smaller WTG rotors to reduce collision risk (**Section 4.4.4.1**)
 - Increased air gap to reduce collision risk (**Section 4.4.4.2**)

4.4.4.1 Smaller rotors

97. Smaller rotors for the same number of WTGs may result in a lower capacity Project, which would limit the ability of the Project to contribute to Net Zero by 2050 targets and would hinder the wider need to deploy offshore wind generation at scale (50GW) before 2030.
98. Smaller rotors to achieve the same offshore windfarm capacity may require a greater number of WTGs, which would increase the magnitude of potential effects on ornithology receptors and would potentially require an increased windfarm site area. This alternative design scenario would not meet the Project objectives and is therefore not considered further.

4.4.4.2 Increased air gap

99. An increased minimum clearance between the rotor blades and sea surface (i.e., air gap) could potentially achieve the Project objectives, whilst having a lesser effect on lesser black-backed gull collision risk. The feasibility of this alternative solution is discussed in **Section 4.5.1**.

4.4.5 Alternative method

100. As the effects of relevance to this 'without prejudice' derogation case relate to the operation of the offshore windfarm, no alternative methods are available beyond the scale, design and timing options considered in the preceding and following sections.

4.4.6 Alternative timing

101. In accordance with the approach outlined in **Section 4.1**, alternative timing options are considered.
102. Since collision effects on breeding lesser black-backed gull have been identified, any operational timing restrictions would have a lesser effect. However, reducing the timing of the operation of the WTGs e.g., through seasonal restrictions, and/or reducing the operational life, would limit the ability of the Project to generate and export low carbon electricity to the National Grid. This alternative solution would, therefore, not satisfy the Project objectives (**Section 4.2.2**) and national targets and policy as directed in NPS EN-1 and is not considered further.

4.5 Step 4: Feasibility of alternative solutions

103. The following sections outline the feasibility of the alternative solutions identified in Step 3.

4.5.1 Increased air gap

104. The minimum clearance between the rotor blades and sea surface (i.e., air gap) included in the Project design envelope is 25m above Highest Astronomical Tide (HAT). In specific response to consultation feedback from Natural England, this has been increased from 22m above HAT (as presented in the Preliminary Environmental Information Report (PEIR)). Increasing the air gap avoids peak bird densities at lower heights and thus reduces potential collision risk impacts for all key ornithological species (i.e., those screened into collision risk modelling).
105. A review of the air gap has been undertaken to determine the consequences of increasing beyond 25m above HAT. Feasibility and delivery have been assessed, based on the resulting hub heights, foundation and WTG dimensions as well as installation requirements.
106. Whilst an air gap of above 25m to HAT is found to be feasible in theory, doing so introduces a number of substantial risks associated with the ability of delivering the Project objectives.
107. By increasing the air gap above 25m HAT, loads on the foundation structure are increased which leads to an increase in the size and weight of the foundation structure. This risks the feasibility of the most likely foundation type (monopile) in terms of the ability to fabricate and install. Current estimates of monopile diameter and weight are at the limits of industry capability in these areas. An increase in monopile size would significantly reduce the available contractors for fabrication and installation. Further, should the size and weight

exceed current installation capability, the Project becomes reliant on development in this field for installation.

108. Should a monopile solution prove unfeasible for the site as a result of the increased loads due to an increased air gap, this would result in a change in foundation type to one of the alternatives set out in **Chapter 5 Project Description** (Document Reference 5.1.5) (e.g., jacket).
109. An increase in air gap would also narrow the range of WTG installation vessels able to install at the required hub height. At the current 25m air gap, the Project is reliant on a very limited number of vessels with an increase further limiting the pool of suitable vessels. Many suitable vessels are under construction and competition for these vessels is extremely challenging. By increasing the air gap thus reducing the number of suitable vessels, the risk of not delivering the Project on the Project time frame as a result of the Project being unable to secure a suitable vessel for the required installation date is increased. Further, considering many of the vessels are yet to enter service, the risk of non-delivery of these vessels increases the risk of delivering the Project on current time frames, thus risking the Project objectives.
110. In summary, an increase in air gap beyond 25m HAT increases risks relating to deliverability on current time frames. These relate to an increase in foundation size and weight, availability of suitable vessels and potential to drive a change in foundation type. The proposed air gap of 25m HAT is considered to be achievable while maintaining the ability to maintain Project time frames and objectives.
111. Further, given that annual mortality of adult lesser black-backed gulls apportioned to Morecambe and Duddon Estuary SPA and Ribble and Alt Estuaries SPA would be less than one bird in respect of each SPA (0.33 and 0.69 birds respectively, increasing the air gap and reducing the extent of collision would not result in an appreciable reduction in the number of lesser black-backed gull collisions and would therefore not be an effective measure. A review of the effectiveness of further increase in air gap in reducing effects on lesser black-backed gulls from the respective SPAs is presented in Offshore Ornithology Technical Note 2 (HRA) Rev02 (Offshore Ornithology Technical Note 2 (HRA)_Rev 02 Clean (Document Reference 9.23)). This confirms that this would only result in a negligible reduction in collision risk to lesser black-backed gull (i.e., a fraction of a bird per annum), would be undetectable at a population level, and hence make no measurable difference to the assessment outcome. Natural England confirmed in its submission at Deadline 2 (REP2-037) that it agreed with the conclusions of this review, and stated *‘We accept that the Applicant has sufficiently demonstrated that this mitigation measure is unlikely to affect the outcome of the assessment, nor lead to a material improvement in terms of the Project’s impact on the lesser*

black-backed gull feature of Morecambe Bay and Duddon Estuary SPA and Ribble and Alt Estuary SPA.'

112. For all the above reasons (the impact on timescale and deliverability of the Project, without an appreciable reduction in ornithological effects), increasing the air gap beyond 25m above HAT is not a feasible alternative solution consistent with the Project objectives.

4.6 Step 5: Assessment of effects of feasible alternative solutions

113. Step 5 is not applicable, as there are no feasible alternative solutions.

4.7 Assessment of alternative solutions conclusion

114. The information presented in this document demonstrates the robust assessment of alternative solutions that has been undertaken by the Applicant. The assessment followed available guidance and included a 'do nothing scenario', and alternative locations, scale, design, methodology and timing.
115. No feasible alternative solutions, which could host comparable scale offshore windfarms consistent with the Project objectives to meet the established needs, were identified. This conclusion aligns with TCE's Round 4 Plan Level HRA (TCE, 2022) assessment of alternatives.

5 Imperative Reasons of Overriding Public Interest

5.1 Introduction

116. In order to define the IROPI case for a plan or project, Defra *et al.* (2021) provided the following definitions:
- “Imperative - it’s essential that it proceeds for public interest reasons
 - In the public interest - it has benefits for the public, not just benefits for private interests
 - Overriding - the public interest outweighs the harm, or risk of harm, to the integrity of the European site that’s predicted by the appropriate assessment”
117. Furthermore, BEIS (2020a) summarised the key principles (as set out in guidance) in defining the IROPI case for the Hornsea Project Three:
- Imperative: Urgency and importance: There would usually be urgency to the objective(s) and it must be considered “indispensable” or “essential” (i.e. imperative). In practical terms, this can be evidenced where the objective falls within a framework for one or more of the following:
 - Actions or policies aiming to protect fundamental values for citizens’ life (health, safety, environment)
 - Fundamental policies for the State and the Society
 - Activities of an economic or social nature, fulfilling specific obligations of public service
 - Public interest: The interest must be a public rather than a solely private interest (although a private interest can coincide with delivery of a public objective)
 - Long-term: The interest would generally be long-term; short-term interests are unlikely to be regarded as overriding because the conservation objectives of the Habitats and Birds Directives are long-term interests
 - Overriding: The public interest of development must be greater than the public interest of conservation of the relevant habitats site(s)
118. It should be noted that, as stipulated by the Habitats Regulations (Regulation 64) and Marine Habitats Regulations (Regulation 29), where no priority habitats and species are present, the IROPI case needs only to consider reasons of a socio-economic nature. Given that priority habitats or species are

listed under Article 1(d) and Article 1(h) of the Habitats Directive, and not the Birds Directive, these are not relevant to the Morecambe Bay and Duddon Estuary SPA and the Ribble and Alt Estuaries SPA.

5.2 Imperative

119. As discussed in **Section 4.2.1** and **4.4.1**, there is an urgent need to establish a secure, diverse, affordable and resilient energy supply and to also meet decarbonisation targets. This provides a clear and urgent need for the development of the Project, to help meet the UK Government commitment to Net Zero by 2050 and 50GW of offshore wind by 2030. The Project would provide around 480MW of renewable energy capacity. The Project would make a substantial contribution to the achievement of national renewable energy targets towards Net Zero and to the UK's contribution to global efforts to reduce the effects of climate change, which are fundamental and priority policies for the state and the society of the UK.

5.3 Public interest

120. The following sections outline the essential public benefits of the Project in line with the Project's objectives.

5.3.1 Climate change benefits - Decarbonisation (Project objective 1)

121. UNEP Copenhagen Climate Centre (UNEP-CCC) (2021) claimed that a global temperature increase of around 2.7°C by 2050 is expected. DECC (2011) predicted that a continuation of global emission trends could lead average global temperatures to rise by up to 6°C by the end of this century. The potential impacts associated with such a global temperature rise include impacts on human health and safety.
122. BEIS (2019) outlined the following potential health risks resulting from climate change:
- Existing health problems become worse as temperatures increase
 - Malnutrition could become more widespread as crop yields are affected by increased drought conditions, or exacerbated precipitation, in some regions, leading to reduced food production
 - Warmer temperatures could increase the range over which disease-carrying insects are able to survive and thrive
 - Vulnerable people will be at risk of increased heat exposure and the number of deaths due to temperature extremes is expected to increase in the future (although in the long-term there will likely be fewer health problems related to cold temperatures)

- Decreasing food production, an increase in health issues associated with climate change, and more extreme weather, will slow economic growth, making it increasingly difficult to reduce poverty
123. The World Meteorological Organization (WMO) reported that between 2001 and 2010 extreme weather events caused more than 370,000 deaths worldwide (including a large increase in heatwave deaths from 6,000 to 136,000) – 20% higher than the previous decade (BEIS, 2019).
124. In the UK, floods and droughts have had significant health impacts, including fatalities in recent years. In addition, health impacts, as a result of climate change, are likely to be more far-reaching than the immediate dangers of flooding. Climate change effects, such as flooding, have potential to impact on mental health and provide other indirect impacts, as a result of disruption to critical supplies of utilities, such as electricity and water (Health Protection Agency, 2012).
125. The UK Committee on Climate Change (CCC) (2017) reported that (at that time) 2016 was the hottest year on record. There have been six occasions in the 21st century that a new record high annual temperature had been set (2016 along with 2005, 2010, 2014, 2015 and 2022) (National Oceanographic and Atmospheric Administration (NOAA), 2023). At the time, 2019 was the second hottest year globally since records began in 1880 (Copernicus Climate Change service, 2020) and 2020 was tied with 2016 as the hottest year on record, globally (National Aeronautics and Space Administration (NASA), 2021). In 2024 NOAA recorded 2023 as the highest global temperature among all years in NOAA climate record (1850-2023). Other scientific organisations, including NASA and the Met office, have conducted separate analyses and also ranked 2023 as the warmest on record and NOAA have predicted a one-in-three chance that 2024 will be warmer than 2023, and a 99% chance that 2024 will rank among the top five warmest years.
126. Increasing global temperatures are predicted to increase frequency of extreme weather events, such as floods and droughts, and result in reduced food supplies.
127. The frequency and extent of extreme weather events have been increasing in the UK and globally, with heat waves becoming more frequent and longer lasting, as well as an increase in intense, heavy rainfall, causing flood events.
128. Should global temperatures rise by 2°C above the pre-industrial average, the UK could see a 30% decrease in river flows during 'dry' periods and a 5% to 20% increase in river flows during 'wet' periods. In addition, between 700 and 1,000 more heat-related deaths have been predicted per year in South-East England alone (BEIS, 2019).

129. Climate change has also been greatly affecting coastal areas in the UK in recent years.
130. Increased temperatures, changes to rainfall patterns, increased prevalence of agricultural pests and an increased risk of extreme weather events are also predicted to reduce the production of major food crops. This would result in an increasing gap between food demand and supply. Since trade networks have become increasingly global, the effects of extreme weather events in one part of the world will affect food supply in another. For example, floods or droughts that damage crops in Eastern Europe, or the US, can directly affect the cost and availability of food in the UK (BEIS, 2019).
131. Generating and harnessing energy from low carbon, renewable sources, such as offshore wind, is one of the solutions available to substantially reduce carbon emissions and, thereby, mitigate predicted climate change impacts. The Project would make a significant contribution both to the achievement of UK decarbonisation targets and to global commitments to mitigating climate change.
132. The switch to renewable sources of energy also has both air quality and associated human health and safety benefits. A recent study has demonstrated the huge beneficial impacts on human health from decarbonisation, stating that *“Our estimates suggest that overall around 3.5 million or so premature deaths from air pollution worldwide could be prevented annually from phasing out fossil fuels at today’s population. If all sources of air pollution from human activities could be eliminated, our estimates show that more than five million premature deaths from air pollution would be prevented annually.”* (London School of Hygiene and Tropical Medicine (LSHTM), 2019).
133. The Project will make a significant contribution to the achievement of both the national renewable energy targets and to the UK’s contribution to global efforts to reduce the effects of climate change. The Climate Change Act 2008 (2050 Target Amendment) Order 2019 set a UK target for at least a 100% reduction of GHG emissions (compared to 1990 levels) by 2050. This ambitious Net Zero target can only be met by the crucial contribution from the offshore wind industry.
134. The Project has a design life of approximately 35 years, after which it may be repowered (subject to the necessary approvals and in line with current legislation at that time). The Project would contribute to reaching national targets on CO₂ reduction of Net Zero GHG emissions by 2050, 50GW of offshore wind by 2030, and renewable energy production growth, with the potential to deliver around 480MW of clean, renewable energy, as also reflected in recent NPS designated under the Planning Act 2008.

5.3.2 Public electricity supply benefits – Security of supply and affordability (Project objective 2 and 3)

135. In addition to its contribution to offsetting carbon emissions, the Project has the potential to power over 500,000 UK homes per annum with clean, renewable and low cost electricity.
136. As discussed in **Section 1.1**, decarbonisation of the UK energy supply chain and increasing electricity demand could result in a significant deficit in UK electricity supply compared with demand and, therefore, there is a clear public benefit inherent in the creation of new electricity supply capacity, such as will be provided by the Project.
137. In order to help meet the targets described in the sections above, renewable energy needs to be affordable. The UK has a world leading offshore wind sector and is well placed to benefit from further investment in renewables innovation, to accelerate cost reduction. The UK Government, in partnership with the Research Councils and Innovate UK, expects to invest around £177 million to further reduce the cost of renewables, including innovation in offshore wind turbine blade technology and foundations.
138. Through offshore wind developer-led innovation there has been a significant reduction in the levelized cost of energy in recent years. The Clean Growth Strategy (BEIS, 2017) indicated that the costs of offshore wind have decreased significantly (50% fall between 2015 and 2022) which will help to alleviate fuel poverty (Offshore Renewable Energy (ORE) Catapult, 2017). The UK offshore wind industry achieved a ‘strike price’ (the minimum price developers will be paid for electricity) as low as £37.35/MWh in the Government’s Contracts for Difference (CfD) auction in 2022. That price was 6% lower than the third CfD auction in 2019 and 30% lower than the lowest strike price seen in the second CfD auction in 2017. However, the CfD auction in September 2023 did not attract any bids by offshore windfarm developers, indicating that the strike price of £44/MWh was set too low for developers to be confident in achieving a return on their investment following the significant cost increases being experienced by developers in late 2022 and throughout 2023. In November 2023, the UK Government announced an increase in the maximum price that projects can receive in the next CfD auction. For fixed-bottom projects the price increased by 66% for offshore wind projects, from £44/MWh to £73/MWh to address the rising supply chain costs which have been impacting upon the commercial viability of UK offshore wind projects.
139. In the Clean Growth Strategy (BEIS, 2017), the UK Government set out a plan to decarbonise all sectors of the UK economy through the 2020s including innovation in the power sector and renewables. Additionally, in March 2019 the UK offshore wind sector committed to an Offshore Wind Sector Deal (BEIS, 2020b) which reinforced the aims of the UK for clean growth. The UK

has a world leading offshore wind sector and is well placed to benefit from further investment in renewables innovation to accelerate cost reduction.

140. Despite current challenges, developers are continuing to drive relative cost reductions through technology development and new work processes. The Project will contribute to this process as it seeks to make use of the most effective new technology and to take advantage of potential cost efficiencies in the development process.
141. Unless renewable capacity is enhanced through the build out of projects, including the Project, it will not be possible for regulators or Government to pass on the public benefit of electricity generation cost reductions to consumers in the form of power price cuts to help them to manage the cost of living crisis. This affordability factor has been recognised in the recent Overarching Energy NPS. As set out in NPS EN-1 at paragraph 3.3.20 *“Wind and solar are the lowest cost ways of generating electricity, helping reduce costs and providing a clean and secure source of electricity supply (as they are not reliant on fuel for generation). Our analysis shows that a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar.”*
142. As identified above, the Project would be able to provide significant electricity generation capacity within the UK to support commitments for offshore wind generation and security of supply and maximise generation capacity at low cost to the consumer.

5.3.3 Socio-economic benefit – Coordination (Project objective 4)

143. The UK Clean Growth Strategy (BEIS, 2017) recognised that actions and investments will be needed to meet the Paris Agreement commitments and that the shift to clean growth will be at the forefront of policy and economic decisions made by governments and businesses in the coming decades. This creates enormous potential economic opportunity – an estimated \$13.5 trillion of public and private investment in the global energy sector alone will be required between 2015 and 2030, if the signatories to the Paris Agreement are to meet their national targets (BEIS, 2017).
144. In 2017, ORE Catapult undertook analysis of the UK offshore wind supply chain and estimated the current and future potential UK content of offshore wind projects as: 32% in 2017; 50% by 2020; and 65% by 2030. In the UK, the Gross Value Added (GVA) to the UK per GW installed, assuming 32% UK content, has been estimated as £1.8bn and is projected to increase to £2.9bn by 2030 – if 65% UK content can be achieved (assuming that 19GW installed capacity is reached) (ORE Catapult, 2017). It is estimated that the total (domestic and export) market for UK-provided offshore wind could exceed

£10.5bn by 2050 and reach £4.9bn annually by 2030 and £8.9bn by 2050 (under a high scenario) (ORE Catapult, 2018).

145. According to RenewableUK's Offshore Wind Industry Investment in the UK report (RenewableUK, 2017), 48% of the total expenditure associated with UK offshore windfarms was spent in the UK in 2015. The UK content of expenditure during the development stage and operation of offshore wind projects was 73% and 75% respectively in 2015, whereas during manufacturing and construction the UK content was 29% (RenewableUK, 2017).
146. The UK is positioned to continue growth in the offshore wind sector by maximising domestic energy resources and utilising the vast offshore wind resource available domestically for electricity generation. The importance of coordination with other marine users is set out in the Overarching Energy NPS EN-1 in line with the need for the expanding number of offshore wind projects to meet Net Zero targets. The UK also has a strong supply chain that continues to expand to support the growth in offshore wind.
147. The Green Paper: Building our Industrial Strategy (His Majesty's (HM) Government, 2017) focused on delivering affordable energy and green growth in the UK. A key commitment within the Green Paper was for the UK to become a leader in delivering clean energy technology and to support innovation in renewable energy. The aim was for:

"the UK to be a global leader in innovation, science and research and our Industrial Strategy will help us to deliver our ambitious CO₂ reduction targets while, creating jobs and opportunities for people across the country".
148. The energy sector in the UK plays a central role in the economy. Renewable energy can play a major part in boosting the economy and providing new jobs and skills. The British Energy Security Strategy (BEIS, 2022d) also sets out how Britain will accelerate homegrown power for greater energy independence.
149. The offshore wind industry in the UK provides important employment opportunities. The importance of maximising opportunities for the involvement of local businesses and communities in offshore wind has been highlighted as a key success factor for the wind energy sector in the UK (TCE, 2014). Low carbon businesses and their supply chain have created over 430,000 skilled jobs in the UK with 7,200 jobs directly in offshore wind (BEIS, 2020b).
150. RenewableUK (2017) stated: *"Offshore wind has become a key part of the UK economy, creating much needed jobs not only in coastal communities like Hull, Grimsby and Great Yarmouth, but also across the country in the ever-expanding supply chain. A huge number of British companies are heavily involved in building the UK's world-leading offshore wind sector".*

151. The UK Government's Industrial Strategy (HM Government, 2017) set out a plan to transform offshore wind generation, making it an integral part of a low-cost, low-carbon, flexible grid system and boosts the productivity and competitiveness of the UK supply chain. These are to be realised through an industry investment into the Offshore Wind Growth Partnership of up to £250m to support better, high-paying jobs right across the UK (BEIS, 2020b).
152. The Offshore Wind Sector Deal builds on the UK's global leadership in offshore wind, maximising the advantages for UK industry from the global shift to clean growth (BEIS, 2020b). The UK Government Ten Point Plan supports the industry's target to achieve 60% UK content by 2030. The offshore wind commitments will enable the offshore wind sector to support up to 30,000 direct jobs and 30,000 indirect jobs in ports, factories and the supply chains by 2030.
153. In a letter to then Prime Minister Boris Johnson, the CCC stressed that, after the COVID-19 crisis, actions towards net-zero emissions, and to limit the damages from climate change, could help rebuild the UK with a stronger economy and increased resilience (CCC, 2020). The CCC has advised the UK Government that reducing GHG emissions and adapting to climate change should be integral to any recovery package.
154. The Project will provide a valuable contribution to employment. During the construction of the Project it is estimated a peak of around 1,300 jobs could be created in the UK. During the operation and maintenance phase it is expected that the Project could support 80 jobs in the local economic area and 140 jobs across the UK. The Project would also contribute to the development of the supply chain and skilled workforce and their associated economic benefits. The indirect effects from employment and expenditure, such as from the workforce, would contribute to the local economy.
155. There would also be significant expenditure in manufacturing, services, materials and equipment. The Project has an estimated overall construction cost of £1.3 billion (2023-pricing). Operation and Maintenance amounts to around £19 million per annum, or £665 million over 35 years. In total, the GVA of the Project over the Project lifetime (35 years) is estimated make a large economic contribution at the national level (£259 million GVA across the UK) and £10 million GVA to the local economy. The Project would also support the development of the supply chain, a skilled workforce and provide employment.
156. Details of the anticipated expenditure and employment from the construction and operation of the Project (direct and indirect) are discussed further in **Chapter 20 Socio-economics, Tourism and Recreation** of the ES (Document Reference 5.1.20).

5.4 Long-term

157. Offshore wind has a critical role in delivering long-term, cost effective, UK based low carbon electricity, as well as contributing to minimising the long-term impacts of climate change. The Project will be capable of producing low cost, clean electricity generation for the National Grid throughout its 35-year operational life, therefore providing long-term benefits.

5.5 Overriding

158. The relevant public interests relating to the Project must be set against the weight of the conservation interest protected by the Habitats Regulations and the Marine Habitats Regulations, having regard to the nature and extent of the harm identified to the relevant European sites features. The effects that could be identified on the European sites features of concern were as follows:
- Lesser black-backed gull collision risk (**Section 4.3.2** and **Section 4.3.3**).
159. As shown in **Section 4.3.2** and **Section 4.3.3**, the Project would have a minimal impact through potential collision (less than one bird annually based on precautionary modelling), with climate change considered the strongest influence on seabird populations in coming years.
160. In weighing up the public interests delivered by the Project with these conservation interests, account needs to be taken of the fact that the benefits of the Project include conservation benefits for both lesser black-backed gull and other bird species within the National Site Network.
161. The Project contribution to reducing the effects of climate change would have ecological benefits which outweigh/override the effects outlined above, by contributing to a reduction in carbon emissions, a slowing of climate change and the securing of habitable environments over the longer term for a range of species within the National Site Network, including lesser black-backed gull. It is recognised that a number of seabird species in the UK have showed declining populations since the 1990s, and that climate change is likely to be one of the main causes of these declines (Burton *et al.*, 2023). Causes of such declines are likely to include changes in prey availability, temporal changes (e.g. through temporal shifts in prey availability relative to peak energy demands) and direct impacts through exposure to extreme weather conditions. Ground-nesting species (including lesser black-backed gull) are also at risk from increased flood risk at nesting sites (Burton *et al.*, 2023).
162. In relation to prey availability, whilst their flexibility in diet does not mean lesser black-backed gull are immune to the effects of climate change, it does make the species potentially more robust to change compared to species unable to display such prey flexibility. It is a surface feeding species, which has generally

fared worse than other seabirds capable of using the entire water column (Mitchell *et al.*, 2018), though it has great habitat flexibility, which enables it to utilise terrestrial food sources as well as more traditional marine feeding grounds. However, enforced shifts to lower quality food would still be likely to result in effects on breeding success, bird survival, and population size.

163. The Strategic Environmental Assessment North Sea Energy (SEANSE) project assessed the impact of climate change on key bird species (Rijkswaterstaat Zee & Delta, 2020) and concluded that changes in prey availability due to climate change is the current pressure which appears to have the largest impact on kittiwake and lesser black-backed gull at the wider North Sea level. This is likely to be responsible for a substantially greater effect than impacts resulting from any other activity (including collision risk). The recent EU funded SEANSE project assessed the impact of climate change on four key seabird species (Rijkswaterstaat Zee & Delta, 2020). For all seabirds it is largely expected that climate change impacts will become more severe in the future as both temperatures, and possibly the rate of increase, become greater, and extreme weather events become more frequent.
164. Whilst no comparable study has been undertaken for the Irish Sea, it is considered that similar pressures are likely to apply within this area given, for example, that both occupy a similar range of latitudes. This also reflects the findings of the review by Burton *et al.*, (2023). It is noted that, as the effects of climate change will impact seabird species throughout the UK, delivery of climate measures (including offshore wind) will be critical in protecting the resilience of the wider National Site Network.
165. The Environment Improvement Plan (HM Government, 2023) recognises the effects of climate change include an increase in pests, pathogens and invasive non-native species; and knock-on impacts on the ecosystems.
166. Global warming places many species at risk of loss of suitable habitat and/or prey, due to changing conditions. Species may shift their geographical ranges to areas where conditions remain suitable (e.g., marine species moving further north in the UK to cooler climates), however, depending on the extent of suitable habitats/prey, there may be increased competition.
167. The overriding nature of the public interests engaged in this case should be evident from the suite of legislation and policy documentation, which has been outlined in this document. The Project would deliver benefits relating to human health, public safety and beneficial consequences of primary importance for the environment. It is also clear, as set out earlier in this document, that without achieving the overriding objective of reducing carbon emissions, there is likely to be very significant species loss, including of wild birds and their prey.
168. It is recognised that IROPI should be considered against the risk to a designated feature(s), having regard to the nature and extent of the harm

identified to relevant European sites. In its contribution to reaching Net Zero, and the associated action against climate change, the Project will provide considerable long-term environment benefits, including benefits to the individual bird species within the SPAs.

169. Key drivers of seabird population size in western Europe are climate change (Sandvik *et al.*, 2012; Frederiksen *et al.*, 2004; Burthe *et al.*, 2014; Macdonald *et al.*, 2015; Furness, 2016; Joint Nature Conservation Committee (JNCC), 2016), and fisheries (Tasker *et al.*, 2000; Frederiksen *et al.*, 2004; Ratcliffe, 2004; Carroll *et al.*, 2017; Sydeman *et al.*, 2017). Pollutants (including oil, persistent organic pollutants, plastics), alien mammal predators at colonies, disease, and loss of nesting habitat also impact on seabird populations but are generally much less important and often more localised factors (Ratcliffe, 2004; Votier *et al.*, 2005, 2008; JNCC, 2016).
170. Trends in seabird numbers in breeding populations are better known, and better understood, than trends in numbers at sea within particular areas. Breeding numbers (including lesser black-backed gull) are regularly monitored at many colonies (JNCC, 2016; 2024), and in the British Isles there have been three comprehensive censuses of breeding seabirds in 1969-70, 1985-88 and 1998-2002 (Mitchell *et al.*, 2004), and a fourth census completed in 2022 (JNCC, 2022); as well as single-species surveys (such as the decadal counts of breeding gannet numbers, Murray *et al.*, 2015).
171. Breeding numbers of many seabird species in the British Isles have been declining (Foster and Marrs, 2012; Macdonald *et al.*, 2015; JNCC, 2016). In the context of these ongoing declines, the emergence of avian influenza in UK breeding seabird populations in 2022 has been a key concern. It is too early to quantify effects on populations and monitoring activities at some seabird colonies have been suspended, to reduce risks of spreading avian flu.
172. Nevertheless, climate change is likely to still be the strongest influence on seabird populations in coming years and decades, with anticipated deterioration in conditions for breeding and survival for most species of seabirds (Burthe *et al.*, 2014; Macdonald *et al.*, 2015; Capuzzo *et al.*, 2018) and, therefore, further population declines are anticipated. It is, therefore, highly likely that without interventions being made, breeding numbers of most of our seabird species will continue to decline under a scenario with continuing climate change, due to increasing levels of GHGs.
173. In considering the overriding nature of climate change effects compared with the effects of the Project, the following key points should be borne in mind:
 - The scale of the impacts predicted from the Project are minimal and the impact prediction is highly precautionary

- The overriding ecological benefits of the Project's contribution to tackling climate change are enhanced by the public benefits described in **Section 5.3** to provide clear overriding benefits of the Project.

5.6 Imperative Reasons of Overriding Public Interest Summary

174. The environmental and social benefits to the UK from increasing the generation of low carbon energy are clear, with the Project providing an important contribution. The Project contributes to the UK's legally binding climate change targets by helping to decarbonise the UK's energy supply, whilst contributing to the essential tasks of ensuring security of supply and providing low-cost energy for consumers, in line with the UK Government's national policies.
175. The Applicant considers that there is a demonstrable overriding public interest in delivering the Project, and the policy objectives it would serve, which outweighs the minimal risk (and minimal contribution made by the Project) of adverse effects (if any) on the lesser black-backed gull feature of the Morecambe Bay and Duddon Estuary SPA (**Section 4.3.2.3**) and the lesser black-backed gull feature of the Ribble and Alt Estuaries SPA (**Section 4.3.3.3**). If the SoS concludes that an adverse effect on integrity of these sites cannot be ruled out, there is a demonstrable overriding public interest in delivering the Project, and the policy objectives they would serve, that is considered to override the potential conservation interests at risk.

6 Compensatory measures

176. This document contains, within its appendices and annexes, the following suite of compensatory measures documents:
- **Appendix 1:** Compensatory Measures Overview
 - Annex 1A: Initial Review of Compensatory Measures and Ecological Evidence for Lesser Black-backed Gull
 - **Appendix 2:** Lesser Black-Backed Gull Compensation Documents
 - Annex 2A: Site Selection for Compensatory Measures for Lesser Black-Backed Gull
 - Annex 2B: Evidence Plan and Roadmap for Lesser Black-Backed Gull
 - **Appendix 3:** Letter of Support from Kenneth Allsop Memorial Trust
177. The Applicant has also prepared an Outline Compensation Implementation and Monitoring Plan (CIMP) (Document Reference 4.11.1) which sets out the information that would be provided within the CIMP post-consent, in the event that compensation is required for lesser black-backed gull as part of the DCO.
178. The Applicant is confident that the Project will be commercially viable in the event that the compensation requirements, as outlined in the documents above, are required to be delivered. The SoS can be satisfied that the financial viability of the Project will not be compromised by the delivery of the potential compensatory measures proposed by the Applicant.

7 Conclusions

179. The evidence presented in this document clearly demonstrates that there are no alternative solutions (**Section 4**) which could deliver the Project objectives (**Section 4.2.2**), in accordance with the need for the Project (**Section 4.2.1**).
180. In addition, there is a clear case for IROPI, underpinned by international and national policy and legislation, as outlined in **Section 5**.
181. **Appendices 1 to 3**, which are listed in **Section 6**, describe the proposed compensatory measures which would be deliverable and could be secured for lesser black-backed gull (should compensation be required).

8 References

Burthe, S.J., Wanless, S., Newell, M.A., Butler, A. and Daunt, F. (2014). Assessing the vulnerability of the marine bird community in the western North Sea to climate change and other anthropogenic impacts. *Marine Ecology Progress Series*, 507, 277-295 [Accessed 01/02/2024].

Burton, N.H.K., Daunt, F., Kober, K., Humphreys, E.M. and Frost, T.M. (2023) *Impacts of Climate Change on Seabirds and Waterbirds in the UK and Ireland*. MCCIP Science Review 2023, 26pp.

British Trust for Ornithology (2022). Tackling the challenge of avian influenza. Available at: <https://www.bto.org/community/blog/tackling-challenge-avian-influenza>. [Accessed 06/06/2023].

Capuzzo, E., Lynam, C.P., Barry, J., Stephens, D., Forster, R.M., Greenwood, N., McQuatters-Gollop, A., Silva, T., Van Leeuwen, S.M. and Engelhard, G.H. (2018). A decline in primary production in the North Sea over 25 years, associated with reductions in zooplankton abundance and fish stock recruitment. *Global Change Biology*, 24, E352-E364.

Carroll M. J., Butler A., Owen E., Ewing S. R., Cole T., Green J. A., Soanes L. M., Arnould J. P. Y., Newton S. F., Baer J., Daunt F., Wanless S., Newell M. A., Robertson G. S., Mavor R. A. and Bolton M. (2015). Effects of sea temperature and stratification changes on seabird breeding success. *Climate Research* Vol. 66, No. 1 (October 6 2015), pp. 75-89 (15 pages).

Carroll, M.J., Bolton, M., Owen, E., Anderson, G.Q.A., Mackley, E.K., Dunn, E.K. and Furness, R.W. (2017). Kittiwake breeding success in the southern North Sea correlates with prior sandeel fishing mortality. *Aquatic Conservation – Marine and Freshwater Ecosystems*, 27, 1164-1175.D.

CCC (2015). *The Firth Carbon Budget. The next step to a low-carbon economy*. November 2015.

CCC (2017). *Reducing emissions and preparing for climate change: 2017 Report to Parliament Summary and recommendations*. June 2017. Available at: <https://www.theccc.org.uk/wp-content/uploads/2017/06/Reducing-emissions-and-preparing-for-climate-change-2017-Report-to-Parliament-Summary-and-recommendations.pdf> [Accessed 16/07/2023].

CCC (2019). *Net Zero – The UK's contribution to stopping global warming*. Available at: <https://www.theccc.org.uk/wp-content/uploads/2019/05/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf> [Accessed 19/04/2024].

CCC (2020). *Building a resilient recovery from the COVID-19 crisis*. Available at: <https://www.theccc.org.uk/wp-content/uploads/2020/05/CCC-to-Prime-Minister-Boris-Johnson-Covid-19-recovery-002.pdf>. [Accessed 17/12/2023].

CCC (2021a). Conference of the Parties (COP)26: Key outcomes and next steps for the UK. Available at: <https://www.theccc.org.uk/wp-content/uploads/2021/12/COP26-Key-outcomes-and-next-steps-for-the-UK-Final.pdf> [Accessed 09/06/2023].

CCC (2021b). Progress in adapting to climate change; 2021 Report to Parliament. Available at: <https://www.theccc.org.uk/wp-content/uploads/2021/06/Progress-in-adapting-to-climate-change-2021-Report-to-Parliament.pdf> [Accessed 28/09/2023].

Copernicus Climate Change Service (2020). Copernicus: 2019 was the second warmest year and the last five years were the warmest on record. Available at: <https://climate.copernicus.eu/copernicus-2019-was-second-warmest-year-and-last-five-years-were-warmest-record> [Accessed 16/07/2023].

Department for Business, Energy & Industrial Strategy (BEIS) (2017). The Clean Growth Strategy Leading the way to a low carbon future. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700496/clean-growth-strategy-correction-april-2018.pdf [19/01/2024].

BEIS (2019). Climate Change Explained. Available at: <https://www.gov.uk/guidance/climate-change-explained> [Accessed 16/07/2023].

BEIS (2020a). Hornsea Three Offshore Windfarm HRA. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-003267-EN010080%20Hornsea%20Three%20-%20Habitats%20Regulations%20Assessment.pdf> [06/11/2023].

BEIS (2020b). Offshore Wind Sector Deal Policy Paper. Available at: <https://www.gov.uk/government/publications/offshore-wind-sector-deal/offshore-wind-sector-deal> [28/11/2023].

BEIS (2020c). The UK's Integrated National Energy and Climate Plan. [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/991649/uk-integrated-national-energy-climate-plan-necp-31-january-2020.pdf. [Accessed 29/09/2023].

BEIS (2020d). MODELLING 2050: Electricity System Analysis. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/943714/Modelling-2050-Electricity-System-Analysis.pdf [Accessed 20/04/2024].

BEIS (2021a). Norfolk Boreas Offshore Wind Farm Habitats Regulation Assessment. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-002919-NORB-Habitats-Regulations-Assessment.pdf> [Accessed 02/03/2024].

BEIS (2021b). Press release dated 20th April 2021: UK enshrines new target in law to slash emissions by 78% by 2035. Available at:

<https://www.gov.uk/government/news/uk-enshrines-new-target-in-law-to-slash-emissions-by-78-by-2035> [Accessed 02/09/2024].

BEIS (2022a). East Anglia ONE North Habitats Regulations Assessment. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010077/EN010077-009803-EA1N%20-%20Habitats%20Regulations%20Assessment.pdf> [Accessed 21/03/2024].

BEIS (2022b). East Anglia TWO Habitats Regulations Assessment. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010078/EN010078-010066-EA2%20-%20Habitats%20Regulations%20Assessment.pdf> [Accessed 12/11/2023].

BEIS (2022c). Norfolk Vanguard Offshore Wind Farm Habitats Regulations Assessment. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-004461-NORV-Habitats-Regulations-Assessment-FINAL.pdf> [Accessed 20/03/2024].

BEIS (2022d). British Energy Security Strategy. Available at: <https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy> [Accessed 02/10/2023].

DECC (2010). Updated Energy and Emissions Projections June 2010. Available at: <https://webarchive.nationalarchives.gov.uk/ukgwa/20130103050237/http://www.decc.gov.uk/media/viewfile.ashx?filetype=4%26filepath=Statistics/Projections/67-updated-emissions-projections-june-2010.pdf> [Accessed 19/03/2024].

DECC (2014). Rampion Offshore Wind Farm and connection works Examining Authority's Report of Findings and Conclusions and Recommendation to the Secretary of State for Energy and Climate Change. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010032/EN010032-001704-Rampion%20Recommendation%20Report.pdf> [Access on 28/02/2024]

DESNZ (2023a) Draft Overarching National Policy Statement for Energy (EN-1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147380/NPS_EN-1.pdf [Accessed 20/11/2023]

DESNZ (2023b). Draft National Policy Statement for Renewable Energy Infrastructure (EN 3) Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1147382/NPS_EN-3.pdf [Accessed 20/11/2023]

DESNZ (2023c). Application by Ørsted Hornsea Project Four Limited for an Order Granting Development Consent for the Hornsea Project Four Offshore Wind Farm Notice of the decision by the Secretary of State. Available at: <https://orstedcdn.azureedge.net/-/media/www/docs/corp/uk/hornsea-project-four/01->

consent-docs/secretary-of-state-for-energy-security-and-net-zero-decision-letter.pdf?rev=514b57e5b11c4b9ba3105fcefcedad33&hash=1EED7D4F4BFF624440B624ECB9F84D5B [Accessed 28/02/2024]

DESNZ (2023d). Digest of UK Energy Statistics (DUKES): energy. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1174355/DUKES_2023_Chapter_1.pdf [Accessed 29/09/2023].

DESNZ (2023e). Digest of UK Energy Statistics (DUKES): energy. Available at: https://assets.publishing.service.gov.uk/media/64c23a300c8b960013d1b05e/DUKES_2023_Chapter_5.pdf [Accessed 07/05/2024]

Defra (2012). Policy paper. Habitats and wild birds directives: guidance on the application of article 6(4) Alternative solutions, imperative reasons of overriding public interest (IROPI) and compensatory measures. Published 11 December 2012 (withdrawn and replaced with Defra 2021).

Defra, Natural England, Welsh Government, and Natural Resources Wales (2021). Habitats regulations assessments: protecting a European site; How a competent authority must decide if a plan or project proposal that affects a European site can go ahead. Available at: <https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site> [Accessed: 23/07/2023].

Defra (2021a). Best practice guidance for developing compensatory measures in relation to Marine Protected Areas. Draft for consultation.

Defra (2021b). Policy paper Changes to the Habitats Regulations 2017. Available at: <https://www.gov.uk/government/publications/changes-to-the-habitats-regulations-2017/changes-to-the-habitats-regulations-2017> [Accessed 02/02/24].

Defra (2022a). Habitats Regulations Assessment Review Working Group summary of findings. Available at: https://consult.defra.gov.uk/nature-recovery-green-paper/nature-recovery-green-paper/supporting_documents/Background%20Doc%201%20%20HRA%20Review%20Working%20Group%20%20Summary%20of%20Findings.pdf [Accessed 23/01/2024].

Defra (2022b). Nature recovery green paper: protected sites and species. Available at: https://consult.defra.gov.uk/nature-recovery-green-paper/nature-recovery-green-paper/supporting_documents/Nature%20Recovery%20Green%20Paper%20Consultation%20%20Protected%20Sites%20and%20Species.pdf [Accessed 26/10/2023].

Defra (2022c). UK Climate Change Risk Assessment 2022. Available at: <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022> [Accessed 19/04/2024].

EC (2001). Assessing of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats

Directive 92/43/EEC. Available at: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. [Accessed 23/07/2023].

EC (2011). Guidelines on the Implementation of the Birds and Habitats Directives in Estuaries and Coastal Zones; with particular attention to port development and dredging. Publications Office, 2012, <https://data.europa.eu/doi/10.2779/44024> [Accessed 02/12/2023].

EC (2012). Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EEC. Clarification of the concepts of: Alternative solutions, imperative reasons of overriding public interest, compensatory measures, overall coherence, opinion of the Commission. Available at: [new_guidance_art6_4_en.pdf](#) (europa.eu) [Accessed 23/07/2023].

EC (2018). Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. Available at: [EN_art_6_guide_jun_2019.pdf](#) (europa.eu) [Accessed 23/12/2022].

Financial Times (2023). Soaring costs threaten offshore wind farm projects. Newspaper article. Available at: <https://www.ft.com/content/8b8aaa67-0c9c-47a6-949d-09bd79a5241d> [Accessed 29/09/2023].

Foster, S. and Marrs, S. (2012). Seabirds In Scotland. Scottish Natural Heritage Trend Note No. 21.

Frederiksen, M., Wanless, S., Harris, M.P., Rothery, P. and Wilson, L.J. (2004). The role of industrial fisheries and oceanographic change in the decline of North Sea black-legged kittiwakes. *Journal of Applied Ecology*, 41, 1129-1139.

Furness, R.W. (2016). Impacts and effects of ocean warming on seabirds. In: Laffoley, D. and Baxter, J.M. (Editors). *Explaining Ocean Warming: Causes, Scale, Effects And Consequences*. Full Report. Gland, Switzerland: IUCN. Pp. 271-288.

Health Protection Agency (2012) Health Effects of Climate Change in the UK 2012 Current evidence, recommendations and research gaps. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/371103/Health_Effects_of_Climate_Change_in_the_UK_2012_V13_with_cover_accessible.pdf [Accessed 16/07/2023].

HM Government (2017). Green Paper: Building our Industrial Strategy. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/611705/building-our-industrial-strategy-green-paper.pdf [Accessed 16/07/2023].

HM Government (2019). Queen's Speech. 2019. Available at: Queen's Speech 2019 - GOV.UK (www.gov.uk) [Accessed 16/07/2023].

HM Government (2023b). Environmental Improvement Plan 2023. Available at: Environmental Improvement Plan ([publishing.service.gov.uk](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/115444/Environmental_Improvement_Plan_2023.pdf)) [Accessed 23/01/2024]

House of Commons (2022). Imports of energy from Russia. Briefing Note Number 9523. House of Commons Library. Available at: [CBP-9523.pdf \(parliament.uk\)](#) [CBP-9523.pdf \(parliament.uk\)](#).

JNCC (2016). Seabird Population Trends And Causes Of Change: 1986-2015 Report [Http://Jncc.Defra.Gov.Uk/Page-3201](http://jncc.defra.gov.uk/Page-3201) Joint Nature Conservation Committee, Peterborough.

JNCC (2022). Seabirds Count – the fourth Breeding Seabird Census. Available at: <https://jncc.gov.uk/our-work/seabirds-count/> [Accessed 02/03/2024].

JNCC (2024) Seabird Monitoring Programme Online Database (Online Database). JNCC, Peterborough

LSHTM (2019). Rapid global switch to renewable energy estimated to save millions of lives annually. London school of hygiene and tropical medicine <https://www.lshtm.ac.uk/newsevents/news/2019/rapid-global-switch-renewable-energy-estimated-save-millions-lives-annually> [Accessed 16/07/2023].

Macdonald, A., Heath, M.R., Edwards, M., Furness, R.W., Pinnegar, J.K., Wanless, S., Speirs, D.C. and Greenstreet, S.P.R. (2015). Climate driven trophic cascades affecting seabirds around the British Isles. *Oceanography and Marine Biology*, 53, 55-80.

Maritime and Coastguard Agency (2021). Marine Guidance Note (MGN) 654 (M+F) Offshore Renewable Energy Installations (OREI) safety response. Statutory Guidance. Published 28 April 2021.

Mitchell, I., French, G., Douse, A., Foster, S., Kershaw, M., Neil McCulloch, N., Murphy, M. and Hawkrigde, J. (2018) Marine Bird Abundance. UK Marine Online Assessment Tool, <https://moat.cefas.co.uk/biodiversity-food-webs-and-marine-protected-areas/birds/abundance/> [Accessed 02/08/2023]

Mitchell, P.I., Newton, S.F., Ratcliffe, N. and Dunn, T.E. (2004). Seabird Populations of Britain and Ireland. T. and A.D. Poyser, London.

Murray, S., Harris, M.P. and Wanless, S. (2015) The status of the gannet in Scotland in 2013-14. *Scottish Birds*, 35, 3-18.

Natural England (2022). Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards. Phase III: Expectations for data analysis and presentation at examination for offshore wind applications. Version 1.2. 140 pp

NASA (2021). 2020 Tied for Warmest Year on Record, NASA Analysis Shows. Available at: <https://www.nasa.gov/press-release/2020-tied-for-warmest-year-on-record-nasa-analysis-shows> [Accessed 22/11/2023].

National Grid ESO (2022). A Holistic Network Design for Offshore Wind. Available at <https://www.nationalgrideso.com/future-energy/beyond-2030/holistic-network-design-offshore-wind> [Accessed 22/10/2023].

NOAA (2023). Global Analysis – Annual 2016. Available at: <https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202213> [Accessed 28/09/2023].

Natural History Museum (2022). Bird flu outbreak devastates UK seabird colonies Available at: <https://www.nhm.ac.uk/discover/news/2022/june/bird-flu-outbreak-devastates-uk-seabird-colonies.html> [Accessed 02/03/2024].

NIRAS (2022). Offshore Wind Leasing Round 4 Plan Level HRA. Report to Inform Appropriate Assessment. March 2022.

ORE Catapult (2017). The Economic Value of Offshore Wind. Benefits to the UK of Supporting the Industry. Available at: SP-0012-The-Economic-Value-of-Offshore-Wind-1.pdf (catapult.org.uk)

ORE Catapult (2018). Offshore Wind Industry Prospectus. Available at: https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/publications/catapult_prospectus_final.pdf [Accessed 29/10/2023].

Parker, J., Fawcett, A., Banks, A., Rowson, T., Allen, S., Rowell, H., Harwood, A., Ludgate, C., Humphrey, O., Axelsson, M., Baker, A. & Copley, V. (2022). Offshore Wind Marine Environmental Assessments: Best Practice Advice for Evidence and Data Standards. Phase III: Expectations for data analysis and presentation at examination for offshore wind applications. Natural England. Version 1.2. 140 pp.

Ratcliffe, N. (2004). Causes of seabird population change. Pp 407-437 In Mitchell, P.I., Newton, S.F., Ratcliffe, N. And Dunn, T.E. (Eds.) Seabird Populations of Britain and Ireland. T. and A.D. Poyser, London.

RenewableUK (2017). Offshore Wind Industry Investment in the UK. Report on Offshore Wind UK Content (Online). Available from: https://cdn.ymaws.com/www.renewableuk.com/resource/resmgr/publications/Offshore_Wind_Investment_V4.pdf [Accessed 22/01/2024].

Rijkswaterstaat Zee & Delta, (2020). Assessment of relative impact of anthropogenic pressures on marine species. Available at: https://northseaportal.eu/publish/pages/144481/assessment_of_relative_impact_of_anthropogenic_pressures_on_marine_species.pdf [Accessed 21/07/2023].

RSPB (2022). How together we can protect wild birds from Avian Flu. Available at: <https://www.rspb.org.uk/our-work/rspb-news/rspb-news-stories/avian-flu-devastating-bird-populations/?from=hp2> [Accessed 12/10/2023].

Sandvik, H., Erikstad, K.E. and Saether, B.-E. (2012). Climate affects seabird population dynamics both via reproduction and adult survival. *Marine Ecology Progress Series*, 454, 273-284.

Sustainability West Midlands (2021). Evidence for the third UK Climate Change Risk Assessment (CCRA3); Summary for England. Available at: <https://www.ukclimaterisk.org/wp-content/uploads/2021/06/CCRA-Evidence-Report-England-Summary-Final.pdf> [Accessed 22/06/2023].

Sydeman, W.J., Thompson, S.A., Anker-Nilssen, T., Arimitsu, M., Bennison, A., Bertrand, S., Boersch-Supan, P., Boyd, C., Bransome, N., Crawford, R.J.M., Daunt, F., Furness, R.W., Gianuca, D., Gladics, A., Koehn, L., Lang, J., Logerwell, E., Morris, T.L., Phillips, E.M., Provencher, J., Punt, A.E., Saraux, C., Shannon, L., Sherley, R.B., Simeone, A., Wanless, R.M., Wanless, S. and Zador, S. (2017). Best practices for assessing forage fish fisheries – seabird resource competition. *Fisheries Research*, 194, 209-221.

Tasker, M.L., Camphuysen, C.J., Cooper, J., Garthe, S., Montevecchi, W.A. and Blaber, S.J.M. (2000). The impacts of fishing on marine birds. *ICES Journal of Marine Science*, 57, 531-547.

TCE (2022). 2020 Offshore Wind Round 4 Plan, Habitats Regulations Assessment.

TCE (2014). Offshore wind operational report 2014.

TCE (undated). Offshore wind extension projects 2017. Available at: <https://www.thecrownstate.co.uk/en-gb/what-we-do/on-the-seabed/energy/offshore-wind-extension-projects-2017/> [Accessed 18/12/2023]

TCE (2019). Information Memorandum. Introducing Offshore Wind Leasing Round 4. <https://www.thecrownstate.co.uk/media/3378/tce-r4-information-memorandum.pdf> [Accessed 16/07/2023].

The Planning Inspectorate (2017). Habitats Regulations Assessment. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/06/Advice-note-10v4.pdf>. [Accessed 02/12/2023]

UK Government Renewable Energy Planning Database (REPD) (2024). Available at: <https://www.gov.uk/government/publications/renewable-energy-planning-database-monthly-extract> [Accessed on 28/02/2024].

UNEP, UNEP Copenhagen Climate Centre (UNEP-CCC) (2021). Emissions Gap Report 2021.

Votier, S.C., Hatchwell, B.J., Beckerman, A., McCleery, R.H., Hunter, F.M., Pellatt, J., Trinder, M. and Birkhead, T.R. (2005). Oil pollution and climate have wide-scale impacts on seabird demographics. *Ecology Letters*, 8, 1157-1164.

Votier, S.C., Birkhead, T.R., Oro, D., Trinder, M., Grantham, M.J., Clark, J.A., McCleery, R.H. and Hatchwell, B.J. (2008). Recruitment and survival of immature

seabirds in relation to oil spills and climate variability. *Journal of Animal Ecology*, 77, 974-983.

Appendix 1: Compensatory Measures Overview



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Morecambe Offshore Windfarm Generation Assets

Annex 1A: Initial Review of Compensatory Measures for Lesser Black-Backed Gull (Tracked)

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1 INTRODUCTION

1.1 Background

Morecambe Offshore Windfarm (OWF) is a proposed offshore windfarm located in the east Irish Sea, approximately 30km off the Lancashire coast. It is being developed by Morecambe Offshore Windfarm Ltd, hereafter 'the Applicant'. The Morecambe Offshore Windfarm shares a grid connection location with the Morgan Offshore Wind Project, also located in the east Irish Sea. For the purposes of this document, 'the Project' refers only to the Morecambe Offshore Windfarm Generation Assets, which consists of the wind turbine generators, inter-array cables, offshore substation platform(s) and possible platform link cables that will be located within the windfarm site. The Project will comprise up to 35 wind turbine generators installed over a windfarm site area of approximately 87km².

The Report to Inform Appropriate Assessment (RIAA, Document Reference 4.9) concluded that no Project-alone adverse effect on the integrity (AEol) of European Sites is expected and the Project does not make any measurable contribution to in-combination values. However, the conclusions of the Secretary of State may not be the same as the Applicant with regard to contribution to in-combination values on the lesser black-backed gull (*Larus fuscus*) feature of the Morecambe Bay & Duddon Estuary Special Protection Area (SPA) and/or the Ribble & Alt Estuaries SPA as a result of collision risk. Therefore, in response to feedback from consultation undertaken during the pre-application period, and through discussions with the Offshore Ornithology Expert Topic Group (ETG) on the in-combination assessment, a 'without prejudice' derogation case has been provided.

A number of options for relevant compensation measures have been developed as far as possible at the point of application. In the event that the Secretary of State determines potential for AEol and considers that compensation is required, the Project has provided sufficient confidence that compensation measures are available, securable and deliverable. The compensation would be implemented in accordance with the approved Compensation Implementation and Monitoring Plan (CIMP). Compensatory measures will be maintained for the operational lifetime of the wind turbine generators (WTGs), subject to any necessary adaptive management.

1.2 Purpose of this document

Where a plan or project is unable to demonstrate that there is no risk of an AEol on a qualifying feature of a European Site, there is a requirement to provide 'derogation' for the potential effect. This comprises (1) an assessment of alternatives to the plan or project, (2) confirmation of Imperative Reasons of Overriding Public Interest (IROPI), and (3) provision compensatory measures. In respect of (3), the Applicant anticipates that, in the event the Secretary of State is unable to reach a conclusion of no AEol on any European site, a requirement will be included in the Development Consent Order (DCO) for the submission and approval of a Compensation Plan for relevant European sites prior to the commencement of works. The Compensation Plan will confirm the compensatory measures that are required in relation to the final design of the Project.

This Initial Review of Compensatory Measures and Ecological Evidence for Lesser Black-Backed Gull report is one of three documents that make up the Compensation Plan for the Project:

- Annex 1A (this report) Initial Review of Compensatory Measures and Ecological Evidence for Lesser Black-Backed Gull;
- Annex 2A Site Selection for Compensatory Measures for Lesser Black-Backed Gull; and,
- Annex 2B Evidence Plan and Roadmap for Lesser Black-Backed Gull.

This Annex 1A report demonstrates the feasibility of potential compensatory measures and sets out the information that will be required in the final Compensation Plan that will be submitted prior to commencement. In doing so, it demonstrates how the proposed works will be controlled by the DCO and gives greater confidence in the assumptions underpinning the approach to compensation. The aim of this report is also to inform consultation with relevant ornithology stakeholders and ensure that compensatory measure proposals for the Project take account of stakeholder advice.

This document presents a long list of in-principle potential compensatory measures for the lesser black-backed gull interest features of the Morecambe Bay & Duddon Estuary SPA and the Ribble & Alt Estuaries SPA. The suitability of each measure for the Project is considered and any obvious challenges to implementation are outlined. The most suitable compensatory measures for the Project are identified and steps required to progress this short list of measures are described.

2 CONSULTATION

Consultation to engage with stakeholders, including members of the Offshore Ornithology ETG, regarding potential in-principle compensatory measures has taken place and is listed below in Table 2-1. The Compensation Plan has been informed through meetings with Natural England, Department for the Environment, Food and Rural Affairs (Defra), the Royal Society for the Protection of Birds (RSPB), Cumbria Wildlife Trust, Spirit Energy Ltd (landowner of Barrow Gas Works) and the Kenneth Allsop Memorial Trust (KAMT; landowner of Steep Holm).

Table 2-1 Summary of information gathered from meetings to inform the Morecambe Offshore Windfarm Compensation Plan.

Consultee/Topic	Date	Details
RSPB – Biodiversity Enhancement Opportunities on the Ribble meeting	30/11/2023	Discussion with RSPB about proposal for the construction of an anti-predator fence on the south bank of the Ribble estuary.
Natural England and the RSPB – Expert Topic Group meeting 6	25/01/2024	Discussion of in-principle compensatory measures and potential sites available for lesser black-backed gull at the Project. Main points discussed included: • Agreement that predator-proof fencing to exclude foxes and badgers from lesser black-backed gull colonies is the preferred compensation measure to take forward; • Release of captive reared chicks was discussed as a potential

Consultee/Topic	Date	Details
		compensation measure, but agreed that this option is not deliverable by the Project; • Agreed that habitat management to improve lesser black-backed gull breeding success could be used as a secondary compensatory measure or as part of an Adaptive Management Plan; • Listed potential sites where predator-proof fencing could potentially be applied, including South Walney, Barrow Gas Terminal and Hesketh Out Marsh; and RSPB raised general additionality concerns with compensation taking place within a boundary of an SPA, but stated that these may vary depending on the Project.
RSPB – Biodiversity Enhancement Opportunities on the Ribble meeting	29/01/2024	Update from RSPB about a Feasibility Report the RSPB is producing regarding a proposal for the construction of an anti-predator fence on the south bank of the Ribble estuary. The Project involves the construction of a c. 9km long permanent predator exclusion fence on the landward boundary of Banks Marsh Natural Nature Reserve and Hesketh Out Marsh between the Crossens channel and River Douglas channel.
Natural England – Lesser black-backed gull sites in North-East England	12/02/2024	Discussion with Natural England (senior specialist in ornithology) about sites suitable for lesser black-backed gull compensation using predator-proof fencing. Sites discussed included: • Barrow Gas Terminal (consideration that this site is possibly the easiest compensation site to develop if agreement can be made with the owner Spirit Energy); • Cavendish Dock (landowner access might be difficult to arrange); • South Walney (including The Spit, Gull Meadow and the Lagoon Complex); • Banks Marsh; and, • Rockcliffe Marsh.

Consultee/Topic	Date	Details
		Stated that there is no known fox predation at Bowland Fells and therefore this site would not be suitable for compensation.
RSPB – Biodiversity Enhancement Opportunities on the Ribble meeting	21/02/2024	Update from RSPB about the Feasibility Report which is now available: - The RSPB plans to use a ‘clipex’ fence with metal posts, which is the same sort of fencing used at Rockcliffe Marsh in the Solway Firth. Plan to use self-closing bridleway gates; and, - Contact has been made with the grazer, public rights of way and wildfowlers - all are content with the progress of the fencing programme.
Cumbria Wildlife Trust – Compensation opportunities at South Walney	27/02/2024	Discussion with the warden of South Walney Nature Reserve about possible opportunities for anti-predator fencing projects on South Walney. Main points discussed: - Fox predation is a key issue limiting lesser black-backed gull breeding success at South Walney; - Fence line on the Spit at South Walney erected in 2021 has resulted in an increase in the number of birds within the fenced area and there are possible plans for extension; - Plans for potential fencing near ‘Gull Meadow’ including an electric fence being constructed in 2024; and, - Potential fencing opportunities around the lagoon complex at South Walney.
Spirit Energy – Fencing opportunities at Barrow Gas Terminal	08/03/2024	Initial positive discussion with Spirit Energy, the owner of Barrow Gas Terminal about the possible opportunities of establishing a predator-proof fence to protect lesser black-backed gulls on the land within or around the gas terminal.
Natural England –	28/03/2024	A summary of the options being progressed for compensation as part of the without prejudice derogation case was discussed with Natural England. Main points discussed regarding

Consultee/Topic	Date	Details
General meeting discussing updates on the assessment and compensation options.		compensation for lesser black-backed gull included: • There are benefits of having a number of compensation plan options; • Another potential option that could be included in the compensation plan involves habitat management on the island of Steep Holm. It was noted the habitat for lesser black-backed gull is restricted due to vegetation growth, with lesser black-backed gulls resorting to nesting on footpaths. Predators are not an issue on the island, but the population has declined and it is thought that vegetation management is required to restore nesting habitat; • There would need to be some liaison regarding archaeological sites on Steep Holm, but these are believed to be located around the edges of the island, and nesting for gulls is more suitable in the middle of the island; • It was noted that despite the distance from the Project site, Steep Holm should not be ruled out if ecologically better than closer potential compensation sites; and It was also noted that the nearby Flat Holm may provide useful data for indication of the density of nesting gulls that could be achieved on Steep Holm.
RSPB – Biodiversity Enhancement Opportunities on the Ribble meeting	15/04/2024	Update from RSPB about the progress of the mega-fence feasibility study.
Natural England – Compensation opportunities at Steep Holm	18/04/2024	Meeting with Natural England to discuss the suitability of Steep Holm to provide compensation. Main points discussed: • The island is owned and managed by the Kenneth Allsop Memorial Trust (KAMT); • The island supported c. 600 lesser black-backed gull pairs in 2018, and c.340 pairs in 2023; • Around 90% of lesser black-backed gull nests are on the plateau/circular

Consultee/Topic	Date	Details
		path of Steep Holm with the remainder located on the cliffs; • The island is considered free of mammalian predators; • Disease (e.g. botulism) is not currently considered to be causing the decline of the lesser black-backed gull population on the island; • Scrub encroachment is the main cause of lesser black-backed gull decline, KAMT estimate that 90% of the island is now covered in scrub, a change from the 1950s when the island was largely free of scrub; • KAMT are supportive of scrub removal, but do not have the resources to undertake this work; • It is considered that scrub clearance could be implemented in September, i.e. outside of the lesser black-backed gull breeding season; • Natural England consider that scrub removal would increase the lesser black-backed gull population, and that this would benefit the National Site Network, i.e. would provide suitable compensation for the Project; and, • Natural England agreed to facilitate a follow-up meeting with KAMT.
Spirit Energy – Email about fencing opportunities at Barrow Gas Terminal	22/04/2024	Email from Spirit Energy outlining that it is not possible to define an area over the Barrow Gas Terminal which may be suitable for the Project's Compensation Plan at the current time.
KAMT – Habitat management opportunities at Steep Holm	23/04/2024	Initial positive discussion with the KAMT, the owner of Steep Holm Island, about possible opportunities for the Project to support scrub clearance to increase the lesser black-backed gull population on Steep Holm.
Defra – Discussion of derogation case and compensation plan.	25/04/2024	Discussion with Defra about all proposed compensation options and potential compensation sites.
RSPB – Biodiversity Enhancement Opportunities on the Ribble meeting	01/05/2024	Discussion with RSPB Area Manager about the mega-fence feasibility study.

Consultee/Topic	Date	Details
KAMT – Letter of support for habitat management opportunities at Steep Holm	12/05/2024	Letter from KAMT has been received supporting the Project’s habitat management measure to enhance the habitat for breeding lesser black-backed gulls on the Trust’s land at Steep Holm Island.

Meetings up to 13/05/2024 included.

3 GUIDANCE ON COMPENSATION

It is the responsibility of the UK government to maintain the ecological coherence of the UK National Site Network (Defra, 2021). In the case of the Project, the Network includes all SPAs for which lesser black-backed gull is designated.

To date, Defra has consulted on two compensation guidance documents setting out best practice for developing compensatory measures in relation to Marine Protected Areas (MPA), each with a compensation hierarchy within them (Defra, 2021; Defra, 2024). Defra (2024) state that they aim to update ‘the 2021 draft guidance’ in Spring 2024.

Under the Defra, 2021 guidance, compensation should:

1. Link to the conservation objectives for the site or feature and address the specific damage caused by the permitted activity;
2. Focus on providing the same ecological function for the species or habitat that the activity is damaging OR, where this is not technically possible, provide functions and properties that are comparable to those that originally justified designation;
3. Not negatively impact on any other sites or features;
4. Ensure the overall coherence of designated sites and the integrity of the MPA network; and,
5. Be able to be monitored to demonstrate that they have delivered effective and sustainable compensation for the impact of the project. The monitoring and management strategy must require further action to be taken if the compensation is not successful.

In relation to the second point above, the guidance proposes a hierarchical approach, as shown in **Table 3-1**.

Table 3-1 Compensation hierarchy, reproduced from Defra (2021)

Hierarchy of Measures	Description
1. Address same impact at same location	Address the specific impact caused by the permitted activity in the same location (within the site boundary)
2. Same ecological function different location	Provide the same ecological function as the impacted feature; if necessary, in a different location (outside of the site boundary)
3. Comparable ecological function same location	Provide ecological functions and properties that are comparable to those that originally justified the designation in the same location as the impact

Hierarchy of Measures	Description
4. Comparable ecological function different location	Provide ecological functions and properties that are comparable to those that originally justified designation; if necessary, in a different location (outside of the site boundary)

In relation to the hierarchical approach, Defra (2021) further state:

***Same ecological function** refers to a feature, habitat, or species that provides the same environmental benefit to the environment as the one that is impacted as a result of a marine activity. This is usually the same species, feature or habitat.*

***Comparable ecological function** refers to a feature, habitat, or species that provides similar but not exactly the same, environmental benefit.*

On rare occasions it may be that other measures delivering wider ecological systems benefits will be the only option for compensation. These opportunities should be identified through developer discussions with SNCBs during the pre-application discussions.

The Defra (2021) consultation document offers a range of compensation options, including applying compensation measures for the same species or an ecologically similar and/or closely related species in areas distant from a given protected site. The more recent Defra (2024) consultation document is similar in the hierarchical approach to compensation, but it lists six points in the hierarchy and includes the term “Local circumstances”, defined as “as far as possible, measures should take account of local circumstances where the risk is predicted to occur”¹.

The Defra (2021, 2024) consultation documents explain there is a hierarchy of compensation options, with measures further up the hierarchy preferred. The Compensation Plan for the Project could potentially deliver the highest preferred option for compensation which is to address the same impact at the same location. For the Project, this would mean increasing lesser black-backed gull breeding success in a location where young gulls fledging from the compensation colony could successfully be recruited into the Morecambe Bay & Duddon Estuary SPA and/or the Ribble & Alt Estuaries SPA populations.

Another option for compensation (Defra 2021, 2024) is to address the same ecological function (e.g. a species that provides the same environmental benefit to the environment as the one that is impacted) in a different location. For the Project, this would mean that it would be possible to compensate for lesser black-backed gulls lost from the Morecambe Bay & Duddon Estuary SPA and the Ribble & Alt Estuaries SPA populations by increasing lesser black-backed gull breeding success at another English site (i.e. same environment) that is not directly connected with either of these two SPAs but is connected to another SPA designated for breeding lesser black-backed gull. This would add to the overall ecological coherence of the National Site Network for breeding lesser black-backed gulls.

¹ Consultation on Defra 2021 guidance: [090224 OWEIP Consultation on updated policies to inform guidance for MPA assessments .pdf \(defra.gov.uk\)](https://www.defra.gov.uk/media/ca/industry/compliance/090224_OWEIP_Consultation_on_updated_policies_to_inform_guidance_for_MPA_assessments_.pdf)

The Defra (2021) consultation document also states that the compensatory measures should be secured before the impact takes place, recognising that ideally the compensation would be functioning prior to impact occurring but that this is not always feasible: “Where this is not possible, it is important that necessary licences are in place, finances are secured, and realistic implementation plans have been agreed with the appropriate bodies to demonstrate that the compensatory measure is secured.”

4 QUANTIFICATION OF EFFECT ON RELEVANT DESIGNATED SITES

4.1 Quantification of effect

The RIAA (Document Reference 4.9) presents a quantitative assessment of predicted increase of population mortality for multiple seabird species including lesser black-backed gull, based on 24 months of Project survey data. The RIAA concludes that there will be no AEoI for the Project-alone and that there are no in-combination AEoI, but the Secretary of State may consider there to be an AEoI in-combination with other offshore windfarms with effects on the same SPA interest features.

Breeding lesser black-backed gull are a feature of eight SPAs in the UK: Alde-Ore Estuary, Bowland Fells, Isles of Scilly, Ribble & Alt Estuaries, Ailsa Craig, Forth Islands, Skomer, Skokholm & the Seas off Pembrokeshire and Morecambe Bay & Duddon Estuary (for both breeding and non-breeding seasons for the latter SPA) (JNCC, 2023).

The RIAA Project-alone assessment predicts a maximum mean annual collision mortality of 0.33 (95% CI: 0.00-1.11) adult lesser black-backed gulls from the Morecambe Bay & Duddon Estuary SPA and 0.69 (95% CI: 0.00-2.32) adult lesser black-backed gulls from the Ribble & Alt Estuaries SPA. Overall, if a conclusion of AEoI of the breeding lesser black-backed gull features of these two SPAs is found, compensation would be required to deliver a minimum mean number of **1.02 individuals and a precautionary upper confidence limit of 3.43 individuals** into the population each year, assuming that there was no requirement to deliver compensation at each SPA separately, according to predicted impacts.

4.2 Morecambe Bay and Duddon Estuary SPA

The Morecambe Bay & Duddon Estuary SPA covers an area of 669km² along the northern Lancashire and southern Cumbria coastline. The current SPA was classified in February 2017, following amalgamation of two existing SPAs and addition of marine foraging area for terns. The protected site comprises areas for both breeding and non-breeding seabirds. The SPA supports 27 features including the following seabirds: breeding and non-breeding lesser black-backed gull, breeding herring gull (*Larus argentatus*), non-breeding Mediterranean gull (*Ichthyaeetus melanocephalus*), common tern (*Sterna hirundo*), little tern (*Sternula albifrons*), Sandwich tern (*Thalasseus sandvicensis*) and a breeding assemblage of almost 62,000 seabirds.

Only the breeding lesser black-backed gull feature is considered further in this Annex 1A report. The RIAA found no adverse effect on integrity for the lesser black-backed gull feature from the Project impacts alone and, due to the very small predicted mortality apportioned to the SPA, that the Project would make no contribution to in-combination effects. Accordingly, the RIAA

concluded that there would be no adverse effect on integrity of the Morecambe Bay & Duddon Estuary SPA (RIAA, Document Reference 4.9).

4.2.1 Site Conservation Objectives

The SPA's overarching conservation objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

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

4.2.2 Supplementary Advice on Conservation Objectives

The Supplementary Advice on Conservation Objectives (SACOs) for breeding lesser black-backed gull, presented below, was downloaded from Natural England's Designated Sites View² on 20th March 2024.

a. Breeding population: Abundance

Target: Restore the size of the breeding population to a level which is above 10,000 pairs whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.

The main colony in the SPA is at South Walney. This colony has declined since the 1990s, which has been attributed to predation of chicks and eggs by foxes and badgers and emigration of breeding adults to other colonies, such as the nearby Barrow Gas Terminal (North West England Gull Project³). In 2011-2015, the five-year peak mean number of breeding pairs was 4,860, which is a 51.4% decrease compared with the citation population of 10,000 pairs, in 1991. The most recent count, in 2023, found 862 AONs, which is a slight increase on the lowest count of 186 AONs in 2021 (BTO Seabird Monitoring Programme).

b. Connectivity with supporting habitats

Target: maintain safe passage of birds moving between nesting and feeding areas.

Currently the movements of lesser black-backed gulls into and out of the SPA are poorly understood. There is speculation that a proportion of gulls found in urban areas close to the SPA colonies may well be birds from the SPA. There is some evidence that this species does fly out to

²

<https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK9020326&SiteName=morecambe&SiteNameDisplay=Morecambe+Bay+and+Duddon+Estuary+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=25>

³ <https://www.nwgulls.org.uk/>

offshore windfarms however there is no evidence of windfarms posing a barrier to movement (Johnston et al. 2022).

Birds breeding at the natural site of South Walney (within the SPA boundary) and at the urban site of the town of Barrow-in-Furness (outside the SPA boundary) were tagged and tracked between 2016 to 2019 to follow their movements in the breeding and non-breeding seasons (Clewley et al. 2021). In the breeding season, birds mostly used the terrestrial environment, including landfill sites, agricultural areas and urban habitats, spending <5% of time in the offshore marine environment (Clewley et al. 2021). This confirms the speculation above that birds from the SPA use urban areas.

c. Disturbance caused by human activity

Target: Restrict the frequency, duration and/or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed.

There is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities.

d. Predation – all habitats

Target: Reduce predation and disturbance caused by native and non-native predators

Impacts to breeding productivity can result directly from predation of eggs, chicks, juveniles and adults, but also from significant disturbance. The presence of predators can influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. Where evidence suggests predator management is required, measures can include their exclusion through fencing, scaring and direct control. Any such measures must consider the legal protection of some predators, as well as the likely effects of such control on other qualifying features. Predation can influence distribution on a local scale (e.g. through abandonment) or at a wider population scale.

The main colony of breeding lesser black-backed gulls is at South Walney with a small number also nesting at Hodbarrow. Predation by foxes and badgers at South Walney is a well-documented issue for the gull colonies and has been attributed to reduced productivity. Permanent fencing is used to surround the nesting gulls and restricts predator access to the colonies which has been successful in reducing predation. At Hodbarrow, the site is managed for terns, which large gull species, including lesser black-backed gulls predate. At this site gulls are actively discouraged through visual and noise disturbance as well as laser hazing.

This target has been set as although management is ongoing, there are additional measures which can be undertaken to further reduce predation.

e. Productivity

Target: [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.

This target has been included because successful breeding is an essential part of bird population biology and data on productivity is often considered to be an important part of effective conservation measures for threatened and rare bird species (Sutherland et al., 2004).

Productivity can be defined as “the mean number of fledged chicks produced per breeding pair, clutch or nest per year” (OSPAR Commission, 2016).

f. Supporting habitat: conservation measures

Target: Restore the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.

There are measures in place for the lesser black-backed gull colonies on South Walney to reduce predation pressure which has caused several years of low productivity. Permanent fencing has been installed around the Spit colony which has successfully excluded mammalian predators, and there are plans to develop further fence enclosures on South Walney (*pers comm* from the warden at South Walney, 27 Feb 2024).

This target has been set as, although management is ongoing, there are additional measures which can be undertaken to further reduce predation.

g. Supporting habitat: extent, distribution and availability of supporting habitat for the breeding season

Target: Restore the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding).

The breeding population of lesser black-backed gulls are primarily found at South Walney. Breeding birds are limited by habitat extent in that they need space free of ground predators. Action is ongoing through measures such as predator exclusion fences around existing colonies. If current measures are successful in achieving recruitment into the population, it is still unclear whether the nesting density within fences will be sufficient to allow recovery to meet targets.

This target has been set as although there is evidence to show that the habitats which this species rely on are in good condition within the SPA, breeding birds are limited by habitat extent in that they need space free of ground predators.

h. Supporting habitat: food availability (bird)

Target: Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sandeel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.

Generally lesser black-backed gulls scavenge, feeding on intertidal areas and the strand line, they may also make use of agricultural land and prey on terrestrial invertebrates. This species also makes use of the local urban human population and its associated waste i.e. landfill sites such as in Barrow in Furness. Lesser black-backed gulls previously fed upon a large landfill site which has subsequently been closed and has reduced the food availability in the area for this species (refer to section 2.1 in Annex 2A for further details), however, as a wholly anthropogenic food source the

closure reflects a return to a more natural state in this species' diet and does not warrant a recover target.

There is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities.

i. Supporting habitat: vegetation characteristics for nesting

Target: Restore the extent and distribution of predominantly medium to tall [i.e. 20-60 cm] grassland swards.

Vegetation characteristics can influence breeding site choice in this species, with a preference for areas of grassy sward of a medium height. In combination with other factors such as predation pressure, a lack of sites with suitable vegetation structure may inhibit range expansion and the ability of the species to recover to meet targets.

Lack of suitable breeding habitat is a factor attributed to the restriction of breeding range in lesser black-backed gulls and in combination with predation and disturbance is a limiting factor to increasing the SPA population.

4.3 Ribble and Alt Estuaries SPA

The Ribble & Alt Estuaries SPA, classified in 2002, covers an area of 124km² on the Lancashire coast. It is composed of extensive intertidal mud, sandflats and saltmarsh. The SPA supports 22 features including the following seabirds: breeding lesser black-backed gull, common tern and a breeding seabird assemblage of >20,000 seabirds.

Only the breeding lesser black-backed gull feature is considered further in this Annex 1A report. The RIAA found no adverse effect on integrity for the lesser black-backed gull feature from the Project impacts alone and, due to the very small predicted mortality apportioned to the SPA, that the Project would make no contribution to in-combination effects. Accordingly, the RIAA concluded that there would be no adverse effect on the integrity of Ribble & Alt Estuaries SPA when considering the Project in-combination with other plans or projects (RIAA, Document Reference 4.9).

4.3.1 Site Conservation Objectives

The SPA's overarching conservation objectives are to ensure that, subject to natural change, the integrity of the site is maintained or restored as appropriate, and that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

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

4.3.2 Supplementary Advice on Conservation Objectives

The SACOs for breeding lesser black-backed gull, presented below, was downloaded from Natural England's Designated Sites View⁴ on 20th March 2024.

a. Breeding population: Abundance

Target: Maintain the size of the breeding population at a level which is above 8,097 pairs, whilst avoiding deterioration from its current level as indicated by the latest mean peak count or equivalent.

The lesser black-backed gull population in the Ribble & Alt Estuaries SPA increased in size since 1993 from an initial count of 1,800 pairs in 1993 to the citation figure of 4,100 in 1998. Since then, the population has further increased to a revised baseline of 8,097 pairs from 2014-2016 counts. However, the most recent count, from 2021, found 4,489 pairs (BTO Seabird Monitoring Programme).

There is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities.

b. Connectivity with supporting habitats

Target: maintain safe passage of birds moving between nesting and feeding areas.

Lesser black-backed gulls nest on Banks Marsh and feed on the intertidal mudflats and saltmarsh of the Ribble Estuary as well as outside of the SPA on the Mersey Estuary and further inland in urban areas, fields and landfill sites (Scragg et al., 2016).

c. Disturbance caused by human activity

Target: Restrict the frequency, duration and/or intensity of disturbance affecting roosting, nesting, foraging, feeding, moulting and/or loafing birds so that they are not significantly disturbed.

The nature, scale, timing and duration of some human activities can result in bird disturbance (defined as any human-induced activity sufficient to disrupt normal behaviours and/or distribution of birds in the absence of the activity) at a level that may substantially affect their behaviour, and consequently affect the long-term viability of the population.

d. Predation – all habitats

Target: Reduce predation and disturbance caused by native and non-native predators.

The target has been set due to a lack of evidence that the feature is being impacted by any anthropogenic activities.

e. Productivity

4

<https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK9005103&SiteName=ribble&SiteNameDisplay=Ribble+and+Alt+Estuaries+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCArea=&NumMarineSeasonality=20>

Target: [Maintain or recover] productivity so that breeding success is maximised within the constraints of the site.

This target has been included because successful breeding is an essential part of bird population biology and data on productivity is often considered to be an important part of effective conservation measures for threatened and rare bird species (Sutherland et al., 2004).

f. Supporting habitat: conservation measures

Target: Maintain the structure, function and supporting processes associated with the feature and its supporting habitat through management or other measures (whether within and/or outside the site boundary as appropriate) and ensure these measures are not being undermined or compromised.

Threats to supporting habitats from coastal erosion and climate change are being addressed through local coastal plans and strategies; areas within the site are managed by the RSPB.

g. Supporting habitat: extent, distribution and availability of supporting habitat for the breeding season

Target: Maintain the extent, distribution and availability of suitable habitat (either within or outside the site boundary) which supports the feature for all necessary stages of its breeding cycle (courtship, nesting, feeding).

The breeding site is Banks Marsh which falls within the Ribble Estuary Natural Nature Reserve (NNR) and as such is subject to the relevant management plan. Management should ensure that the expansion of the lesser black-backed gull colony does not impact other qualifying species.

There is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities.

h. Supporting habitat: food availability (bird)

Target: Maintain the distribution, abundance and availability of key food and prey items (e.g. voles, small seabirds, waders, sandeel, sprat, cod, herring, roach, rudd, beetles, flies, earthworm, shellfish, as appropriate) at preferred sizes.

The target has been set due to a lack of evidence that the feature is being impacted by any anthropogenic activities.

i. Supporting habitat: vegetation characteristics for nesting

Target: Maintain the extent and distribution of predominantly medium to tall [i.e. 20-60 cm] grassland swards.

This species prefers short to medium sward height at this site, building nests so they sit above the saltmarsh.

There is evidence from survey or monitoring that shows the feature to be in a good condition and/or currently un-impacted by anthropogenic activities.

5 OVERVIEW OF LESSER BLACK-BACKED GULL COMPENSATION OPTIONS

The RIAA identifies that, if an AEoI could not be ruled out by the Secretary of State, compensation could be required for a mean of 1.02 adult lesser black-backed gulls per annum (refer to section 4.1). The aim of compensation for the Project is to offset the predicted collision mortality on the breeding lesser black-backed gull populations at the Morecambe Bay & Duddon Estuary SPA and Ribble & Alt Estuaries SPA, by increasing the size and productivity of the lesser black-backed gull breeding population and/or reducing mortality from other factors. This in-principle compensation is provided without prejudice to the Applicant's assessment conclusions.

5.1 Ecology, conservation status and causes of decline in lesser black-backed gull populations

Lesser black-backed gulls are colonial nesters, often nesting with herring gulls. They build nests on the ground and on man-made structures such as flat rooftops, using a variety of natural, semi-urban and urban habitats. Over the last 20 years, lesser black-backed gulls have greatly increased their use of urban habitats for breeding (Burnell et al. 2023). Natural nest sites include offshore islands, inland lakes and reservoirs, coastal cliffs, dunes, salt marshes and moorland, sometimes with taller vegetation than that preferred by herring gulls (Ross-Smith et al. 2015; Burnell et al. 2023). They lay an average of 3 eggs.

Lesser black-backed gulls are omnivores, feeding on fish caught at sea or fishing discards, as well as earthworms, small mammals, insects and grain from agricultural land. They can also scavenge at landfill sites (MacArthur Green, 2021; Burnell et al. 2023). Diet varies with nest site location.

After breeding, part of the British lesser black-backed gull population migrates southwards, although the population is showing an increasing trend of year-round residency in Britain (Banks et al. 2009). The expansion in winter range in the UK is consistent with a large increase in winter abundance since 1953, with increases particularly notable in Ireland, Wales, southwest England, East Anglia and Scotland (Balmer et al. 2013).

The International Union for Conservation of Nature (IUCN) lists the global population of lesser black-backed gull as “Least Concern”, while the UK population has been given amber status in Birds of Conservation Concern (BOCC) 2, 3, 4 and 5 (Stanbury et al. 2021). The majority of the biogeographic population (subspecies *graellsii*) breeds in Britain but is also found in Ireland, Greenland, Iceland, Faroe Islands, France, Spain and Portugal. The subspecies comprises an estimated 430,000 pairs (Burnell et al. 2023).

The total UK lesser black-backed gull breeding population is 324,465 breeding pairs or apparently occupied nests, AONs (Burnell et al. 2023). Coverage of coastal, inland and urban breeding habitats has varied across the UK national seabird censuses meaning determining national trends for this species is challenging. The most recent Seabirds Count (Burnell et al. 2023) included comprehensive coverage of inland and urban areas. Numbers of lesser black-backed gulls nesting in natural habitats increased in all coastal regions from the late 1960s to the early 2000s but has subsequently declined. The increase in breeding population was thought to be due to an increase in food availability due to fishery discards and edible waste at landfill sites (Mitchell et al. 2004). Between the Seabird 2000 (data collected between 1998 to 2002) and Seabirds Count (data

collected between 2015 to 2021) censuses, the numbers of coastal AONs decreased by 54% to 41,670 AONs whereas the inland population increased by 5% to 22,597 AON (Mitchell et al. 2004; Burnell et al. 2023). Declines in the coastal breeding population were most severe at the South Walney colony, part of the Morecambe Bay & Duddon Estuary SPA, where the population had increased to a maximum of 19,487 AON between 1998 to 2002 (Seabird 2000 data) but only 404 AON were recorded during Seabirds Count between 2015 to 2021 (Burnell et al 2023). Urban nesting increased dramatically over the last 20 years with an estimated 271,535 AONs at coastal and inland urban areas combined (Burnell et al 2023).

Causes of breeding population declines in natural nesting areas include disease (botulism and highly pathogenic avian influenza); predation of eggs and chicks by mammals (e.g. foxes, badgers, American mink and rats) and birds (e.g. crows and herring gulls); intra-specific egg predation; suitability of vegetation at breeding sites; reductions in availability of nesting habitat and increased flooding of nest sites; food stress caused by a decrease in fishery discards; and emigration to urban nest sites (Burnell et al. 2023; Dalrymple, 2023; Furness et al. 2014; Ross-Smith, 2014a; MacArthur Green, 2021). Mitchell et al. (2004) reported culling of breeding adult lesser black-backed gulls as another cause of decline, although quantifying culling impacts on populations was not possible as numbers taken were not reported. However, recent changes in licensing of culling of lesser black-backed gulls mean that culling at natural sites, particularly SPAs, has ceased and also that numbers taken at other sites, e.g. urban sites, will be reported (Burnell et al. 2023).

5.2 Development of a long list of potential compensatory measures

Compensatory measures for lesser black-backed gulls aim to deliver additional adult breeding lesser black-backed gulls to offset those that are presumed to be lost from the breeding population through collision with the Project's wind turbine generators. This could be achieved through increasing the number of chicks which fledge and/or increasing survival of adult, juvenile and immature birds.

The SACOs for the Morecambe Bay & Duddon Estuary SPA and Ribble & Alt Estuaries SPA are presented above (see Section 4.2.2 and 4.3.2). They were used to identify both potential compensatory measures and to evaluate the potential success of each measure (**Table 5-1**). Additionally, Furness et al. (2013), MacArthur Green (2021) and Statutory Nature Conservation Body (SNCB) advice to other OWF Projects were used to draw up a long list of potential compensatory measures.

Furness et al. (2013) listed the following compensatory measures for lesser black-backed gulls:

- Mink eradication at lesser black-backed gull colonies;
- Fencing out foxes from colonies;
- End culling of lesser black-backed gulls;
- Closure of sandeel and sprat fisheries; and,
- Eradicate rats at lesser black-backed gull colonies.

In addition to these, the following potential compensatory measures were identified from information presented above on drivers of population change in lesser black-backed gull populations, particularly Burnell et al. (2023), as well as the SACOs for the Morecambe Bay & Duddon Estuary SPA and Ribble & Alt Estuaries SPA (see Section 4.2.2 and Section 4.3.2 above):

- Habitat management to create suitable vegetation height and cover for lesser black-backed gull nesting;
- Habitat management to reduce flooding of nests;
- Release of captive-reared lesser black-backed gull chicks; and,
- By-catch reduction of lesser black-backed gulls by commercial fisheries.

This list of potential compensatory measures is summarised as follows:

1. Closure of sandeel and sprat fisheries;
2. Reduce by-catch by commercial fisheries;
3. Eradication/exclusion of mammalian predators at colonies;
4. Ending culling;
5. Habitat management to create suitable nesting vegetation height and cover;
6. Habitat management to reduce flooding of nests; and,
7. Release of captive reared chicks.

The ecological evidence supporting each of these potential compensatory measures is presented below.

5.3 Ecological evidence to support potential compensatory measures

5.3.1 Closure of sandeel and sprat fisheries

Food shortages have been implicated as a cause of reduced productivity in some lesser black-backed gull colonies (Mitchell et al. 2004). Lesser black-backed gulls are omnivorous and have a broad diet that includes foraging in marine, agricultural, coastal and urban environments (Burnell et al. 2023; Langley et al. 2023), meaning they do not have the strong dependency on sprat and sandeel that some other seabird species do (Furness & Tasker, 2000). However, lesser black-backed gulls are more dependent on small pelagic fish than herring gulls (Furness et al., 2013), so could derive some demographic benefits (increases in survival or productivity) from closure of these fisheries.

5.3.2 Reduce by-catch by commercial fisheries

The East Anglia ONE North and East Anglia TWO OWF projects proposed an in-principle compensatory measure for lesser black-backed gulls of reducing bycatch by commercial fisheries (MacArthur Green & Royal HaskoningDHV, 2021). However, a review of seabird bycatch mortality reported great black-backed gull and herring gull bycatch but none for lesser black-backed gull, although unidentified ‘gull spp.’ were also reported which could have included lesser black-backed

gulls (Northridge, et al. 2020). Compared with other species such as fulmar, gannet and guillemot, gulls were bycaught in relatively low numbers. Therefore, reducing bycatch may have limited benefits for lesser black-backed gull populations breeding around the Irish Sea. The bycatch compensatory measure proposed by East Anglia ONE North and East Anglia TWO was proposed as a secondary compensatory measure for this species, recognising that reducing bycatch would be of benefit to multiple seabird species.

5.3.3 Eradication/exclusion of mammalian predators at colonies

Mammalian and avian predation on eggs, chicks, juveniles and adults impacts breeding bird productivity and can also cause significant disturbance to adults and young birds (for example refer to Furness et al. 2013). The presence of predators can also influence bird behaviours, such as abandonment of nest sites or reduction of effective feeding. Predation can influence distribution on a local scale (e.g. through abandonment) or at a wider population scale.

Foxes have reduced breeding success at multiple lesser black-backed gull colonies in England including South Walney, Barrow Gas Terminal, Orford Ness, Hodbarrow and Rockcliffe Marsh (Blackledge et al. 2013; Campbell, 2012; Dalrymple, 2023; North West England Gull Project, 2021; Mavor et al. 2001; Mavor et al. 2003). Davies et al. 2018 recorded that with an increasing fox sighting rate, the average probability of a lesser black-backed gull egg producing a fledgling was reduced from 0.31 to zero. A single fox can kill a large number of gull chicks (Howe and Record, 2015) although Davis et al (2018) concluded that fox predation was not a major widespread problem at all lesser black-backed gull colonies, but was a localised issue for a few. Fox predation is thought to have played a key role in the decline of designated breeding lesser black-backed gulls at Morecambe Bay & Duddon Estuary SPA (Cumbria Wildlife Trust 27 Feb 2024) and the Ribble & Alt Estuaries SPA (RSPB, 2024). The Morecambe Bay & Duddon Estuary SPA which has a target population of over 10,000 pairs of lesser black-backed gulls (Natural England Designated Sites View⁵) used to have one of the largest colonies of lesser black-backed gulls in the UK, with numbers in excess of 20,000 individuals in the 1990s (North West England Gull Project⁶). However, over the past three decades the gull population has experienced a sharp decline; between 2011-2015, the five-year peak mean number of breeding pairs was 4,860, and the most recent count recorded in 2023 was 862 pairs (BTO Seabird Monitoring Programme⁷). The Ribble & Alt Estuaries SPA has a target population of over 8,079 pairs of lesser black-backed gulls (Natural England Designated Sites View⁸) and since 2014 population counts have recorded a marked decline c.2000 nests per

⁵ Natural England Designated Sites View for Morecambe Bay and Duddon Estuary SPA is available at: <https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK9020326&SiteName=morecambe&SiteNameDisplay=Morecambe+Bay+and+Duddon+Estuary+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=25>

⁶ North West England Gull Project South Walney study site is available at: <https://www.nwggulls.org.uk/projects/south-walney>

⁷ The Seabird Monitoring Programme database is available at: <https://app.bto.org/seabirds/public/index.jsp>

⁸ Natural England Designated Sites View for Ribble and Alt Estuaries SPA <https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK9005103&SiteName=ribble&SiteNameDisplay=Ribble+and+Alt+Estuaries+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=&NumMarineSeasonality=20>

year; the 2023 census revealed the lesser black-backed gull population to be 2,319 nests (RSPB, 2024).

American mink has also been reported to reduce lesser black-backed gull breeding success in Argyll (Mavor et al. 2006) and badgers were found to be predating on lesser black-backed gull eggs and chicks at South Walney (Dalrymple, 2023). While rats have not been directly demonstrated to reduce lesser black-backed gull breeding success, gull productivity has increased on islands, such as Ailsa Craig, following rat eradication (Furness et al. 2013), suggesting rat predation may be a problem in some cases.

American mink and rats can be removed from small islands by trapping although they swim well and can recolonise. Foxes can be removed by trapping or shooting. A fence can also exclude a range of mammalian predators, including American mink and foxes. Invasive eradication methods (e.g. trapping, shooting) have the potential to cause more disturbance to breeding gulls as traps would need to be checked on a daily basis and shooting would need to occur near to the colony throughout the breeding season. Fencing has been demonstrated to successfully exclude foxes and mink and increase breeding success, once the predators have been removed from an area (Furness et al. 2013). For mainland gull colonies, excluding predators with fencing is a better long-term solution, requiring less long-term investment than ongoing predator control (Furness et al. 2013).

5.3.3.1 *Exclusion of predators using fencing*

Predator-proof fencing has been used to improve habitat and increase hatching success for a range of ground-nesting birds by controlling mammals including: foxes, badgers, rats, feral cats, mink, hedgehogs, mice, rabbits and other mammals (Smith et al. 2021; Furness et al. 2013). Predator-proof fencing has recently been used very successfully to increase productivity of the lesser black-backed gull breeding colony at South Walney (refer to section 5) and predator-proof fencing followed by a programme of mammal removal within the enclosed area has also been used as a compensation measure to increase productivity of breeding lesser black-backed gulls within the Alde-Ore Estuary SPA impacted by the development of the Norfolk Boreas and Norfolk Vanguard offshore wind farm projects (MacArthur Green and Royal HaskoningDHV, 2022).

In the United States, predator-proof fences were deployed very effectively in Hawaii at Ka'ena Point Natural Area Reserve to protect vulnerable populations of birds (Young et al. 2012). Fences two metres tall were set up in November 2010 to February 2011 around 20 hectares (ha) of coastal habitat within Ka'ena Point to prevent predators (including dogs, cats, mongooses, rats and mice) from entering the protected area. Predators were eradicated within the enclosed 20 ha – it took three months to complete for all predators except mice, which were eradicated within an additional six months. Cooper (2013) listed a further ten examples of successful deployment of predator-proof fencing around seabird colonies in New Zealand, Hawaii (USA) and Azores (Portugal), and these are also reviewed in detail by White and Hirons (2019).

Electric fences can be used to surround nesting gulls and restrict predator access to the colonies. The use of electric fences has been successful in reducing predation, however the ability of predators, particularly badgers and foxes to dig underneath electric fencing can reduce the effectiveness of this type of fencing and electric fences generally require more maintenance than

permanent fences (*pers comm* from a senior ornithologist at Natural England). Modern permanent predator-proof fencing usually requires little maintenance and is known to be effective in excluding all mammalian predators (Cooper, 2013) and therefore, if a mammalian predator-proof enclosure for the Project is proposed, the Applicant proposes to use permanent fencing rather than temporary electric fencing.

Mammal removal and eradication from islands is a well-established procedure that has now been carried out at hundreds of sites world-wide and at a small number of islands in the UK (see Furness et al. 2013, and Furness 2021 for review). Mammal removal protocols for fox, otter, badger, mink, hare and Chinese water deer were developed as part of the compensation measures for Norfolk Boreas and Norfolk Vanguard offshore wind farm projects to protect breeding lesser black-backed gulls within a newly constructed fenced enclosure inside the Alde-Ore Estuary SPA (MacArthur Green and Royal HaskoningDHV, 2022). Potential mammal removal methods were categorised into three broad categories including 1) Passive measures (e.g. one-way gates and escape ramps), 2) Active measures (e.g. live traps, flushing/driving) and 3) Lethal measures (e.g. shooting and poisoning). Therefore, if a mammalian predator-proof enclosure for the Project is proposed, the Applicant proposes to develop similar mammal removal protocols for appropriate mammal species potentially present within the fenced enclosure constructed for the Project.

5.3.3.2 *Predator exclusion fencing at South Walney*

The South Walney colony, within the Morecambe Bay & Duddon Estuary SPA, which includes breeding great black-backed gulls, herring gulls and lesser black-backed gulls, has had very low breeding success in recent years, largely attributed to foxes and badgers (see Figure 5-1 and Dalrymple, 2023).

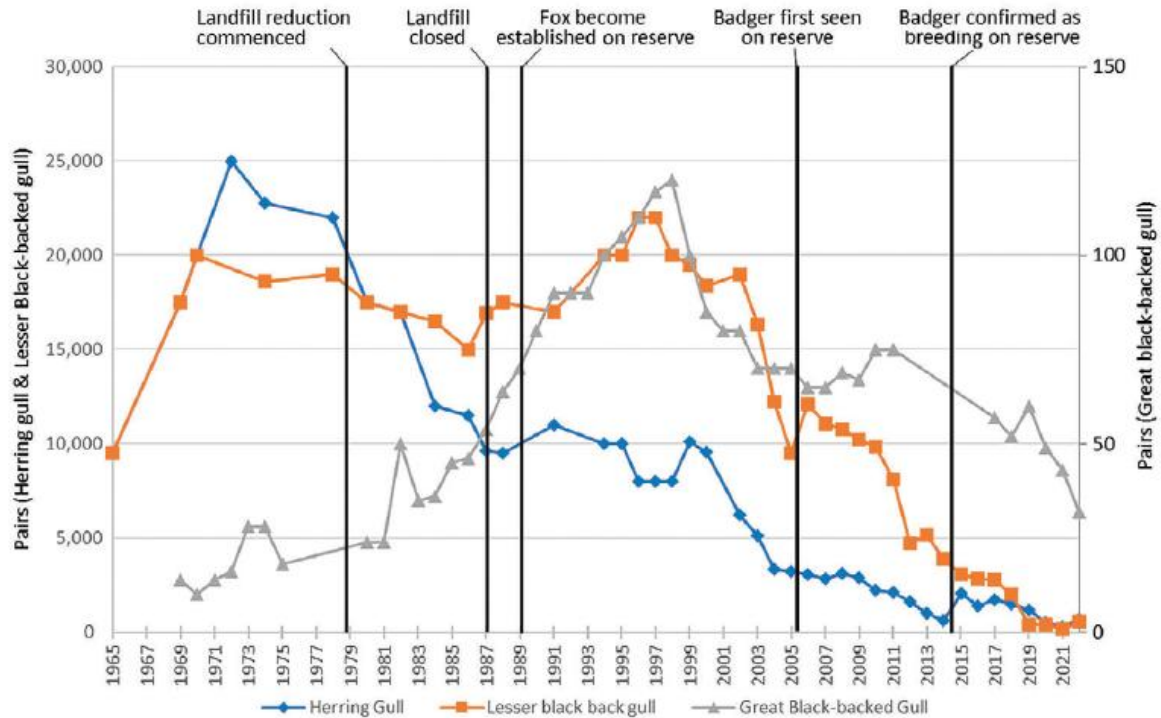


Figure 3. Nesting pairs of Herring Gulls *Larus argentatus*, Lesser Black-backed Gulls *L. fuscus*, and Great Black-backed Gulls *L. marinus* at South Walney, 1965–2021. Data: (Brown 1967; Hosey & Goodridge 1980; Dean 1990; unpublished data held by Cumbria Wildlife Trust and the Walney Bird Observatory).

Figure 5-1. Numbers of nesting pairs of herring gulls, lesser black-backed gulls and great black-backed gulls at South Walney, 1965-2021, showing a large decline in the lesser black-backed gull population since 1996 and potential drivers of the decline, lack of food and egg/chick predation. Reproduced from Dalrymple (2023).

A 12-strand electric fence was erected in 2010 around the colony but it was found to not be effective, with evidence of fox and badger predation within the fenced area (Dalrymple, 2023). This was replaced with a 2m high permanent fence in 2021 (see Figure 5-2 and Dalrymple, 2023, for full details). The fence was originally 1.8m tall but additional electric fencing was added to the top of the fence as foxes were suspected of climbing over the fence. The additional height and electrification appeared to have prevented foxes entering the enclosed area, with no evidence found of fox or badger activity within the fenced area in 2022 (Dalrymple, 2023). In the 2022 breeding season, numbers of breeding pairs of lesser black-backed gulls increased, with a further increase in 2023 (Dalrymple, 2023; BTO Seabird Monitoring Programme). Productivity also increased, with chicks fledging for the first time in five years in 2021 and increases in breeding success seen from 2021 to 2022.



Figure 5-2. Predator exclusion fencing at South Walney (reproduced from Dalrymple, 2023).

5.3.4 Ending culling

Until 2019, adult lesser black-backed gulls were culled and nests destroyed, under a General Licence issued under the Wildlife and Countryside Act (1981), meaning there was no requirement for specific permission or reporting of numbers taken (Ross-Smith et al. 2014b). Mitchell et al. (2004) reported mass culling of lesser black-backed gulls as recently as 1999-2002. Culling has been undertaken for human health and safety reasons and also to reduce predation by lesser black-backed gulls on other species of conservation concerns, e.g. terns (Ross-Smith et al. 2014b). However, recent changes to licensing means that specific permission is now required and culling is now all but obsolete (Burnell et al. 2023).

5.3.5 Habitat management to create suitable nesting vegetation height and cover

The amount of ground covered by vegetation and the height of the sward is known to influence breeding success in large gulls (*Larus* spp.). Lesser black-backed gull breeding success, in particular, chick survival, has been shown to be related to plant cover (Davis & Dunn, 1976). The SACOs for both Morecambe Bay & Duddon Estuary SPA and Ribble & Alt Estuaries SPA (see Section 4.2.2 and 4.3.2) include a target of restoring or maintaining the extent and distribution of predominantly medium to tall (i.e. 20-60 cm) grassland swards.

If vegetation is too dense (e.g. encroaching scrub), gulls will be unable to breed in it. For example, the scrub on the island of Steep Holm (refer to Annex 2A) has grown to such an extent that it is

now preventing lesser black-backed gulls from breeding, this species has taken to breeding on the public footpaths where the vegetation is controlled by the Steep Holm warden; encroaching scrub is now considered to be the key factor limiting lesser black-backed gull breeding success on Steep Holm (Natural England, 28 March 2024).

However, some vegetation can offer shelter from adverse weather and cover from predators and lesser black-backed gulls require at least some vegetation with a mixture of sward height to breed successfully. A lack of suitable vegetation structure is cited as inhibiting range expansion and the ability of lesser black-backed gull populations to recover (Morecambe Bay & Duddon Estuary SPA SACOs). At Flat Holm Island, Wales, hatch rate of eggs was highest in nests with a substantial amount of surrounding vegetation and eggs at open nests with little vegetation were more likely to disappear (Ross-Smith et al. 2015). Chick growth rate was faster at nests in taller vegetation, but laying date, breeding density and chick survival rate was lower in taller vegetation (Kim & Monaghan, 2005a). Herring gulls with nests surrounded by vegetation had earlier laying dates, heavier eggs and more fledglings than individuals nesting at unvegetated sites. Nests surrounded by vegetation had milder air temperatures and lower wind speeds, and incubating adults spent more time sleeping and were less alert, compared with unvegetated nests (Kim & Monaghan, 2005b). Management of vegetation at colonies (e.g. Steep Holm) could potentially increase hatch rate, chick growth rate and chick survival. These all point to a need for a patchwork of sward heights and vegetation types, to provide open areas with higher vegetation on the fringes, thereby providing protection from predation and inclement weather.

5.3.6 Habitat management to reduce flooding of nests

The Ribble & Alt Estuaries SPA includes the Ribble Estuary National Nature Reserve, within which is the Banks Marsh gull colony (Annex 2A). In 2017 and 2018, no lesser black-backed gull chicks were fledged from this site due to high spring tides inundating all nests (North West England Gull Project⁹).

Climate change will increase the frequency and magnitude of flooding events, so lesser black-backed gull colonies close to the sea, rivers, estuaries, etc. are likely to be at increasing risk of reduced breeding success (Burnell et al. 2023). This risk can be managed by building flood defences but these need to be developed as part of a holistic approach to managed realignment of coastlines and waterways and this holistic approach will not always be favourable for lesser black-backed gulls. For example, a new embankment was constructed in the RSPB's reserve, Hesketh Out Marsh¹⁰, along the south bank of the River Ribble, as part of reducing flood risk for agricultural land and residents in south Lancashire. The work also included creation of new saltmarsh habitat in both the RSPB reserve and the Ribble Estuary National Nature Reserve (which is part of the Ribble & Alt Estuaries SPA). This habitat management improved biodiversity in the reserves and reduced flood risk for nearby residents, but it was not specifically designed to reduce the risk of flooding of gull nesting habitat. The Banks Marsh colony lies adjacent to the River Ribble and is not protected by the new embankment, meaning the risk of flooding reducing breeding success remains for this colony.

⁹ <https://www.nwgulls.org.uk>

¹⁰ <https://www.rspb.org.uk/days-out/reserves/hesketh-out-marsh>

5.3.7 Release of captive reared chicks

Numbers of lesser black-backed gulls nesting in urban environments has increased greatly over the last 20 years (Burnell et al. 2023). Consequently, this species, along with herring gulls, are often viewed as a pest by residents and businesses in cities. As a result, the SNCBs receive many requests for licences to remove eggs and nests. While non-lethal deterrents are encouraged¹¹ there is an ongoing need to remove a small number of gull eggs and chicks from urban areas; the latest Natural England data available shows that in 2022, a total of 112 eggs were taken from nests and 39 nests were destroyed.

Currently, eggs and chicks are destroyed but an alternative approach would be to hatch the eggs in an incubator and raise chicks in captivity. These chicks could then be released into the wild, when independent. For this to be a successful compensatory measure, these captive-reared individuals would need to recruit into designated SPA colonies.

This method is not widely used at present but in 2021, NatureScot commissioned a trial to assess the feasibility of establishing captive rearing of eggs and chicks removed under licence. The report to NatureScot is not in the public domain but key issues considered in the trial included feasibility of transporting eggs and chicks from urban sites to suitable facilities in which eggs and chicks could be raised, capacity of suitable facilities and welfare implications of releasing young birds.

Further investigation would be required before this approach could be used as a compensatory measure, including consideration of:

- How many lesser black-backed gull eggs and chicks are likely to be removed each year in the future and therefore could potentially be available for later release as fledglings.
- How many lesser black-backed gull eggs and chicks are viable/alive following removal and how feasible is it to transport them to a facility while guaranteeing ethical and welfare standards are met?
- Are there sufficient facilities with adequate capacity to hatch/raise enough eggs and chicks or would additional facilities need to be built?
- What hatch rate and chick survival rate can facilities achieve while appropriate ethical and welfare standards are met?
- Is it possible to raise chicks and release fledglings in such a way to ensure they are independent and not habituated to humans, i.e. avoiding them being attracted to urban areas and potentially a pest to people?
- Lesser black-backed gulls show strong natal philopatry, often recruiting to the colony from which they fledged (Rock, 2005; Rock & Vaughan, 2013), meaning the release site(s) need careful consideration to maximise the chance that the released birds recruit into target colonies as adults but do not directly compete with fledglings and other con-specifics from the target colony.

¹¹ <https://naturalengland.blog.gov.uk/2021/12/17/urban-gull-licensing-a-review-of-our-organisational-licence-trial-and-plans-for-2022/>

- Are the survival and return rates of released birds sufficiently high to make this approach a feasible compensatory measure, or do captive reared birds have lower survival rates than naturally reared birds?

5.4 Strategic Option

The Energy Act 2023¹² includes provision for the Secretary of State to create a Marine Recovery Fund (MRF¹³) to help deliver compensation measures at a strategic level across multiple projects.

The concepts of predator reduction and habitat restoration and creation are currently identified by the Offshore Wind Industry Council (OWIC) as target compensatory measures to be delivered through the Collaboration on Offshore Wind Strategic Compensation (COWSC) group¹⁴, that will be available through the MRF and as such may be delivered at a strategic, cross-project level. For both these measures, the evidence collated for the respective Project-alone measures are equally valid for the purposes of the strategic delivery of these measures.

Delivery of strategic compensation will be dependent on secondary legislation which is not yet in place. Notwithstanding this, the Applicant would consider fulfilling any compensation requirements determined by the Secretary of State through this mechanism, if available and appropriate.

5.5 Evaluation of the long list of potential compensatory measures

The long list of potential compensatory measures was reviewed in the context of Defra's best practice consultation documents for developing compensatory measures in relation to MPAs (Defra 2021, 2024), as well as the advice from SNCBs and other consultees on other recent UK OWF projects which considered compensatory measures for lesser black-backed gull.

Below, each measure is assessed against a set of criteria, with the most promising measures taken forward to a short-list of compensatory measures for discussion with stakeholders. Each measure is scored as low, medium or high against each criterion. The criteria comprise:

- **Chance of success**, defined as the likelihood of a measure successfully increasing the number of breeding adult lesser black-backed gulls.
 - LOW = unlikely to be successful;
 - MEDIUM = likely to be successful; and,
 - HIGH = highly likely to be successful;
- **Timeframes**, defined as the time required both for the measure to be in place and to increase the numbers of breeding adults.
 - LOW = long timeframe until numbers of breeding adult gulls increase;

¹² Energy Act 2023 is available at: <https://www.legislation.gov.uk/ukpga/2023/52/contents/enacted>

¹³ Marine Recovery Fund: <https://www.legislation.gov.uk/ukpga/2023/52/section/292/enacted>

¹⁴ Offshore Wind Industry Council (OWIC) project: <https://www.thecrownestate.co.uk/news/the-crown-estate-and-offshore-wind-industry-council-launch-gbp3-5m-project>

- MEDIUM = medium timeframe until numbers of breeding adult gulls increase; and,
- HIGH = short timeframe until numbers of breeding adult gulls increase;
- **Cost-effectiveness**, defined as the cost to the Project of implementing the measure throughout the lifetime of the Project.
 - LOW = measure will be very expensive to implement;
 - MEDIUM = measure will be quite costly to implement; and,
 - HIGH = measure will be relatively cheap to implement;
- **Deliverability**, defined as the ability of the Project to implement the compensatory measure. Measures are classed as ‘strategic’ meaning they could only be delivered either by government or by a collaboration of several OWF projects, or ‘project-specific’ meaning they could be delivered by the Project-alone.
 - LOW = the Project has little or no ability to implement the measure;
 - MEDIUM = the Project has some ability to implement the measure; and,
 - HIGH = the Project has the ability to deliver the measure.

For each compensatory measure on the long list, as well as evaluation against the above criteria, the measure has been considered in relation to the Defra (2021, 2024) compensatory measures hierarchy (see Section 3 above). Measures higher up the hierarchy are preferred. For example, measures such as ‘same impact, same location’ and ‘same ecological function, different location’, will be preferentially short-listed.

Timeframes for delivering an increase in numbers of breeding adults are discussed in section 7 of Annex 2B). For the Compensation Plan, it is assumed that lesser black-backed gulls begin breeding at four years old which is the age of first breeding cited by Cramp & Simmons (1983). Therefore, with any measure that increases breeding success, resulting in more chicks fledging from colonies, there will be a delay of up to four years following implementation before an increase in numbers of breeding adults is seen. Horswill & Robinson, 2015 cite five years as age of first breeding, however, this estimate of age of first breeding comes from Harris (1970) based on data from the late 1960s when the population was rapidly growing and opportunities for new breeders to recruit to colonies may have been constrained. Since then, the lesser black-backed gull population has undergone a substantial decline, most likely primarily due to reduced breeding success (Burnell et al. 2023). Consequently, given reduced numbers of adults in the population, compared with the late 1960s, birds younger than five years old may now be able to secure breeding sites. Ross-Smith et al. (2014a) noted that recruitment into breeding populations occurred at a younger age at colonies where the population size was reduced by culling. In other words, assuming birds first breed at age four years is a realistic assumption under current ecological conditions.

Table 5-1. Evaluation of long list of compensatory measures for lesser black-backed gull to compensate for potential Morecambe Offshore Windfarm collision mortality.

	Compensatory measure & delivery mechanism	Defra compensation hierarchy	Chance of success	Timeframe	Cost-effectiveness	Deliverability	Take forward to short list?
1.	Closure of sandeel and sprat fisheries. This measure would need to be delivered by changes to fisheries management by government	1. Address same impact at same location OR 2. Same ecological function different location OR 4. Comparable ecological function different location. There is no active sandeel fishery in the Irish Sea so benefits from fishery closure would only be for colonies on the east coast of Britain, i.e. 'different location'. The greatest benefits would be for other seabird species, i.e. 'comparable ecological function'. There is a sprat fishery in the Irish Sea so closure of this fishery could deliver benefits at the same location.	LOW as lesser black-backed gulls do not rely heavily on sandeel or sprat in their diet and there is no active sandeel fishery in the Irish Sea	MEDIUM as fishery closure could be rapidly implemented by government but full stock recovery could take several years	UNKNOWN as this strategic measure would need to be implemented by government	LOW. STRATEGIC measure. The Project is not able to deliver this strategic measure; only government can implement fisheries closures	NO due to the low chance of success and low ability of the Project to deliver this measure
2.	Reducing by-catch by commercial fisheries. The commercial fleet could be encouraged to use alternative fishing gear that reduces bycatch but changes to government policy on gear	2. Same ecological function different location OR 4. Comparable ecological function different location	LOW as lesser black-backed gulls are rarely caught by commercial fisheries (Northridge et al. 2020) and tend to	LOW due to time required for development and testing of new gear. However, once implemented, benefits of reducing bycatch of	LOW as development and trials of novel fishing gear would be expensive; financial incentives may be required to	LOW. STRATEGIC measure. The Project alone is not able to deliver this strategic measure; the resources required to deliver this measure would mean	NO due to the low chance of success and low ability of the Project to deliver this measure

Compensatory measure & delivery mechanism	Defra compensation hierarchy	Chance of success	Timeframe	Cost-effectiveness	Deliverability	Take forward to short list?
use would increase the extent to which alternative gear was used.	There is no evidence of bycatch impacting lesser black-backed gull colonies around the Irish Sea so reductions in bycatch would likely benefit colonies elsewhere, i.e. 'different location'. The greatest benefits would be for other seabird species, i.e. 'comparable ecological function'.	forage in land rather than at sea where they are at risk of bycatch (Clewley et al. 2020; Scragg et al. 2016).	adult birds would immediately increase numbers of breeding adults	ensure uptake of new gear by the fishing fleet, in the absence of a change in government policy	multiple OWF projects would need to contribute to delivering this; to be effective, this measure would need support from a change in government policy.	
3. Eradication/exclusion of mammalian predators at colonies. This could be delivered by construction of a fence and/or a trapping programme and subsequent biosecurity measures. Given evidence for fox and badger predation on lesser black-backed gulls breeding in Lancashire and Cumbria, and the success of predator exclusion fencing, the focus for this measure would be fencing to exclude predators rather than a trapping programme.	1. Address same impact at same location OR 2. Same ecological function different location. A fence has already been installed at South Walney but fencing at Banks Marsh (Alt & Ribble Estuaries SPA) could be an option, i.e. address same impact at same location, as would erecting fencing at other colonies, i.e. same ecological function different location.	HIGH as lesser black-backed gull breeding success is known to be suppressed by mammalian predation (Dalrymple, 2023)	MEDIUM . As it would be necessary to obtain evidence of mammalian predation of lesser black-backed gull eggs/chicks prior to erecting a fence. Once a fence was installed, the size of the breeding colony and productivity would be expected to rapidly increase, as has occurred at South Walney (Dalrymple, 2023). While it would be up to five years before the increased numbers of fledglings recruit into the breeding population, immigration of breeding adults from	MEDIUM . Fox and badger proof fencing is expensive to purchase and install. Regular inspection and maintenance of the fence would be required as well as monitoring for any signs of mammalian predation within the colony.	HIGH . The Project could deliver this compensatory measure at a suitable site. Further discussion with Natural England and RSPB will assist with identifying suitable sites while ensuring measures are additional to existing site management. However, there are likely to be challenges in terms of identifying suitable locations, obtaining land rights and securing planning permission to erect a fence through the local planning authority.	YES . Predation by foxes and badgers was identified as the primary cause of declines in the Morecambe Bay & Duddon Estuary SPA lesser black-backed gull feature. Mammalian predator exclusion fencing was a compensatory measure for lesser black-backed gulls that was agreed for the consented OWF projects: Norfolk Boreas, Norfolk Vanguard, East Anglia ONE North and East Anglia TWO (MacArthur Green and Royal HaskoningDHV, 2022) illustrating the

Compensatory measure & delivery mechanism	Defra compensation hierarchy	Chance of success	Timeframe	Cost-effectiveness	Deliverability	Take forward to short list?
			elsewhere would quickly supplement the breeding population.			acceptability of this measure.
4. Ending culling. This would require the relevant authority/SNCB to not issue licenses to cull lesser black-backed gulls.	2. Same ecological function different location. Culling is virtually obsolete at natural colonies (Burnell et al. 2023) meaning this measure would need to be implemented at a colony other than the potentially impacted SPAs, e.g. at urban gull colonies.	LOW as culling is no longer limiting population growth at SPAs where lesser black-backed gull are a listed feature.	HIGH as cessation of culling would immediately ensure that adult lesser black-backed gulls remain in the breeding population, that would otherwise have been lost from the population.	HIGH. There would be negligible costs to implementing this measure beyond monitoring requirements.	LOW. STRATEGIC measure. The Project is not able to control the issue of licences for culling lesser black-backed gulls as that is the responsibility of the relevant authority/SNCB.	NO due to the low chance of success and low ability of the Project to deliver this measure
5. Habitat management to create suitable nesting vegetation height and cover. This could be delivered through planting/control of vegetation/scrub to provide optimal ground cover and sward height for breeding success	1. Address same impact at same location OR 2. Same ecological function different location. Habitat management either at impacted SPAs or other suitable colonies.	MEDIUM. Prevention of scrub encroachment would maintain breeding areas, although currently there is insufficient evidence on optimal vegetation management to maximise breeding success to ensure success of this measure.	MEDIUM. If successful, habitat management would result in an increase in numbers of chicks fledged. While it would be up to four years before the increased numbers of fledglings recruit into the breeding population, immigration of breeding adults from elsewhere would quickly supplement the breeding population.	HIGH. Management of vegetation could be relatively cheap to implement.	HIGH. The Project would be able to deliver vegetation management.	YES. Vegetation management, particularly prevention of scrub encroachment has been identified as the primary cause of declines in the lesser black-backed gull population on Steep Holm. This compensatory measure is very likely to be beneficial as a key measure as well as a supporting, e.g. secondary measure, alongside exclusion of mammalian predators.

Compensatory measure & delivery mechanism	Defra compensation hierarchy	Chance of success	Timeframe	Cost-effectiveness	Deliverability	Take forward to short list?
6. Habitat management to reduce flooding of nests, through creation of flood defences.	1. Address same impact at same location OR 2. Same ecological function different location. Habitat management either at impacted SPAs or other suitable colonies.	LOW. While flooding has reduced breeding success at Banks Marsh, relatively few colonies are at risk of flooding and creation of flood defences is likely to be challenging alongside wider 'managed realignment' approaches.	MEDIUM. If successful, habitat management would result in an increase in numbers of chicks fledged. While it would be up to five years before the increased numbers of fledglings recruit into the breeding population, immigration of breeding adults from elsewhere would quickly supplement the breeding population.	MEDIUM. Creation and maintenance of flood defences could be relatively expensive.	MEDIUM. Building flood defences would require wider consultation and integration with local flood management schemes.	NO. due to the low chance of success and low ability of the Project to deliver this measure
7. Release of captive reared chicks	1. Address same impact at same location OR 2. Same ecological function different location. Release of captive-reared chicks may need to be in a location away from existing colonies to reduce intra-specific competition which could reduce survival of both released birds and naturally fledged birds.	UNKNOWN at present – further investigation and research is required to understand whether captive reared chicks can successfully survive and recruit into natural colonies.	LOW. Further work is needed to establish (a) availability of lesser black-backed gull eggs, (b) availability of facilities for hatching and rearing chicks, (c) survival rates of captive-reared chicks compared with wild chicks, (d) determine suitable locations for releasing captive-reared chicks. This would take several years.	MEDIUM / LOW. Setting up a programme and facilities for successfully raising and releasing chicks could be very expensive, including initial monitoring / trialling of methods	LOW. Setting up a programme of releasing captive reared chicks requires considerable time and financial investment that would be best suited to a collaborative compensation approach among a group of developers.	NO. Current risks to success of this measure along with long timescales and uncertainty about delivery make this measure unsuitable for further consideration.

	Compensatory measure & delivery mechanism	Defra compensation hierarchy	Chance of success	Timeframe	Cost-effectiveness	Deliverability	Take forward to short list?
8	Strategic option – contribution to a Marine Recovery Fund	1. Address same impact at same location OR 2. Same ecological function different location. Strategic compensation may be implemented either at impacted SPAs or other suitable colonies.	HIGH Predator reduction and habitat restoration and creation are currently identified by OWIC as target compensatory measures. For both these measures, the evidence collated for the respective Project-alone measures are equally valid for the purposes of the strategic delivery of these measures.	UNKNOWN at present, delivery of strategic compensation is dependent on secondary legislation which is not yet in place.	MEDIUM / HIGH Management of vegetation could be relatively cheap to implement, fox and badger proof fencing is more expensive.	UNKNOWN at present, there is currently no mechanism by which strategic compensation through the MRF can be formally delivered.	YES. A contribution to the MRF (or equivalent) may be considered as an alternative to a Project-specific compensation measure if it is considered that there is a mechanism by which strategic compensation can be delivered.

6 NEXT STEPS

The evaluation of the long list of potential compensatory measures (**Table 5-1**) considered eight measures. Of these, five were considered to be unsuitable for further consideration as Project led options:

- Closure of sandeel and sprat fisheries;
- Reduce by-catch by commercial fisheries;
- Ending culling;
- Habitat management to reduce flooding of nests; and,
- Release of captive reared chicks.

Two Project-specific measures were considered suitable to take forward for the Project Compensation Plan:

- Exclusion of mammalian predators at colonies using fencing; and,
- Habitat management to create suitable nesting vegetation height and cover.

A contribution to the MRF may be considered as an alternative to a Project-specific compensation measure if it is considered that there is a mechanism by which strategic compensation can be delivered.

Following the identification of the two key measures, the following steps were taken:

1. **Stakeholder agreement** on the two key compensation measures (exclusion of mammalian predators and habitat management) to take forward for the Compensation Plan has taken place (refer to Table 2-1);
2. **Suitable compensation sites have been identified** where lesser black-backed gull breeding success is currently suppressed either by mammalian predation or lack of suitable breeding habitat; potential site locations have also been discussed with stakeholders (**Table 2-1Table 2-1**). A list of potential compensation sites has been evaluated in Annex 2A.
3. The **Evidence Plan and Roadmap** (Annex 2B) describes, in detail, exactly how the proposed compensation measures would be delivered if deemed required.

7 REFERENCES

- Balmer, D.E., Gillings, S., Caffrey, B.J., Swann, R.L., Downie, I.S. and Fuller, R.J. 2013. Bird Atlas 2007-11: the breeding and wintering birds of Britain and Ireland. BTO Books, Thetford.
- Blackledge, D., Holton, N., and Maclauchlan, M. 2013. Hodbarrow Reserve Annual Report for 2012/13. Unpublished RSPB report.
- Campbell, J. 2012. Rockcliffe Marsh Wardens Report 2012. Unpublished report, Cumbria Wildlife Trust.
- Clewley, G.D., Thaxter, C.B., Humphreys, E.M., Scragg, E.S., Bowgen, K.M., Bouten, W., Masden, E.A. & Burton, N.H.K. 2021. Assessing movements of Lesser Black-backed Gulls using GPS tracking devices in relation to the Walney Extension and Burbo Bank Extension Offshore Wind Farms. BTO Research Report No. 738.
- Cooper, J. 2013. <http://www.acap.aq/index.php/en/news/latest-news/1359-predator-proof-fences-are-helping-to-protect-procellariiform-seabirds-including-acap-listed-albatrosses-and-petrels>
- Cramp, S. & Simmons, K.E.L. (Eds.) 1983. The birds of the Western Palearctic. Vol. III. Oxford University Press, Oxford.
- Davis, J. W. F. & Dunn, E. K. 1976. Intraspecific predation and colonial breeding in Lesser Black-backed Gulls *Larus fuscus*. Ibis 118: 65–77.
- Davis, S., Wilson, L. J., Brown, A. and Bolton, M. 2018. Productivity of Herring Gulls *Larus argentatus* and Lesser Black-backed Gulls *L. fuscus* in relation to fox predation risk at colonies across northern England and Wales in 2012. RSPB Research Report 61. RSPB Centre for Conservation Science, RSPB, The Lodge, Sandy, Bedfordshire, SG19 2DL.
- Defra 2021. Best practice guidance for developing compensatory measure in relation to Marine Protected Areas. 25 pp.
- Defra, 2024. Consultation on policies to inform updated guidance for Marine Protected Area (MPA) assessments. Available at: 090224 OWEIP Consultation on updated policies to inform guidance for MPA assessments_.pdf (defra.gov.uk).
- Department for Environment, Food and Rural Affairs (Defra), 2021. Best practice guidance for developing compensatory measures in relation to Marine Protected Areas. Version: For consultation.
- Furness, R.W., Tasker, M.L. 2000. Seabird-fishery interactions: quantifying the sensitivity of seabirds to reductions in sandeel abundance, and identification of key areas for sensitive seabirds in the North Sea. Marine Ecology Progress Series, 202: 253-264.
- Furness, R.W., MacArthur, D., Trinder, M. and MacArthur, K. 2013. Evidence review to support the identification of potential conservation measures for selected species of seabirds. Report to Defra.
- Harris. 1970. Rates and Causes of Increases of some British Gull Populations. *Bird Study*, 17, 325–335.

Howe, A., and Record, L. 2015. Havergate Reserves South Suffolk Coast. Annual Report for 2014/15.

JNCC, 2023. UK National Site Network: site summary details, 31 October 2023. UK National Site Network (SAC and SPA): site summary details spreadsheet | JNCC Resource Hub

Johnston DT, Thaxter CB, Boersch-Supan PH, Humphreys EM., Bouten, W., Clewley, G.D., Scragg, E.S., Masden, E.A., Barber, L., Conway, G.J., Clark, N.A., Burton, N.H.K. Cook, A.S.C. P. 2022. Investigating avoidance and attraction responses in lesser black-backed gulls *Larus fuscus* to offshore wind farms. Mar Ecol Prog Ser 686:187-200. <https://doi.org/10.3354/meps13964>

Kim, SY., Monaghan, P. 2005a. Effects of vegetation on nest microclimate and breeding performance of lesser black-backed gulls (*Larus fuscus*). J Ornithol 146, 176–183. <https://doi.org/10.1007/s10336-005-0077-6>

Kim, SY., Monaghan, P. 2005b. Interacting effects of nest shelter and breeder quality on behaviour and breeding performance of herring gulls. Animal Behaviour, 69 (2), 301-306.

Langley, L.P., Bearhop, S., Burton, N.H.K., Banks, A.N., Frayling, T., Thaxter, C.B., Clewley, G.D., Scragg, E. and Votier, S.C. (2023), Urban and coastal breeding lesser black-backed gulls (*Larus fuscus*) segregate by foraging habitat. Ibis, 165: 214-230. <https://doi.org/10.1111/ibi.13109>

MacArthur Green & Royal HaskoningDHV, 2021. East Anglia ONE North Offshore Windfarm. Offshore Ornithology Without Prejudice Compensation Measures (No. EN010077- 005186_ ExA.AS- 28.D11.V3).

MacArthur Green, 2021. Report to Crown Estate Scotland and SOWEC: HRA Derogation Scope B - Review of seabird strategic compensation options (Commissioned by Crown Estate Scotland).

Mavor, R.A., Parsons, M., Heubeck, M. and Schmitt, S. 2006. Seabird numbers and breeding success in Britain and Ireland, 2005. JNCC. Peterborough. (UK Nature Conservation, No. 30).

Mavor, R.A., Parsons, M., Heubeck, M., Pickerell, G. and Schmitt, S. 2003. Seabird numbers and breeding success in Britain and Ireland, 2002. JNCC. Peterborough. (UK Nature Conservation, No. 27).

Mavor, R.A., Pickerell, G., Heubeck, M. and Thompson, K.R. 2001. Seabird numbers and breeding success in Britain and Ireland, 2000. JNCC. Peterborough. (UK Nature Conservation, No. 25).

North West England Gull Project, 2021. Gull Ringing Report. North West England Gull Project - 2021 Gull Ringing Report (nwgulls.org.uk)

Northridge, S., Kingston, A., Coram, A. 2020. Preliminary estimates of seabird bycatch by UK vessels in UK and adjacent waters. Final report to JNCC. Scottish Ocean Institute, University of St Andrews.

OSPAR Commission. 2016. Common Indicator: Marine bird breeding productivity (B3): OSPAR.

Rock, P. 2005. Urban gulls: problems and solutions. British Birds 98: 338–355.

Rock, P. & Vaughan, I. P. 2013. Long-term estimates of adult survival rates of urban Herring Gulls *Larus argentatus* and Lesser Black-backed Gulls *Larus fuscus*. Ringing & Migration 28: 21–29.

Ross-Smith, V.H., Grantham, M.J., Robinson, R.A., Clark, J.A. 2014a. Analysis of Lesser Black-backed Gull data to inform meta-population studies. BTO Research Report No. 654. Report of work carried out by The British Trust for Ornithology under contract to Natural England. https://www.bto.org/sites/default/files/shared_documents/publications/research-reports/2014/rr654.pdf

Ross-Smith, V.H., Robinson, R.A., Banks, A.N., Frayling, T.D., Gibson, C.C., Clark, J.A. 2014b. The Lesser Black-backed Gull *Larus fuscus* in England: how to resolve a conservation conundrum. SEABIRD, 27: 41–61.

Ross-Smith, V.H., Johnston, A. and Ferns, P.N. 2015. Hatching success in Lesser Black-backed Gulls *Larus fuscus* - an island case study of the effects of egg and nest site quality. Seabird 28, 1-16

Smith, R.K., Pullin, A.S., Stewart, G.B., Sutherland, W.J. 2011. Is nest predator exclusion an effective strategy for enhancing bird populations? Biological Conservation. 144 (1) 1-10. doi.org/10.1016/j.biocon.2010.05.008.

Sutherland, W. J., Newton, I. and Green, R. 2004. Bird Ecology and Conservation: A Handbook of Techniques, Oxford University Press.

Appendix 2: Lesser Black-Backed Gull Compensation Document



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Morecambe Offshore Windfarm Generation Assets

Annex 2A: Site Selection for Compensatory Measures for Lesser Black- Backed Gull (Tracked)

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Figure 1-1 Locations of potential lesser black-backed gull compensation sites for Morecambe Offshore Windfarm discussed during consultation, as well as the two potentially impacted SPAs and the Morecambe Offshore Wind Farm development area. 7

1 INTRODUCTION

1.1 Background

Morecambe Offshore Windfarm (OWF) is a proposed offshore windfarm located in the east Irish Sea, approximately 30km off the Lancashire coast. It is being developed by Morecambe Offshore Windfarm Ltd, hereafter ‘the Applicant’. The Morecambe Offshore Windfarm shares a grid connection location with the Morgan Offshore Wind Project, also located in the east Irish Sea. For the purposes of this document, ‘the Project’ refers only to the Morecambe Offshore Windfarm Generation Assets, which consists of the wind turbine generators, inter-array cables, offshore substation platform(s) and possible platform link cables that will be located within the windfarm site. The Project will comprise up to 35 wind turbine generators installed over a windfarm site area of approximately 87km².

The Report to Inform Appropriate Assessment (RIAA, Document Reference 4.9) concluded that no Project-alone adverse effect on the integrity (AEol) of European Sites is expected and the Project does not make any measurable contribution to in-combination values. However, the conclusions of the Secretary of State may not be the same as the Applicant with regard to contribution to in-combination values on lesser black-backed gull (*Larus fuscus*) feature of the Morecambe Bay & Duddon Estuary Special Protection Area (SPA) and/or the Ribble & Alt Estuaries SPA as a result of collision risk. Therefore, in response to feedback from consultation undertaken during the pre-application period, and through discussions with the Offshore Ornithology Expert Topic Group (ETG) on the in-combination assessment, a ‘without prejudice’ derogation case has been provided.

A number of options for relevant compensation measures have been developed as far as possible at the point of application. In the event that the Secretary of State determines potential for AEol and considers that compensation is required, the Project has provided sufficient confidence that compensation measures are available, securable and deliverable. The compensation would be implemented in accordance with the approved Compensation Implementation and Monitoring Plan (CIMP). Compensatory measures will be maintained for the operational lifetime of the wind turbine generators (WTGs), subject to any necessary adaptive management.

1.2 Purpose of this document

This Site Selection for Compensatory Measures for Lesser Black-Backed Gull report is one of three documents that make up the Compensation Plan for the Project:

- Annex 1A Initial Review of Compensatory Measures and Ecological Evidence for Lesser Black-Backed Gull;
- Annex 2A (this report) Site Selection for Compensatory Measures for Lesser Black-Backed Gull; and,
- Annex 2B Evidence Plan and Roadmap for Lesser Black-Backed Gull.

This report identifies potential sites where compensation measures (refer to Annex 2A) could be delivered. A total of seven potential compensation sites have been identified in this document (section 1.5). The suitability of each site has been assessed and four key sites have been taken

forward where proposed compensation measures (construction of a mammalian predator-proof fence and/or habitat management) could be implemented to improve breeding lesser black-backed gull breeding success.

1.3 Aim of the Compensation Plan

The key aim of the Compensation Plan is to enable increased lesser black-backed gull breeding success at a selected compensation colony either through the construction of a mammalian predator-proof exclusion fence followed by a programme to control mammalian predators within the fenced enclosure and/or through habitat management to create suitable lesser black-backed gull nesting vegetation height and cover.

Objectives for the Compensation Plan will depend on the key factor (mammalian predation or lack of suitable breeding habitat) limiting lesser black-backed gull breeding success at the chosen compensation site.

Objectives if the key factor limiting breeding success at the selected compensation site is mammalian predation:

- 1) Construction of a mammalian predator-proof exclusion fence around an existing lesser black-backed gull colony or a recently vacated colony or in an area that is close to an existing/recently vacated lesser black-backed gull colony where predatory mammals are known to be present and predate on gull eggs and chicks. Vegetation management within the exclusion fence may be required to make it suitable for breeding lesser black-backed gulls, depending on the compensation site;
- 2) Mammalian predator removal (e.g. foxes and badgers) within the constructed fenced enclosure;
- 3) Regular monitoring after the exclusion fence has been installed to check for any breaches in the fence and incursion of predators. Additional mammalian predator removal would be carried out if a breach is identified as an adaptive management measure; and,
- 4) Annual monitoring of the compensation colony to record productivity and evaluate the effectiveness of the proposed compensation measure to be reported back to the lesser black-backed gull Compensation Steering Group (LBBGCSG) and Secretary of State.

Objectives if the key factor limiting breeding success at the selected compensation site is lack of suitable breeding habitat:

- 1) Habitat management at an existing lesser black-backed gull colony or a recently vacated colony or in an area that is close to an existing/recently vacated lesser black-backed gull colony where mammalian predation is not a key factor limiting breeding success to create suitable nesting vegetation height and cover and prevent scrub encroachment;
- 2) Ongoing vegetation and scrub management and monitoring to assess increases in lesser black-backed gull breeding population; and,

- 3) Annual monitoring of the compensation colony to record colony size and evaluate the effectiveness of the proposed compensation measure to be reported back to the LBBGCSG and Secretary of State.

1.4 Consultation

Pre-application consultation to engage with members of the Offshore Ornithology ETG and other stakeholders regarding potential in-principle compensation sites has taken place. For a summary of all consultation and information gathering that has taken place refer to Table 2-1 in Annex 1A.

1.5 Site overview

The locations of the following seven key potential compensation sites are provided in Figure 1-1

- Barrow gas terminal;
- The 'Spit' colony on South Walney;
- 'Gull Meadow' colony on South Walney;
- The 'Lagoon complex' on South Walney;
- Banks Marsh gull colony;
- Cavendish Dock; and
- Steep Holm island.

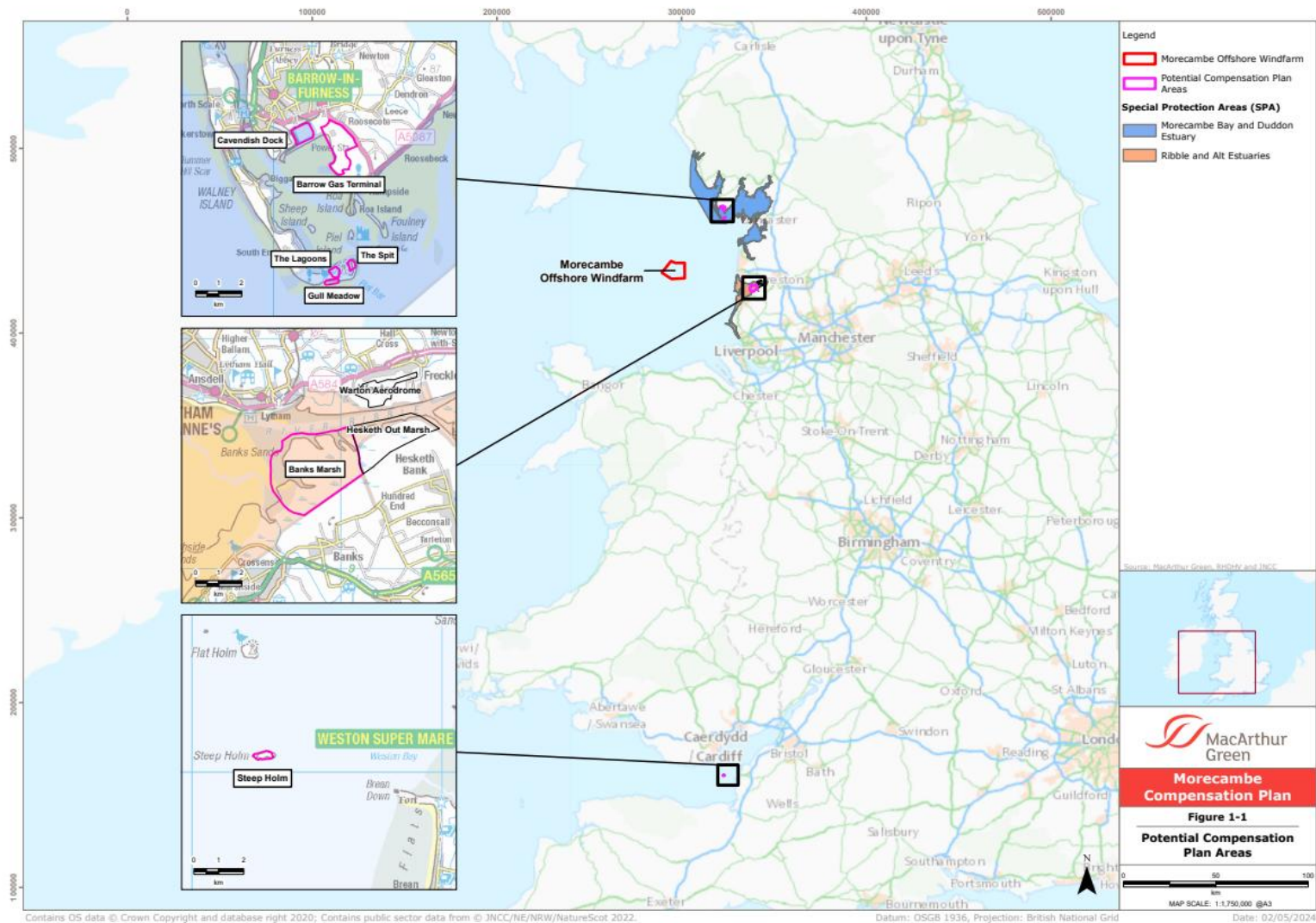


Figure 1-1 Locations of potential lesser black-backed gull compensation sites for Morecambe Offshore Windfarm discussed during consultation, as well as the two potentially impacted SPAs and the Morecambe Offshore Wind Farm development area.

1.5.1 Barrow Gas Terminal

The Barrow Gas Terminal, owned by Spirit Energy is a potential compensation site located immediately adjacent to the Morecambe Bay & Duddon Estuary SPA. Lesser black-backed gulls have been recorded in the recent past (up until 2022) within the southern terminal complex on a round concrete patch that was fenced on three sides; the gas terminal used to be considered relatively predator-proof as the complex was surrounded by a fence, however foxes were able to gain access through a space underneath the main gate and predate the gull colony (*pers comm* from a senior ornithologist at Natural England, 12 Feb 2024). Plans were announced at the end of January 2023 to redevelop the decommissioned gas terminal into a new carbon storage cluster facility (Spirit Energy Ltd, 08 Mar 2024). The gas terminal is directly adjacent to a tidal sandy bay ‘Roosecote Sands’ on the west side and the rest of the complex is surrounded by agricultural fields as well as a quarry in the north; Spirit Energy also own fields and the quarry that surround the terminal complex. An initial discussion with Spirit Energy Ltd regarding possible opportunities to establish a mammalian predator-proof fence to protect lesser black-backed gulls on the land within or around the Barrow gas terminal has been held (Spirit Energy Ltd, 08 Mar 2024). Due to the redevelopment plans much of the southern part of the complex (where the gull colony on the round concrete patch was located) has changed in recent months (Spirit Energy Ltd, 08 Mar 2024). Use of suitable land parcels for the Project’s Compensation Plan have been considered by Spirit Energy. Although it is not currently possible for Spirit Energy to commit any of these areas in the time frame required by the Project, discussions are on ongoing (Spirit Energy, 22 April 2024).

1.5.2 South Walney

The ‘Spit’, ‘Gull Meadow’ and the ‘Lagoon complex’ are three potential compensation sites that are part of the South Walney Nature Reserve located on South Walney ‘Island’ which is within the boundary of the Morecambe Bay & Duddon Estuary SPA. South Walney is connected to the mainland by a bridge (into the town of Barrow-In-Furness) at the north end of the island. The land at South Walney Nature Reserve is rented by Cumbria Wildlife Trust from the Holker Estate. A discussion with the warden at South Walney has taken place to consider potential suitable compensation sites for the Project (*pers comm* from the warden at South Walney, 27 Feb 2024).

1.5.2.1 The Spit

The ‘Spit’ is a dune and shingle area at the far south-eastern end of South Walney. Although gulls used to breed all over South Walney, lesser black-backed gulls now only breed within a permanent fenced enclosure located on the Spit (Dalrymple, 2023; *pers comm* from the warden at South Walney, 27 Feb 2024).

1.5.2.2 Gull Meadow

Gull Meadow is an area of semi-fixed dune on the western shoreline of the South Walney Nature Reserve that is approximately 600m west of the Spit. Currently no fence exists at Gull Meadow; in 2011 the Cumbria Wildlife Trust trialled temporary electric fencing at Gull Meadow, but it was ineffective at preventing fox predation on lesser black-backed gulls (*pers comm* from the warden at South Walney, 27 Feb 2024).

1.5.2.3 Lagoon Complex

The Lagoon Complex is a series of lagoons containing some islands that are approximately 200m north of Gull Meadow. The lagoons are 5 to 6 metres deep in places but as foxes can swim between the islands, being surrounded by water is not enough to stop fox predation. One of the lagoon islands (nicknamed ‘Gullcatraz’) is already fenced. This fence protects breeding great black-backed gulls from otter and fox predation (*pers comm* from the warden at South Walney, 27 Feb 2024). There are potential options for other islands in the lagoon complex to be fenced, or another potential option is to entirely surround the lagoon complex with a long extensive fence (Natural England, 25 Jan 2024). A new fencing project in an area west of the lagoons (due north of Gull Meadow) is due to be trialled in summer 2024. The aim is to construct a temporary electric fence and try using decoy gulls within the electric fence to see if gulls can be encouraged back to breed in this area (*pers comm* from the warden at South Walney, 27 Feb 2024).

1.5.3 Banks Marsh

The Banks Marsh gull colony on the Ribble Estuary is a potential compensation site within the boundary of the Ribble & Alt Estuaries SPA, the site is a National Nature Reserve (NNR) owned and managed by Natural England. The adjacent Hesketh Out Marsh (owned and managed by the RSPB) to the east of Banks Marsh is outside the Ribble & Alt Estuaries SPA. Banks Marsh is an area of coastal saltmarsh, grazed by cattle and sheep; it is subject to flooding during spring tides early in the season, although lesser black-backed gulls nest on the higher ground at Banks Marsh and are slightly less affected by flooding than other species on lower ground (RSPB, 29 Jan 2024). The RSPB has written a Feasibility Report (RSPB, 2024) regarding a proposal to construct a mammalian predator-proof fence along the southern (landward) boundary of the saltmarshes at Banks Marsh NNR and the RSPB Hesketh Out Marsh nature reserve on the Ribble Estuary. Mammalian predator pressure is currently impacting protected breeding bird species in this area. The project involves the construction of a c. 9km long permanent predator exclusion fence (otherwise referred to as the ‘mega-fence’ proposal) on the landward boundary of Banks Marsh NNR and Hesketh Out Marsh between the Crossens channel and River Douglas channel. The RSPB fence project aims to protect a range of ground nesting birds from mammalian predation (principally caused by foxes) including a range of waders, terns and lesser black-backed gulls (RSPB, 2024)

1.5.4 Cavendish Dock

Cavendish Dock is a disused dock that is now a reservoir, within the boundary of the Morecambe Bay & Duddon Estuary SPA. The dock, which is owned by the Associated British Ports, is located within 500m to the north-west of the Barrow Gas Terminal where it is situated between Roosecote Sands adjacent to the south and the town of Barrow-In-Furness in the north. The area of the dock spans some 591,000 square metres and is around 10ft deep. A trout fishery once operated at the dock but now it is fished mostly by carp anglers¹. The dock is a known wintering site for some wildfowl species (Banks et al. 2006) and a range of passerines and waders are recorded in this location each year (Cumbria Bird Club²). Natural England consider that lesser black-backed gulls could be encouraged to breed at Cavendish Dock on floating platforms which could also be

¹ <https://barrowanglingassociation.co.uk/our-waters/cavendish-dock/>

² <https://cumbriabirdclub.org.uk/page/2/?s=Cavendish>

surrounded by predator proof fencing (Natural England 25 Jan 2024; *pers comm* from a senior ornithologist at Natural England, 12 Feb 2024).

1.5.5 Steep Holm

Steep Holm is an island approximately 3.7km south of the island of Flat Holm and 8km west of the town of Weston-Super-Mare in North Somerset; the islands mark the transition between the Severn Estuary and the Bristol Channel. Steep Holm is over 240km south of the Ribble & Alt Estuaries SPA and the Morecambe Bay & Duddon Estuary SPA. The island, which is privately owned by the Kenneth Allsop Memorial Trust, is approximately 790m long and 315m wide; it is a nature reserve and a Site of Special Scientific Interest (SSSI) which lists breeding lesser black-backed gull (as well as herring gull and great black-backed gull) colonies as a feature of interest³. The island has partially vegetated cliffs, with scrub and immature woodland habitats, and is also of archaeological interest. The growth of the scrub in the centre of the island is known to be currently limiting lesser black-backed gull breeding success by encroaching on suitable breeding sites, with many nests now restricted to cleared footpaths around the island (Natural England, 28 March and 18 April 2024). Steep Holm SSSI is overlapped by the Severn Estuary SPA and Seven Estuary Ramsar site. Although lesser black-backed gull is not currently listed as a designated feature of the Severn Estuary SPA, which was classified in 1995, both the islands of Steep Holm and Flat Holm are located within the SPA; 2,040 pairs of lesser black-backed gull bred on these two islands in 1993, which represented 2.5% of the British total population⁴. Subsequent to the designation of the Severn Estuary Ramsar site in 1995, the Ramsar site was revised in 2005 to include breeding lesser black-backed gull under criterion 6⁵ which qualifies a species or subspecies of waterbird if it “regularly supports 1% of the individuals in a population”⁶.

³ Steep Holm SSSI Citation is available at:

<https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/1002935.pdf>

⁴ Severn Estuary SPA citation, available at:

<https://publications.naturalengland.org.uk/publication/5601088380076032>

⁵ Information Sheet on Ramsar Wetlands for the Severn Estuary, available at: <https://jncc.gov.uk/jncc-assets/RIS/UK11081.pdf>

⁶ The Ramsar Sites Criteria are available at:

https://www.ramsar.org/sites/default/files/documents/library/ramsarsites_criteria_eng.pdf

2 REQUIREMENT FOR LESSER BLACK-BACKED GULL COMPENSATION

2.1 Key factors limiting breeding success

For the Compensation Plan to be successful, mammalian predation and/or lack of suitable breeding habitat must be the key factors limiting lesser black-backed gull breeding success at the compensation colony (refer to Annex 1A).

At six out of the seven potential compensation sites listed in this report (refer to section 1.5), consultation with the Offshore Ornithology ETG and other stakeholders has identified that mammalian predation (fox and badger) is the key constraint limiting the growth of the lesser black-backed gull colonies (e.g. Natural England 25 Jan 2024; *pers comm* from a senior ornithologist at Natural England, 12 Feb 2024; *pers comm* from the warden at South Walney, 27 Feb 2024). Mammalian predation has been identified as the key cause of decline of breeding lesser black-backed gull numbers at South Walney (Davis, 2013; Natural England's Designated Sites View; accessed 20th March 2024⁷), Barrow Gas Terminal (North West England Gull Project, 2021) and at Banks Marsh on the Ribble Estuary (RSPB, 2024).

At one potential compensation site (Steep Holm Island), a lack of suitable breeding habitat due to scrub encroachment is a key constraint limiting lesser black-backed gull breeding success (Natural England, 28 Mar and 18 April 2024). There are no foxes present on the island and mammalian predation is not considered to be causing a problem, however lesser black-backed gulls are now mainly restricted to nesting on the public pathways that are kept clear of vegetation (Natural England, 28 Mar and 18 April 2024). Natural England considers that the number of breeding lesser black-backed gulls would increase if the vegetation was managed to restore nesting habitat.

Food availability has not been identified as a key factor currently limiting lesser black-backed gull breeding success at the seven potential compensation sites. Lesser black-backed gulls have very broad diets (Langley, 2021), relatively large foraging ranges (Clewley et al. 2021) and they can breed successfully in urban areas which suggests that at the wider population scale, the lesser black-backed gull population doesn't appear to be limited by lack of food. As an example, a GPS tracking study on lesser black-backed gulls at South Walney has shown that this species uses a wide range of foraging habitats, particularly terrestrial habitats rather than the offshore marine environment (Clewley et al., 2021; Langley, 2021), which indicates there is potential for the South Walney colony to grow substantially larger before being restricted by food availability. If the predation pressure at South Walney was to be removed (e.g. by protecting lesser black-backed gulls within mammalian predator-proof fence enclosures; Dalrymple, 2023), then the population would be expected to increase to a new carrying capacity until restricted by the next most important limiting factor, which at South Walney could be food availability. The closure of a landfill at Walney in 2016⁸ did have an impact on lesser black-backed gull numbers. However, the fact that the lesser black-

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<https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK9020326&SiteName=morecambe&SiteNameDisplay=Morecambe+Bay+and+Duddon+Estuary+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAAArea=&NumMarineSeasonality=25>

⁸ South Walney Gull Colony <https://www.projectlote.life/news/swalney-gull>

backed gull population on South Walney was once much larger than it is now (more than 20,000 individuals in the 1990s but the latest count recorded in 2023 was 1,724 individuals (862 Apparently Occupied Nests), refer to **Table 3-1Table 3-1**) does suggest that food availability is not a key limiting factor, although landfill closures may mean that the South Walney population cannot now achieve sizes recorded in the past.

2.2 SPA connectivity with compensation sites

The Defra (2021) and Defra (2024) consultation documents offers a range of compensation options, including applying compensation measures for the same species or an ecologically similar and/or closely related species in areas distant from a given protected site (refer to section 3 in Annex 1A). Although for the Project it would be preferable to implement compensation at a site with evidence of connectivity to the Morecambe Bay & Duddon Estuary SPA and the Ribble & Alt Estuaries SPA (e.g. Barrow Gas Terminal) in order to have confidence that lesser black-backed gull chicks fledging from the compensation colony can potentially recruit into the impacted SPA populations, the Defra (2021, 2024) consultation documents allows compensation to be implemented at a site without direct connectivity to these SPAs (e.g. Steep Holm). As the likelihood of connectivity increases the closer colonies are together (Clewley et al., 2021; Ross-Smith et al., 2014), potential compensation sites close to the Morecambe Bay & Duddon Estuary SPA and the Ribble & Alt Estuaries SPA (e.g. Barrow Gas Terminal, South Walney, Banks Marsh, Cavendish Dock) would more likely have direct connectivity to these SPAs compared with a compensation site outside of the Lancashire or Cumbria area (e.g. Steep Holm).

A GPS tracking study on lesser black-backed gulls has shown that breeding gulls fitted with a GPS tag at South Walney (within the Morecambe Bay & Duddon Estuary SPA) have a relatively wide onshore distribution over anthropogenic habitats (e.g. agricultural, landfill and urban habitats) between Morecambe Bay and the River Ribble (Clewley et al., 2021). The tracking study indicates that a potential lesser black-backed gull compensation site located between the Morecambe Bay & Duddon Estuary SPA and the Ribble & Alt Estuaries SPA would likely have connectivity with both of these SPAs. The tracking study on lesser black-backed gulls also showed that areas close to the South Walney colony (including the 'Barrow Gas Terminal' potential compensation site; **Table 3-1Table 3-1**) clearly appear to be within range of lesser black-backed gulls from South Walney (Clewley et al., 2021). Ringing studies conducted by the North West England Gull Project⁹ have also shown that lesser black-backed gulls ringed as adults on South Walney have been recorded at the Barrow Gas Terminal colony which suggests that some individual gulls have relocated from the nearby South Walney colony.

Lesser black-backed gulls have high natal philopatry, with particularly males returning to breed at the site from which they fledged (Rock, 2005; Rock & Vaughan, 2013). Ringing studies on individuals ringed as chicks and later recovered in a different breeding season have demonstrated a high natal philopatry. This has been shown from studies ringing chicks in the north-west of England at both the Morecambe Bay & Duddon Estuary SPA and the Alt & Ribble Estuaries SPA, with most birds being resighted or recovered at their natal colony but with some interchange between colonies at South Walney, the Ribble Estuary (including Banks Marsh) and Bowland Fells (Ross-Smith et al.,

⁹ North West England Gull Project is available at: <https://www.nwgulls.org.uk/>

2014). For example, of 411 chicks ringed at South Walney, 93% were resighted at the same colony, 4% were recovered at the inland Bowland Fells colony and 2% at the Ribble Estuary; of 281 adults culled at Bowland Fells, 73% had been ringed at that colony, 22% were from South Walney and 3% from the Ribble colony (Ross-Smith et al., 2014). From this, Ross-Smith et al. (2014) concluded that the north-west England lesser black-backed gull colonies at South Walney, Ribble Estuary and Bowland Fells function as a single meta-population unit to some extent, although they noted that culling and low breeding success could have driven greater inter-colony movements than might have occurred otherwise.

The Severn Estuary region (including Steep Holm island) may function as a separate meta-population from the north-west England (and the east of England) gull colonies. A ringing study of 43 lesser black-backed gull chicks in Bristol found that all were resighted in Bristol and not at north-west colonies (South Walney, Bowland or Ribble) or at Orford Ness in the east of England; other ringing studies have shown that approximately half of the chicks ringed in Bristol were resighted as adults less than 100km away, although others were resighted between 100 to 500km away (Ross-Smith et al., 2014). These studies indicate that it is less likely that lesser black-backed gull chicks fledging from a compensation colony on Steep Holm would be recruited into the Morecambe Bay & Duddon Estuary SPA or the Alt & Ribble Estuaries SPA populations which are at least 240km distant from Steep Holm. However, Skomer, Skokholm and the Seas off Pembrokeshire SPA is designated for breeding lesser black-backed gull¹⁰. This species breeds primarily on the islands of Skomer and Skokholm which are approximately 157km west from Steep Holm, it is considered possible that at this distance chicks fledging from a compensation colony on Steep Holm could be recruited into the Skomer, Skokholm and the Seas off Pembrokeshire SPA and therefore improve the wider National Site Network (refer to section 3, Annex 1A). Natural England has confirmed (meeting 18 April 2024) that measures to increase the lesser black-backed gull population at Steep Holm would provide suitable compensation for potential effects on Morecambe Bay & Duddon Estuary SPA and the Ribble & Alt Estuaries SPA, through the wider benefits to the National Site Network.

2.3 Location of compensation measure

Out of the seven key potential compensation sites listed in this report (refer to section 1.5), one site (Barrow Gas Terminal) is located outside the boundary of any SPA, five potential sites (the Spit, Gull Meadow, Lagoon Complex, Banks Marsh and Cavendish Dock) are wholly located either within the Morecambe Bay & Duddon Estuary SPA or the Ribble & Alt Estuaries SPA and one site (Steep Holm) is located within the Severn Estuary SPA (refer to ~~Table 3-1~~Table 3-1 and Error! Reference source not found.).

A number of suitable locations for the compensation measure have been identified within and adjacent to the Barrow Gas Terminal (Email to Spirit Energy Ltd, 25 Mar 2024) which is adjacent to the Morecambe Bay & Duddon Estuary SPA; during consultation it was suggested that one of the reasons the Barrow Gas Terminal may be the most straightforward site to take forward for the

¹⁰ Skomer, Skokholm and the Seas off Pembrokeshire SPA. Citation available at: <https://jncc.gov.uk/our-work/skomer-skokholm-and-the-seas-off-pembrokeshire-mpa/>

Compensation Plan is that it avoids any ‘additionality’ concerns (Natural England and RSPB, 25 Jan 2024) as discussed below.

During consultation, the RSPB (e.g. 25 January 2024) raised concerns about the issue of ‘additionality’ i.e. whether it could be considered that the key compensation measure for the Project is additional to existing site management actions for either the Morecambe Bay & Duddon Estuary SPA or the Ribble & Alt Estuaries SPA, if the compensation site is located within the SPA boundary. The RSPB stated that compensation within an SPA could be considered possible, but that it would be necessary for the RSPB to examine their Due Diligence process to assess the RSPB’s position on whether the compensation measure for the Project could be considered as ‘in addition’ to the stated aims of the site management for either the Morecambe Bay & Duddon Estuary SPA or the Ribble & Alt Estuaries SPA (RSPB 25 Jan 2024; RSPB 29 Jan 2024).

However, Natural England and the Secretary of State have agreed to recent offshore wind farm projects developing a compensation plan within an SPA boundary. For example, for the Norfolk Boreas, Norfolk Vanguard, East Anglia ONE North and East Anglia TWO offshore wind farm projects, the Secretary of State agreed to a compensation plan involving the construction of a mammalian predator-proof fence enclosure within an SPA to protect breeding lesser black-backed gulls. The predator-proof fence enclosure was constructed in 2023 within the Alde-Ore Estuary SPA to compensate for predicted lesser-black backed gull mortality from these four offshore wind farms (MacArthur Green and Royal HaskoningDHV, 2022). The general approach to compensation was set out in the ‘Alde-Ore Estuary SPA In Principle Compensation Plan’ (MacArthur Green and Royal HaskoningDHV 2020), which established that Orford Ness contained suitable grassland habitat for breeding lesser black-backed gulls which could be used for compensation if an area was made fox-proof. Establishing the mammalian predator-proof fence within the Alde-Ore Estuary SPA was thought to be appropriate as it was considered to be an additional conservation measure above existing site management plans for the SPA for which there was no immediate prospect of funding being available to take this forward as a management measure.

Natural England’s Supplementary Advice on Conservation Objectives aims to restore the lesser black-backed gull population to a target above 10,000 pairs at Morecambe Bay & Duddon Estuary SPA (refer to Natural England’s Designated Sites View; accessed 20th March 2024⁷) and above 8,097 pairs at the Ribble & Alt Estuaries SPA (refer to Natural England’s Designated Sites View; accessed 20th March 2024¹¹). Given these set targets, there would appear to be scope for the Project to increase breeding success of lesser black-backed gulls within these two SPAs.

It should be noted that as habitat management is not part of current management plans listed for the Severn Estuary SPA¹², therefore the proposed habitat management compensation measure on Steep Holm island which is part of the SPA would be additional to management of the site.

¹¹

<https://designatedsites.naturalengland.org.uk/Marine/SupAdvice.aspx?SiteCode=UK9005103&SiteName=ribble&SiteNameDisplay=Ribble+and+Alt+Estuaries+SPA&countyCode=&responsiblePerson=&SeaArea=&IFCAAArea=&NumMarineSeasonality=20>

¹² Severn Estuary SPA Site Improvement Plan. Available at: <https://publications.naturalengland.org.uk/publication/4590676519944192>

2.4 Compensation level

To deliver compensation for Norfolk Boreas, Norfolk Vanguard, East Anglia ONE North and East Anglia TWO offshore wind farms within the Alde-Ore Estuary SPA at Orford Ness (refer to section 2.3) a 6-hectare (ha) enclosure was constructed using mammalian predator-proof fence. The fenced enclosure was erected in 2023 to compensate for the combined losses of lesser black-backed gulls of approximately 6.6 birds per annum (2.1 birds at Norfolk Boreas, 2.6 birds at Norfolk Vanguard, 0.3 birds at East Anglia ONE North and 1.6 birds at East Anglia TWO; MacArthur Green and Royal HaskoningDHV, 2022). To address the concerns of Natural England and the RSPB regarding the scale of compensation appropriate for this level of mortality, a compensation ratio of 3:1 was proposed (indicating that the compensation needed to be capable of delivering a minimum of 19.8 (6.6 multiplied by 3) adult birds into the population each year). The 6ha enclosure was considered to greatly over-compensate the number of breeding birds required to deliver this level of compensation.

Natural England has advised in its Relevant Representations (RR-061) that the method presented by Hornsea 3 OWF to calculate compensation requirements for their predicted kittiwake impacts is also appropriate for calculating lesser black-backed gull compensation. The Hornsea 3 OWF approach uses detailed demographic data which are not available for most species and is also quite difficult to follow as limited explanation was submitted by the project. However, as a guide for the scale of compensation this method estimated it is possible to take the final output (467 nest spaces) and divide it by the predicted mortality (73) to obtain a compensation multiplier of 6.4. Hornsea 3 then applied precaution to this through a proposal to build 4 structures, each with this nest space capacity. Hence the total compensation multiplier was 25.6 (4 x 6.4)¹³. By applying this 25.6 multiplier to the mean mortality of 1.02 lesser black-backed gulls (refer to section 4.1 in Annex 1a), it can be estimated that a total of 26 (25.6 multiplied by 1.02) new nest spaces would be required to offset the mortality of 1.02 lesser black-backed gull adults per year.

2.5 Spatial scale

Applying a multiplier of 25.6, the Compensation Plan would aim to produce an additional 26 lesser black-backed gull nest spaces within a target colony each year (section 2.4). Ross-Smith et al. (2015) recorded 348 nests in an area of 0.77ha, which equates to 452 nests/ha.

To reach a target of 26 nest spaces within a mammalian predator-proof enclosure for the Project (i.e. potentially constructed at Barrow Gas Terminal, South Walney, Banks Marsh or Cavendish Dock), the enclosure, in theory, would need to be approximately 0.06ha assuming a 'low' lesser black-backed gull nest density.

¹³ Hornsea 3 OWF: Response to the Secretary of State's Minded to Approve Letter Annex 2 to Appendix 2, Kittiwake Artificial Nest Provisioning, Ecological Evidence: [https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-003241-HOW03_30Sep_Appendix_2_Annex_2%20Ecological%20Evidence%20\(06543000_A\)%20combined%20\(06543760_A\).pdf](https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010080/EN010080-003241-HOW03_30Sep_Appendix_2_Annex_2%20Ecological%20Evidence%20(06543000_A)%20combined%20(06543760_A).pdf)

However, to minimise the risk that the birds do not use the enclosed space, it is not appropriate for the Project to enclose an area much smaller than 4ha. Like other gull species, lesser black-backed gulls do not breed in isolation, they are highly colonial and often breed in amongst other gull species, especially herring gull¹⁴. Nests can be tightly spaced (Ross-Smith et al. 2015) with just enough space between nests for occupants to avoid being pecked by the inhabitants of neighbouring nests. This scale of enclosure would provide for orders of magnitude many more pairs than would be necessary to compensate for the potential loss of a mean of 1.02 birds per annum at the Project (refer to section 2.4). For example, even at a low nest density of 452/ha (Ross-Smith et al. 2015), an area of 4ha (a square with 200m long sides) could theoretically accommodate 1,808 lesser black-backed gull pairs.

On Steep Holm island, there would be no requirement to construct an enclosure around the lesser black-backed gull colony as the key compensation measure required at this potential site is habitat management (refer to section 5, Annex 1A). To reach a compensation target of an additional 26 new nest spaces on Steep Holm each year, in theory, the scrub clearance area would need to be approximately 0.06ha assuming a 'low' lesser black-backed gull nest density. Given that Steep Holm is approximately 790m long and 315m wide (approximately 24.9ha), it can be concluded that there would be abundant capacity at this site to compensate for predicted mortality from the Project and that scrub clearance works at Steep Holm have the potential to significantly over-compensate for the for the potential loss of 1.02 birds per annum at the Project.

3 POTENTIAL KEY SITES FOR COMPENSATION

A total of seven key potential compensation sites (including Barrow Gas Terminal, Walney Island including the 'Spit', 'Gull Meadow' and the 'Lagoon complex', Banks Marsh, Cavendish Dock and Steep Holm) have been identified.

3.1 Site identification

Initially, a long list of sites in the UK identified the locations of key lesser black-backed gull breeding colonies (Davis et al., 2018; details of colony sizes recorded are available on the BTO Seabird Monitoring Programme¹⁵). The long list was narrowed down to the seven potential compensation sites listed in this report because they all have the following features:

- The site has some potential connectivity with lesser black-backed gulls breeding within the Morecambe Bay & Duddon Estuary SPA and the Ribble & Alt Estuaries SPA or at another SPA where breeding lesser black-backed gull is a designated feature;
- The site is known to support an existing lesser black-backed gull colony or has supported gull colonies in the recent past or is an area that is close to a known / recently vacated lesser black-backed gull colony; and,
- The key factor currently impacting lesser black-backed gull breeding success at the site is considered to be mammalian predation and/or lack of suitable breeding habitat.

¹⁴ <https://jncc.gov.uk/our-work/lesser-black-backed-gull-larus-fuscus/>

¹⁵ Seabird Monitoring Programme database is available at: <https://app.bto.org/seabirds/public/index.jsp>

The seven potential compensation sites have been discussed with the Offshore Ornithology ETG and other stakeholders during consultation (refer to Table 2-1, Annex 1A). A few other lesser black-backed gull breeding sites (e.g. Rockcliffe Marshes, Bowland Fells and urban gull colonies) were discussed briefly during consultation) but as it was considered that mammalian predation and/or the need for habitat management were unlikely to be the key factors currently impacting lesser black-backed gull breeding success at these sites (*pers comm* from a senior ornithologist at Natural England, 12 Feb 2024), these sites were not included in this report.

3.2 Evaluation of potential sites

An evaluation of each potential site discussed is presented in [Table 3-1Table 3-4](#). To evaluate the suitability of each potential compensation site for the Project's Compensation Plan, a set of criteria was used as follows:

- **SPA connectivity with compensation site**, defined as the likelihood that lesser black-backed gull fledglings at the compensation site could successfully be recruited into the Morecambe Bay & Duddon Estuary SPA and/or the Ribble & Alt Estuaries SPA populations or the wider National Site Network (refer to section 2.2), thereby compensating for the predicted mean number of 1.02 individuals per annum lost to the SPA populations due to predicted collision at the Project. Sites were colour coded either orange 'MEDIUM' or green 'HIGH' in [Table 3-1Table 3-4](#) which are defined as follows:
 - MEDIUM = site is not directly connected with Morecambe Bay & Duddon Estuary SPA and/or the Ribble & Alt Estuaries SPA, although the site is potentially connected to an SPA which includes lesser black-backed gulls as a designated feature; and,
 - HIGH = connectivity between the site and Morecambe Bay & Duddon Estuary SPA and/or the Ribble & Alt Estuaries SPA is highly likely.
- **Likelihood of lesser black-backed gull presence**, defined as whether lesser black-backed gulls are currently breeding or have bred at the potential compensation site in the recent past. Sites were colour coded either orange 'MEDIUM' or green 'HIGH' in [Table 3-1Table 3-4](#) which are defined as follows:
 - MEDIUM = gulls have bred in recent past, but are not currently breeding; and,
 - HIGH = gulls were last recorded breeding at the compensation site in 2023.
- **Likelihood that mammalian predation or lack of suitable breeding habitat is a key factor limiting breeding success**, defined as whether there is any evidence that mammalian predation and/or lack of suitable breeding habitat is the leading cause of lesser black-backed gull breeding failure at the site, or if other key factors also have an impact. Sites were colour coded either orange 'MEDIUM' or green 'HIGH' in [Table 3-1Table 3-4](#) which are defined as follows:
 - MEDIUM = some evidence for mammalian predation and/or lack of suitable breeding habitat, but other key factors may also impact lesser black-backed gull breeding success; and,

- HIGH = evidence that mammalian predation and/or lack of suitable breeding habitat is the key issue.
- **Likelihood that the site can be used by the Project for compensation**, defined as how likely it is the site can be secured by the Project and used to deliver the compensation measure. Sites were colour coded either red 'LOW', orange 'MEDIUM' or green 'HIGH' in **Table 3-1** which are defined as follows:
 - LOW = unlikely the site could be used by the Project for compensation;
 - MEDIUM = potentially the site could be used by the Project for compensation, but there are some limitations (e.g. 'additionality' concerns, issues with flooding, issues with land ownership) regarding the site location; and,
 - HIGH = strong possibility the site could be used by the Project for compensation, few or no identified limitations regarding the site location.

Table 3-1 Evaluation of potential sites that could be used to compensate for lesser black-backed gull collision mortality at Morecambe Offshore Windfarm.

Site and landowner	SPA connectivity	Likelihood of lesser black-backed gull presence	Likelihood that mammal predation or lack of suitable breeding habitat is the key factor limiting breeding success	Likelihood that the site can be used by the Project for compensation
Barrow Gas Terminal. Owned by Spirit Energy Ltd	HIGH Morecambe Bay & Duddon Estuary SPA: Barrow Gas Terminal is adjacent to the SPA. Ringing studies carried out by the North West England Gull Project have indicated that lesser black-backed gulls ringed on South Walney within the SPA have relocated to Barrow Gas Terminal¹⁶ which shows connectivity between this SPA and the site. Ribble & Alt Estuaries SPA: Barrow Gas Terminal is approximately 36.5 km outside the boundary of the SPA. At this distance, connectivity between this SPA and the site is considered very likely (Ross-Smith et al.,	MEDIUM - A lesser black-backed gull colony has been present at Barrow Gas Terminal at least since 2019. - Latest count in 2022 was 150 Apparently Occupied Nests (AON). The colony has declined from 680 AON in 2021 and 329 AON in 2019 (BTO Seabird Monitoring Programme). - The current status of lesser black-backed gulls at Barrow gas terminal is currently unknown, they have now largely abandoned this site due to fox predation and the colony hasn't been checked within the last two years (<i>pers comm</i> from a senior ornithologist	HIGH - While other factors may impact gull breeding success at this site (e.g. food availability), predation by foxes is the key factor limiting breeding success at this site (<i>pers comm</i> from a senior ornithologist at Natural England, 12 Feb 2024). - The gull colony at Barrow Gas Terminal failed in 2021 due to fox predation (North West England Gull Project, 2021). - A high security fence used to surround the gas terminal, but a gap under the main gate meant that foxes could get into the colony and predate eggs, chicks and adults – when that happened the colony could be depleted very	MEDIUM for Barrow Gas Terminal High SPA connectivity. Medium lesser black-backed gull presence. High mammal predation. - Construction of a mammalian predator-proof fence is highly likely to be an effective compensation measure at Barrow Gas Terminal as fox predation is the key factor limiting lesser black-backed gull breeding success at this site. - Initial positive consultation with Spirit Energy Ltd has taken place regarding permission to secure a suitable parcel of land at Barrow Gas Terminal to deliver the compensation measure (Spirit Energy Ltd, 08 Mar 2024, 12 Mar 2024 and 25 Mar 2024). However, there are now plans to redevelop the gas terminal into a carbon storage cluster facility and Spirit Energy have specific plans for the site which may or may not include potential for the compensation proposal to go ahead.

¹⁶ <https://www.nwgulls.org.uk/projects/barrow-gas-terminal>

Site and landowner	SPA connectivity	Likelihood of lesser black-backed gull presence	Likelihood that mammal predation or lack of suitable breeding habitat is the key factor limiting breeding success	Likelihood that the site can be used by the Project for compensation
	2014; Clewley et al., 2021).	at Natural England, 12 Feb 2024). It is considered highly likely that lesser black-backed gulls will return to breed at this site if a protected fenced enclosure is set up somewhere in this location (<i>pers comm</i> from a senior ornithologist at Natural England, 12 Feb 2024).	quickly (<i>pers comm</i> from a senior ornithologist at Natural England, 12 Feb 2024). Flooding has not been a factor limiting breeding success of nesting gulls at this site in recent years (<i>pers comm</i> from a senior ornithologist at Natural England, 12 Feb 2024).	- Natural England considers that the compensation measure would likely have a high chance of success at the Barrow Gas Terminal - either within the terminal or on land adjacent to the terminal (Natural England 25 Jan 2024; <i>pers comm</i> from a senior ornithologist at Natural England, 12 Feb 2024). - The site is located close to, but outside, the boundary of any SPA, therefore implementation of the compensation measure at this site avoids any 'additionality' concerns that may be raised. - Some land parcels in and around the complex that may be suitable for breeding lesser black-backed gull have been identified and are currently being discussed with Spirit Energy Ltd (email to Spirit Energy, 25 Mar 2024).
The 'Spit' gull colony on South Walney.	HIGH Morecambe Bay & Duddon Estuary SPA: The 'Spit' gull colony, 'Gull Meadow' and the 'Lagoon complex' are all part of the South Walney Nature Reserve which is	HIGH The main colony of lesser black-backed gulls within the Morecambe Bay & Duddon Estuary SPA is on South Walney. Gull numbers have been monitored on South	HIGH Fox predation on eggs and young gulls is identified as key factor causing the decline in lesser black-backed gull numbers at South Walney (<i>pers comm</i> from a senior ornithologist at Natural England, 12 Feb	LOW for the Spit High SPA connectivity. High lesser black-backed gull presence. High mammal predation. - Construction of a mammalian predator-proof fence has been shown to be an effective measure at the Spit as fox and badger predation is the key factor limiting

Site and landowner	SPA connectivity	Likelihood of lesser black-backed gull presence	Likelihood that mammal predation or lack of suitable breeding habitat is the key factor limiting breeding success	Likelihood that the site can be used by the Project for compensation
	located inside the SPA boundary. • Ribble & Alt Estuaries SPA: South Walney Nature Reserve is approximately 32.5 km outside the boundary of the SPA. At this distance, connectivity between this SPA and the site is considered very likely (Ross-Smith et al., 2014; Clewley et al., 2021).	Walney at least since the early 1990's. • Having previously been one of the largest colonies of lesser black-backed gulls in the UK, with numbers in excess of 20,000 individuals in the 1990's (North West England Gull Project ¹⁷), which bred all over South Walney (pers comm from the warden at South Walney, 27 Feb 2024), the gull population on South Walney has experienced a steep decline over the last three decades. • Natural England has set a target to restore the Morecambe Bay & Duddon Estuary SPA population size of breeding lesser black-backed gulls to a level which is above 10,000 pairs (refer to Natural England's Designated Sites	2024; pers comm from the warden at South Walney, 27 Feb 2024). • The closure of a landfill at Walney in 2016 did have an impact on lesser black-backed gull numbers, but as this species can be adapt to a range of foraging habitats (Langley, 2021), it is considered that predation, principally by foxes, is the key factor impacting gull numbers (pers comm from the warden at South Walney, 27 Feb 2024; Dalrymple, 2023). • A permanent fox predator-proof fence was constructed on the Spit at South Walney in 2021, since this time lesser black-backed gull numbers within the enclosure have increased by approximately 200% (pers comm from the warden at South Walney, 27 Feb 2024; Dalrymple, 2023).	lesser black-backed gull breeding success at this site. • However, much of the area on the Spit is fenced already. Although the lesser black-backed gull colony has increased within the fenced enclosure since 2021 (due to the protection from foxes that the fence provides) and there is some potential to expand the existing fenced area, it is unlikely this option would be available to the Project. Cumbria Wildlife Trust may have other sources of potential funding available from other developers who are considering extending the fence on the Spit (pers comm from the warden at South Walney, 27 Feb 2024). • The RSPB has raised concerns that the compensation measure may not be considered as being an additional measure above existing management plans for South Walney (RSPB, 25 Jan 2024).
'Gull Meadow' colony on South Walney.				LOW for Gull Meadow • High SPA connectivity. • High lesser black-backed gull presence. • High mammal predation.

¹⁷ <https://www.nwgulls.org.uk/projects/south-walney>

Site and landowner	SPA connectivity	Likelihood of lesser black-backed gull presence	Likelihood that mammal predation or lack of suitable breeding habitat is the key factor limiting breeding success	Likelihood that the site can be used by the Project for compensation
The 'Lagoon complex' on South Walney. The 'Spit', 'Gull Meadow' and the 'Lagoon complex' are part of the South Walney Nature Reserve which is rented by Cumbria Wildlife Trust from the Holker Estate.		View; accessed 20th March 2024⁷). - Between 2011-2015, the five-year peak mean number of breeding pairs was 4,860, which was a 51.4% decrease compared with the citation population of 10,000 pairs (BTO Seabird Monitoring Programme). - The most recent count of lesser black-backed gulls in the SPA in 2023 recorded 862 AONs, which is a slight increase on the lowest count of 186 AONs in 2021, but this latest count represents a 91% decrease from the target population of 10,000 pairs (BTO Seabird Monitoring Programme).	Predation by foxes has been identified as the primary cause of the decline in lesser black-backed gull numbers at South Walney. The fence project on the Spit has clearly demonstrated that breeding success can rapidly increase within a fence enclosure, it is likely that another fence enclosure in the Lagoon complex would be a successful measure to increase lesser black-backed gull breeding success (<i>pers comm</i> from a senior ornithologist at Natural England, 12 Feb 2024; <i>pers comm</i> from the warden at South Walney, 27 Feb 2024).	- Construction of a mammalian predator-proof fence is highly likely to be an effective compensation measure at Gull Meadow as fox and badger predation is the key factor limiting lesser black-backed gull breeding success at this site. - However, there are already other conservation plans for the Gull Meadow area, so this area is unlikely to be available for the Project's Compensation Plan (<i>pers comm</i> from the warden at South Walney, 27 Feb 2024).
				MEDIUM for the Lagoon complex High SPA connectivity. High lesser black-backed gull presence. High mammal predation. - Construction of a mammalian predator-proof fence is highly likely to be an effective compensation measure at the Lagoon complex as fox and badger predation is the key factor limiting lesser black-backed gull breeding success at this site. - However, for the Lagoon complex, due to additionality concerns raised by the RSPB, it may be more difficult (compared to a potential compensation site located

Site and landowner	SPA connectivity	Likelihood of lesser black-backed gull presence	Likelihood that mammal predation or lack of suitable breeding habitat is the key factor limiting breeding success	Likelihood that the site can be used by the Project for compensation
				outside of an SPA) to locate a site within an SPA for the Project's Compensation Plan (RSPB 25 Jan 2024). • Compensation within an SPA could be considered possible by the RSPB, but they will need to assess their Due Diligence process to assess the RSPB's position on whether the compensation measure for the Project could be considered as 'in addition' to the stated aims of the site management for the Morecambe Bay & Duddon Estuary SPA (RSPB 29 Jan 2024). • Natural England consider that the compensation measure would have a good chance of success in or around the Lagoon complex at South Walney. A fence enclosure on one of the lagoon islands has already been shown to increase great black-backed gull breeding success. There is potential to construct another fence enclosure on another lagoon island, or construct a long fence around the perimeter of the Lagoon complex (<i>pers comm</i> from a senior ornithologist at Natural England, 12 Feb 2024; <i>pers comm</i> from the warden at South Walney, 27 Feb 2024). • Due to the success of the fencing project on the Spit, an additional temporary

Site and landowner	SPA connectivity	Likelihood of lesser black-backed gull presence	Likelihood that mammal predation or lack of suitable breeding habitat is the key factor limiting breeding success	Likelihood that the site can be used by the Project for compensation
				electric fencing project is currently planned on South Walney in 2024 in a new area west of the Lagoon complex. With the help of decoy gulls, the new electric fencing project aims to attract gulls back to breeding in a new area, if successful the fence may be made permanent (<i>pers comm</i> from the warden at South Walney, 27 Feb 2024).
Banks Marsh gull colony Owned and managed by Natural England	HIGH Morecambe Bay & Duddon Estuary SPA: Banks Marsh is approximately 15 km outside the boundary of the SPA. At this distance, connectivity between this SPA and the site is considered very likely (Ross-Smith et al., 2014; Clewley et al., 2021). Ribble & Alt Estuaries SPA: Banks is located inside the SPA boundary.	HIGH - Natural England has set a target to restore the Ribble & Alt Estuaries SPA population size of breeding lesser black-backed gulls to a level which is above 8,097 pairs (refer to Natural England's Designated Sites View; accessed 20th March 2024¹). - The lesser black-backed gull population at Banks Marsh increased in size from an initial count of 1,800 pairs in 1993 to the citation figure of 4,100 pairs in 1998 (BTO Seabird	MEDIUM - Fox predation at Banks Marsh has been identified as one of the key issues that reduces lesser black-backed gull breeding success in this area, (Natural England 25 Jan; RSPB 2024). - In 2022 and 2023 the gull colony at Banks Marsh completely collapsed with no nests producing any chicks, fox predation was thought to have been the key issue preventing lesser black-backed gulls from successfully raising any young.	MEDIUM for Banks Marsh High SPA connectivity. High lesser black-backed gull presence. Medium mammal predation. - Construction of a mammalian predator-proof fence is likely to be an effective compensation measure at Banks Marsh as fox predation is one of the key factors limiting lesser black-backed gull breeding success at this site. - The RSPB has written a report which outlines the feasibility of the mega-fence project (RSPB, 2024). The mega-fence project plans to join both the Hesketh Out Marsh (outside the Ribble & Alt Estuaries SPA) with Banks Marsh where the lesser

Site and landowner	SPA connectivity	Likelihood of lesser black-backed gull presence	Likelihood that mammal predation or lack of suitable breeding habitat is the key factor limiting breeding success	Likelihood that the site can be used by the Project for compensation
		Monitoring Programme). Between 1998 and 2008 the colony was fairly stable numbering c.4000 pairs. The Banks Marsh population peaked in 2014 when the population was recorded as over 10,000 pairs. Subsequent population counts have recorded a marked decline c.2000 nests per year; the 2023 census reveals the lesser black-backed gull population to be 2,319 nests, which is a 71 percent decrease from the SPA citation value of 8,097 (RSPB, 2024).	- However, another key factor that can prevent lesser black backed gull breeding success at Banks March is flooding and high spring tides (RSPB, 29 Jan 2024). - High spring tides can inundate lesser black-backed gull nests at Banks Marsh and this can result in zero productivity which is what happened in 2017 and 2018 (North West England Gull Project¹⁸). - Banks Marsh is expected to flood approximately once every 15 years, it is accepted that this happens and that when it does it will be a poor breeding year for birds, although, it depends when in the year it happens, if it floods early in the year, lesser black-backed gulls will often re-lay. Lesser black-backed gulls also nest on the higher ground at Banks Marsh and are slightly less	black-backed gull colony is located (inside the SPA). - However, physical measures to protect nests from tidal inundation (e.g. flood defences) are unlikely to be acceptable or feasible. Partial fencing may be possible but tidal conditions could prohibit this. - Due to additionality concerns raised by the RSPB, it may be more difficult (compared to other potential compensation sites located outside of an SPA) to form a compensation plan for lesser black-backed gulls within an SPA (RSPB 29 Jan 2024). - Potentially, it may be difficult to combine the requirements for biodiversity enhancement (required by other offshore wind farm developers) alongside an in-principal Compensation Plan required by the Project SPA (RSPB 29 Jan 2024). - Consultation with the RSPB and Natural England regarding how the Project Compensation Plan could potentially fit with the RSPB fence project is ongoing.

¹⁸ <https://www.nwgulls.org.uk/projects/ribble-estuary>

Site and landowner	SPA connectivity	Likelihood of lesser black-backed gull presence	Likelihood that mammal predation or lack of suitable breeding habitat is the key factor limiting breeding success	Likelihood that the site can be used by the Project for compensation
			affected by flooding than other species on lower ground (RSPB, 29 Jan 2024).	
Cavendish Dock Owned by Associated British Ports	HIGH • Morecambe Bay & Duddon Estuary SPA: Cavendish Dock is located inside the SPA boundary. • Ribble & Alt Estuaries SPA: Cavendish Dock is approximately 38 km outside the boundary of the SPA. At this distance, connectivity between this SPA and the site is considered very likely (Ross-Smith et al., 2014; Clewley et al., 2021).	MEDIUM • Cavendish Dock is part of the Morecambe Bay & Duddon Estuary SPA. • Natural England has set a target to restore the Morecambe Bay & Duddon Estuary SPA population size of breeding lesser black-backed gulls to a level which is above 10,000 pairs (refer to Natural England's Designated Sites View; accessed 20th March 2024⁷). • No colony counts of lesser black-backed gulls at Cavendish Dock have been recorded by the BTO Seabird Monitoring Programme, but this site is a known wintering site for some wildfowl species (Banks et al. 2006) and a range of passerines and waders are recorded in this	HIGH • Mammalian predation, particularly by foxes has been identified as the key issue limiting lesser black-backed gull breeding success within other parts of the Morecambe Bay & Duddon Estuary SPA, e.g on the 'Spit' on South Walney (<i>pers comm</i> from the warden at South Walney, 27 Feb 2024). • Following the installation of a predator-proof exclusion fence on the Spit on South Walney in 2021, lesser black-backed gull numbers within the enclosure have increased by approximately 200% (<i>pers comm</i> from the warden at South Walney, 27 Feb 2024; Dalrymple, 2023). • Natural England has suggested that the construction of floating	LOW for Cavendish Dock • High SPA connectivity. • Medium lesser black-backed gull presence. • High mammal predation. • Construction of a mammalian predator-proof fence is highly likely to be an effective compensation measure at Cavendish Dock as fox predation is the key factor limiting lesser black-backed gull breeding success the Morecambe Bay & Duddon Estuary SPA. • However, Natural England have indicated that arranging landowner permission to construct platforms in the dock could be difficult (<i>pers comm</i> from a senior ornithologist at Natural England, 12 Feb 2024). • The RSPB has raised general additionality concerns with compensation taking place within a boundary of an SPA, but they have also stated that additionality concerns may vary depending on the requirements of the colony in question. The RSPB's position on

Site and landowner	SPA connectivity	Likelihood of lesser black-backed gull presence	Likelihood that mammal predation or lack of suitable breeding habitat is the key factor limiting breeding success	Likelihood that the site can be used by the Project for compensation
		location throughout the year (Cumbria Bird Club). Natural England suggest that lesser black-backed gulls could be encouraged to breed at Cavendish Dock (pers comm from a senior ornithologist at Natural England, 12 Feb 2024).	platforms (either designed to be predator proof or possibly surrounded by a fence enclosure) could be used to attract lesser black-backed gulls to breed at Cavendish Dock (pers comm from a senior ornithologist at Natural England, 12 Feb 2024). Natural England has suggested that a fence enclosure at Cavendish Dock would likely attract breeding lesser black-backed gulls (pers comm from a senior ornithologist at Natural England, 12 Feb 2024).	additionality may vary depending on the project (RSPB, 25 Jan 2024).
Steep Holm island Owned by the Kenneth Allsop Memorial Trust	MEDIUM Morecambe Bay & Duddon Estuary SPA: Steep Holm is approximately 280km outside the boundary of the SPA. Ribble & Alt Estuaries SPA: Steep Holm is approximately 240km	HIGH - Records of lesser black-backed gull numbers are publicly available at least since 1986 (BTO Seabird Monitoring Programme). - Steep Holm is thought to have hosted breeding gulls at least since the eighteenth century, colonizing Flat Holm from	HIGH Natural England have identified that the nesting habitat for lesser black-backed gulls is restricted on Steep Holm due to scrub encroachment. Lesser black-backed gulls have started resorting to nesting on the footpaths and at archaeological sites around	HIGH for Steep Holm Medium SPA connectivity. High lesser black-backed gull presence. High vegetation encroachment. - Vegetation and scrub management is highly likely to be an effective compensation measure at Steep Holm as scrub encroachment is the key factor

Site and landowner	SPA connectivity	Likelihood of lesser black-backed gull presence	Likelihood that mammal predation or lack of suitable breeding habitat is the key factor limiting breeding success	Likelihood that the site can be used by the Project for compensation
	outside the boundary of the SPA. Steep Holm is classified as a SSSI and a Ramsar site which includes lesser black-backed gull as a designated feature. The Severn Estuary lesser black-backed gull population is considered to be a separate meta-population from colonies in the north-west of England (Ross-Smith et al., 2014), therefore direct connectivity with these SPAs is considered unlikely. There is potential connectivity between Steep Holm and the Skomer, Skokholm and the Seas off Pembrokeshire SPA which is designated for breeding lesser black-backed gulls.	Steep Holm in the 1950s (Ross-Smith et al., 2013). • In 1993, a total of 2,040 pairs of lesser black-backed gull bred on Steep Holm and Flat Holm which represented 2.5% of the British total⁴. • Latest count for Steep Holm in 2023 was 340 AON. The colony has declined from 596 AON in 2018 and a peak count of 880 AON in 1997 (BTO Seabird Monitoring Programme).	the edge of the island which are kept clear by the island's warden (Natural England, 28 Mar and 18 April 2024). • Foxes are not present on Steep Holm and there are no threats to lesser black-backed gulls from mammalian predation, but the lesser black-backed gull population has declined in recent years, and it is thought that vegetation management is required to restore nesting habitat (Natural England, 28 Mar and 18 April 2024).	limiting lesser black-backed gull breeding success at this site. • Following positive consultation with Kenneth Allsop Memorial Trust (KAMT, 23 April 2024), a letter from KAMT has been received supporting the Project's habitat management measure to enhance the habitat for breeding lesser black-backed gulls on the Trust's land at Steep Holm Island (KAMT, 12 May 2024). • Natural England considers that habitat management to control the scrub encroachment would likely have a high chance of success on Steep Holm (Natural England, 28 Mar and 18 April 2024). • Liaison regarding archaeological sites on Steep Holm is needed, but these are believed to be located around the edges of the island, and gulls have previously nested more in the middle of the island (Natural England, 28 March 2024). • Health, Safety and Environment factors that potentially could be encountered when working on an island will be considered.

4 NEXT STEPS

Evaluation of the seven potential compensation sites (~~Table 3-1~~**Table 3-1**) has identified that the following four sites are suitable for the compensation measures (construction of a mammalian predator-proof fence enclosure and/or habitat management) and are potentially available for the Project's Compensation Plan:

- Barrow Gas Terminal;
- Lagoon complex on South Walney;
- Banks Marsh; and,
- Steep Holm island.

During consultation, Natural England stated that three of these sites (Barrow Gas Terminal, Lagoon Complex and Banks Marsh, 25 Jan 2024) are suitable locations at which to protect breeding lesser black-backed gulls from mammalian predation and one site (Steep Holm, 28 Mar 2024) is suitable for habitat management to increase lesser black-backed gull breeding success. It was acknowledged that Barrow Gas Terminal could be a relatively easy site to support because this site is outside the boundary of any SPA (but has strong connectivity with breeding lesser black-backed gulls at Morecambe Bay & Duddon Estuary SPA, section 2.2) and therefore avoids issues of 'additionality' (refer to section 2.3). However, there are now plans to redevelop the gas terminal into a carbon storage cluster facility and the landowners (Spirit Energy) may not be able to commit to providing a suitable area for lesser black-backed gulls for the Project's Compensation Plan at the current time (Spirit Energy, 22 April 2024). The Lagoon complex and Banks Marsh are either within the Morecambe Bay & Duddon Estuary SPA or the Ribble & Alt Estuaries SPA and therefore could potentially incur some additionality issues with the RSPB, although Natural England have been supportive of these locations and have previously agreed to a Compensation Plan within an SPA for other offshore wind farm projects (refer to section 2.3). Steep Holm is not directly connected with either the Morecambe Bay & Duddon Estuary SPA or the Ribble & Alt Estuaries SPA (section 2.2), but this site is potentially connected with other SPAs in the National Site Network, including the Skomer, Skokholm and the Seas off Pembrokeshire SPA. Therefore, chicks recruited into this SPA from Steep Holm could benefit the wider National Site Network. Natural England support habitat management to increase lesser black-backed gull breeding success on Steep Holm (Natural England, 28 Mar and 18 April 2024).

The Evidence Plan and Roadmap (Annex 2B) outlines the next steps to be taken to apply an appropriate compensation measure (removal of mammalian predators and/or vegetation and scrub management) at a selected compensation site. The on-going procedures to secure a compensation site for the 'in-principle' Compensation Plan are as follows:

- 1) Discussions are on-going with the landowner Spirit Energy Ltd to secure land for the Project's Compensation Plan at Barrow Gas Terminal. Some potential land parcels have already been identified as suitable for the compensation measure, further discussion with Spirit Energy about the availability of land is due to take place in Spring 2024;
- 2) Consultation with the landowner (the Kenneth Allsop Memorial Trust) and Natural England regarding opportunities to implement the Project's Compensation Plan at

Steep Holm is due to take place in Spring 2024. Following positive consultation with Kenneth Allsop Memorial Trust and Natural England (KAMT, 23 April 2024), a letter from KAMT has been received supporting the Project's habitat management measure to enhance the habitat for breeding lesser black-backed gulls on the Trust's land at Steep Holm Island (KAMT, 12 May 2024);

- 3) Consultation with Natural England and the RSPB regarding potential funding to support the fence project at Banks Marsh and Hesketh Out Marsh is ongoing;
- 4) Consultation with stakeholders to confirm whether the construction of a mammalian predator-proof fence at the South Walney Lagoon Complex or Banks Marsh can be considered as an additional conservation measure above existing site management plans for either the Morecambe Bay & Duddon Estuary SPA or the Ribble & Alt Estuaries SPA; and,
- 5) Pre-implementation field studies at potential compensation sites will be conducted by ornithologists with a specialist knowledge of habitat requirements for lesser black-backed gulls (for details, refer to Annex 2B).

The measures identified in the Evidence Plan and Roadmap are secured in a schedule to the draft Development Consent Order accompanying the application. This schedule states that a detailed Compensation Implementation and Monitoring Plan (based on the Evidence Plan and Roadmap) to deliver the selected measure will be submitted to the Secretary of State for approval, in consultation with statutory nature conservation bodies before the Project can commence.

5 REFERENCES

- Banks, A.N., Ellis, P., Holloway, S.J., Holt, C., Horner, R., Maclean, I.M.D., Marchant, J., Musgrove, A.J., Schofield, R.A., Sheldon, J. & Stenning, J 2006. Surveying waterbirds in Morecambe Bay for the Wetland Bird Survey (WeBS) Low Tide Count Scheme. BTO Research Report No. 443. Available at: https://www.bto.org/sites/default/files/shared_documents/publications/research-reports/2006/rr443.pdf
- Clewley, G.D., Thaxter, C.B., Humphreys, E.M., Scragg, E.S., Bowgen, K.M., Bouten, W., Masden, E.A. & Burton, N.H.K. 2021. Assessing movements of Lesser Black-backed Gulls using GPS tracking devices in relation to the Walney Extension and Burbo Bank Extension Offshore Wind Farms. BTO Research Report No. 738.
- Dalrymple, S. 2023. Predator exclusion fencing improves productivity at a mixed colony of Herring Gulls *Larus argentatus*, Lesser Black-backed Gulls *L. fuscus* and Great Black-backed Gulls *L. marinus*. *Seabird* 35: p18-29.
- Davis, S. 2013. Large gull research 2012: Population trend and productivity of large gull colonies in relation to mammalian predator presence across northern England and Wales. RSPB report.
- Davis, S., Wilson, L. J., Brown, A. and Bolton, M. 2018. Productivity of Herring Gulls *Larus argentatus* and Lesser Black-backed Gulls *L. fuscus* in relation to fox predation risk at colonies across northern England and Wales in 2012. RSPB Research Report 61. RSPB Centre for Conservation Science, RSPB, The Lodge, Sandy, Bedfordshire, SG19 2DL.
- Defra 2021. Best practice guidance for developing compensatory measure in relation to Marine Protected Areas. 25 pp.
- Defra, 2024. Consultation on policies to inform updated guidance for Marine Protected Area (MPA) assessments. Available at: 090224 OWEIP Consultation on updated policies to inform guidance for MPA assessments_.pdf (defra.gov.uk).
- JNCC. 2021. Seabird Population Trends and Causes of Change: 1986–2019 Report (<https://jncc.gov.uk/our-work/smp-report-1986-2019>). Joint Nature Conservation Committee, Peterborough. Updated 20 May 2021.
- Langley, LP, Bearhop, S, Burton, NHK, Banks, AN, Frayling, T, Thaxter, CB, Clewley, GD, Scragg, E & Votier, SC 2021. GPS tracking reveals landfill closures induce higher foraging effort and habitat switching in gulls. *Movement Ecology*, 9, 56. Available at: https://pure.hw.ac.uk/ws/portalfiles/portal/51505398/s40462_021_00278_2.pdf
- MacArthur Green and Royal HaskoningDHV, 2022. Norfolk Projects Offshore Wind Farms. Lesser black-backed gull Implementation and Monitoring Plan. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010087/EN010087-002993-The%20Norfolk%20Projects%20Lesser%20Black-Backed%20Gull%20Implementation%20and%20Monitoring%20Plan%20.pdf>

MacArthur Green and Royal HaskoningDHV, 2020. Norfolk Boreas Lesser black-backed gull Compensation plan: In Principle Habitats Regulations Derogation Provision of Evidence Appendix 2 Alde-Ore Estuary SPA In Principle Compensation. Available at: <https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010079/EN010079-004229-8.24%20Appendix%202%20Alde-Ore%20Estuary%20SPA%20In%20Principle%20Compensation%20Measures%20for%20lesser%20black-backed%20gull.pdf>

Natural England 2022. Natural England interim advice on updated Collision Risk Modelling parameters (July 2022).

North West England Gull Project, 2021. Gull Ringing Report. North West England Gull Project - 2021 Gull Ringing Report (nwgulls.org.uk)

Ozsanlav-Harris, L., Inger, R. & Sherley, R. 2022. Review of data used to calculate avoidance rates for collision risk modelling of seabirds. JNCC Report 732 (Research & review report), JNCC, Peterborough, ISSN 0963-8091.

Rock, P. 2005. Urban gulls: problems and solutions. *British Birds* 98: 338–355.

Rock, P. & Vaughan, I. P. 2013. Long-term estimates of adult survival rates of urban Herring Gulls *Larus argentatus* and Lesser Black-backed Gulls *Larus fuscus*. *Ringing & Migration* 28: 21–29.

Ross-Smith, V.H., Johnston, A. and Ferns, P.N. 2015. Hatching success in Lesser Black-backed Gulls *Larus fuscus* - an island case study of the effects of egg and nest site quality. *Seabird* 28, 1-16.

Ross-Smith, V.H., Grantham, M.J., Robinson, R.A. and Clark, J.A. 2014. Analysis of Lesser Black-backed Gull data to inform meta-population studies. BTO Research Report No. 654. Available at: https://www.bto.org/sites/default/files/shared_documents/publications/research-reports/2014/rr654.pdf.

Ross-Smith, V.H., Conway, G.J., Facey, R., Bailey, B., Lipton, M., Ferns, P.N. 2013. Population size, ecology and movements of gulls breeding on Flat Holm Island. *Birds in Wales* (10); 7-21.

RSPB 2024. Ribble Estuary NNR Species and Habitats Recovery 2023-2028: Project 1 – South Ribble predator exclusion fence “Mega-fence” SPA large gull colony recovery & Common tern colony restoration. Draft RSPB report.

Woodward, I., Thaxter, C.B., Owen, E. & Cook, A.S.C.P. 2019. Desk-based revision of seabird foraging ranges used for HRA screening. BTO research report number 724.



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Morecambe Offshore Windfarm Generation Assets

Annex 2B: Evidence Plan and Roadmap for Lesser Black-Backed Gull (Tracked)

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1 INTRODUCTION

1.1 Background

Morecambe Offshore Windfarm (OWF) is a proposed offshore windfarm located in the east Irish Sea, approximately 30km off the Lancashire coast. It is being developed by Morecambe Offshore Windfarm Ltd, hereafter 'the Applicant'. The Morecambe Offshore Windfarm shares a grid connection location with the Morgan Offshore Wind Project, also located in the east Irish Sea. For the purposes of this document, 'the Project' refers only to the Morecambe Offshore Windfarm Generation Assets, which consists of the wind turbine generators, inter-array cables, offshore substation platform(s) and possible platform link cables that will be located within the windfarm site. The Project will comprise up to 35 wind turbine generators installed over a windfarm site area of approximately 87km².

The Report to Inform Appropriate Assessment (RIAA, Document Reference 4.9) concluded that no Project-alone adverse effect on the integrity (AEol) of European Sites is expected and the Project does not make any measurable contribution to in-combination values. However, the conclusions of the Secretary of State may not be the same as the Applicant with regard to contribution to in-combination values on lesser black-backed gull (*Larus fuscus*) feature of the Morecambe Bay & Duddon Estuary Special Protection Area (SPA) and/or the Ribble & Alt Estuaries SPA as a result of collision risk. Therefore, in response to feedback from consultation undertaken during the pre-application period, and through discussions with the Offshore Ornithology Expert Topic Group (ETG) on the in-combination assessment, a 'without prejudice' derogation case has been provided.

A number of options for relevant compensation measures have been developed as far as possible at the point of application. In the event that the Secretary of State determines potential for AEol and considers that compensation is required, the Project has provided sufficient confidence that compensation measures are available, securable and deliverable. The compensation would be implemented in accordance with the approved Compensation Implementation and Monitoring Plan (CIMP). Compensatory measures will be maintained for the operational lifetime of the wind turbine generators (WTGs), subject to any necessary adaptive management (discussed in Section 8).

1.2 Purpose of this document

This Evidence Plan and Roadmap for Lesser Black-Backed Gull is one of three documents that make up the Compensation Plan for the Project:

- Annex 1A Initial Review of Compensatory Measures and Ecological Evidence for Lesser Black-Backed Gull;
- Annex 2A Site Selection for Compensatory Measures for Lesser Black-Backed Gull; and,
- Annex 2B (this report): Evidence Plan and Roadmap for Lesser Black-Backed Gull.

This Annex 2B provides information on how key compensation measures (construction of a mammalian predator-proof exclusion fence and/or habitat management) at a potential site proposed by the Applicant (refer to Annex 2A) could be implemented and monitored, if it is concluded that a Compensation Plan is required by the Secretary of State. This Plan provides information to enable the Secretary of State to be satisfied that the compensatory measure

proposed by the Applicant can be delivered in a timely manner and can be relied upon to secure the overall coherence of the National Site Network (JNCC, 2023). Information about monitoring, reporting, programming, management and potential adaptive management is included within this document. This document will be used to inform the Outline Compensation Implementation and Monitoring Plan (CIMP, Document reference 4.11.1), if required.

1.3 Aim and objectives of the Compensation Plan

This Compensation Plan has been developed with the key aim to increase lesser black-backed gull breeding success, either close to, or inside the Morecambe Bay & Duddon Estuary SPA and Ribble & Alt Estuaries SPA or at another SPA which includes breeding lesser black-backed gull as a designated feature. It is anticipated that these additional fledglings will recruit into the SPA populations, thereby compensating for the predicted mean 1.02 individuals per annum lost to the SPA populations by collision with the Project wind turbine generators (refer to section 4.1 in Annex 1A). Increased breeding success will be augmented through the removal of mammalian predation pressure (principally from foxes and badgers) and/or through habitat management to create suitable nesting vegetation height and cover (Annex 1A) at one of four sites identified as being suitable for compensation and potentially available (Annex 2A).

Objectives for the Compensation Plan will depend on the key factor (mammalian predation or lack of suitable breeding habitat) limiting lesser black-backed gull breeding success at the chosen compensation site.

Objectives if the key factor limiting breeding success at the selected compensation site is mammalian predation:

- 1) Construction of a mammalian predator-proof exclusion fence around an existing lesser black-backed gull colony or a recently vacated colony or in an area that is close to an existing/recently vacated lesser black-backed gull colony where predatory mammals are known to be present and predate on gull eggs and chicks. Vegetation management within the exclusion fence may be required to make it suitable for breeding lesser black-backed gulls, depending on the compensation site;
- 2) Mammalian predator removal (e.g. foxes and badgers) within the constructed fenced enclosure;
- 3) Regular monitoring after the exclusion fence has been installed to check for any breaches in the fence and incursion of predators. Additional mammalian predator removal would be carried out if a breach is identified as an adaptive management measure; and,
- 4) Annual monitoring of the compensation colony to record productivity and evaluate the effectiveness of the proposed compensation measure to be reported back to the lesser black-backed gull Compensation Steering Group (LBBGCSG) and Secretary of State.

Objectives if the key factor limiting breeding success at the selected compensation site is lack of suitable breeding habitat:

- 1) Habitat management at an existing lesser black-backed gull colony or a recently vacated colony or in an area that is close to an existing/recently vacated lesser black-backed gull

colony where mammalian predation is not a key factor limiting breeding success to create suitable nesting vegetation height and cover and prevent scrub encroachment;

- 2) Ongoing vegetation and scrub management and monitoring to assess increases in lesser black-backed gull breeding population; and,
- 3) Annual monitoring of the compensation colony to record colony size and evaluate the effectiveness of the proposed compensation measure to be reported back to the LBBGCSG and Secretary of State.

1.4 Limitations to compensation measures

The key aim of the Compensation Plan for the Project is to increase lesser black-backed gull breeding success and a key objective of the monitoring programme (refer to section 1.3) would be to record any observations that could potentially explain why breeding success expectations might not be met. For example, evidence of avian predation, disease or starvation within the colony, disturbance from human activities (e.g. people with dogs walking close to the area) are all potential reasons why there could be a shortfall in breeding success against expectations.

Control and/or exclusion of avian predators can be more of a challenge compared with the control of mammalian predators. Egg and chick predation by a range of bird species (e.g. gulls, corvids, birds of prey and shorebirds) is well documented and can reduce nesting success and productivity in the predated species (e.g. Donehower et al. 2007; Guillemette and Brousseau, 2001; Kubelka, 2020; Kazama, 2007). It is also well known that gulls (as well as other bird groups) cannibalize eggs and chicks within their own colony, possibly promoted by food stress (see Ross-Smith et al., 2014a for review) which is another factor that could explain poor productivity in gull colonies where mammalian predation is absent.

1.5 Lesser black-backed gull Compensation Steering Group

Should the Secretary of State conclude that compensation for adult lesser black-backed gulls impacted by the Project is required, a Steering Group (LBBGCSG) will be convened by the Applicant. This group will help steer the delivery of compensation implementation and maintenance, monitoring, reporting and any other relevant matters, as determined by the conditions of the consent. It is envisaged that, if requested, core members of the LBBGCSG will be the relevant Statutory Nature Conservation Bodies (SNCBs), as well as the Royal Society for the Protection of Birds (RSPB), local planning authority and owners and/or managers of the selected site at which the compensation measure is planned to be implemented (for site options, refer to Annex 2A).

1.6 How success of compensation will be determined

To quantify the success of the proposed compensation measure, it will be necessary to set breeding success targets for the lesser black-backed gull compensation colony to demonstrate success of the compensation measure. These targets will be discussed and agreed with the LBBGCSG.

1.7 Consultation

Pre-application consultation to engage with members of the Offshore Ornithology ETG and other stakeholders regarding potential in-principle compensatory measures and potential compensation sites has taken place. The Compensation Plan has been informed by meetings with Natural

England, Department for the Environment, Food and Rural Affairs (Defra), RSPB, Cumbria Wildlife Trust, Spirit Energy Ltd (landowner of Barrow Gas Works) and the Kenneth Allsop Memorial Trust (KAMT; landowner of Steep Holm). Consultation is on-going, for a summary of consultation that has taken place to date, refer to Table 2-1 in Annex 1A.

2 PRE-IMPLEMENTATION STUDIES

This section outlines what pre-implementation desk and field studies will be required before the compensation measure (section 3, 4 and 5) is carried out at one of the potential compensation sites (Annex 2A).

2.1 Potential locations, scale of compensation and landowner agreements

Annex 2A evaluates a list of potential sites where compensation measures could be implemented. Annex 2A also provides some details of landowners and discusses a suitable scale of compensation measures.

2.2 Background study

Should the Secretary of State request a Compensation Plan for the Project, an initial desk-based Background Study will collate and assess all information available on lesser black-backed gull habitats and populations as well as the potential scale of predation at the selected site. The Background Study will include an assessment of the following:

- Abundance and distribution of mammalian predators, where applicable and information is available;
- Assessment of the presence of avian predators (i.e. raptors, corvids and gulls);
- Current seabird census data reporting on the population trends and productivity of lesser black-backed gulls both locally and UK wide; and,
- Type and extent of nesting habitat available and required by lesser black-backed gulls.

The Background Study will inform the preparation of an Operational Plan (section 2.5) to deliver and implement the programme of works as well as the associated monitoring, reporting and adaptive management that will be required for the compensation measures.

2.3 Pre-implementation field studies

A habitat walk-over survey, or a drone survey if considered appropriate, of the selected site will be conducted by ornithologists with a specialist knowledge of habitat requirements for lesser black-backed gulls. For sites where the construction of a mammalian predator-proof enclosure is an appropriate compensation measure (Annex 2A), the habitat survey will be conducted during the gull non-breeding season (September to February) to avoid disturbance to breeding birds. For sites requiring management of the vegetation at the compensation colony, a habitat survey will be conducted during the breeding season to assess the structure and distribution of vegetation during the breeding season when it is at its maximum height. The aim of these surveys will be to assess the availability of suitable habitat for lesser black-backed gulls and to determine the specific location of where the fenced enclosure (if used) should be constructed and/or where habitat management (if required) should be implemented.

The following information will be collected:

- Adapted phase 1 habitat assessment considering key habitat requirements for lesser black-backed gulls;
- Assessment of the presence of all predatory mammals (e.g., footprints, holes, fox/badger and otter scats etc);
- Assessment of protected features the fence enclosure (if constructed) and/or scrub/vegetation management must avoid (e.g. badger setts, otter holts and protected plant species);
- Assessment of potential sources of disturbance (e.g., presence of public footpaths and buildings etc): and,
- Vegetation surveys to assess the extent of availability of suitable nesting habitat and areas where vegetation management would be beneficial.

During the breeding season (March to August), a lesser black-backed gull count will also be conducted, using recognised methods as detailed in Walsh et al. 1995, including photographic records and digital mapping. This will provide an up-to-date full colony baseline count of the number of breeding pairs of lesser black-backed gulls in the compensation colony measured by the number of Apparently Occupied Nests (AON). Potentially, surveys to count breeding pairs that are present within the Morecambe Bay & Duddon Estuary SPA and the Ribble and Alt Estuaries SPA as well as the wider area surrounding the compensation colony may be required where colony count data is not publicly available. Although the focus will be on counting lesser black-backed gulls, all bird species will be included in the count, including signs of the presence of any predatory mammals and birds.

Seabird counts will be conducted by ornithologists on land where access is possible and disturbance to breeding seabirds is minimal. Data collected from the habitat surveys and seabird counts will be analysed to identify the optimal placement of the mammalian predator-proof fence and/or areas for habitat management.

All survey methodology, data and conclusions will be discussed and shared with the LBBGCSG.

2.4 Fencing surveys

If construction of a mammalian predator-proof fence is considered an appropriate compensation measure for the site (refer to Table 3-1 in [\[7\]](#)), the appointed fencing contractor will conduct pre-implementation field surveys to determine the exact location of fence construction in the selected site.

Surveys will focus on gathering the following information:

- Assessment of ground conditions and site access;

- Assessment of any obstructions to fence installation (e.g. trees, buildings);
- Evaluation of the vegetation, soil structure and depth;
- Assessment of the route of the fence line as well as start and end points;
- Assessment of whether the fence can be buried all the way along the fence line;
- Assessment of the requirement and location of predator-proof gates (for humans and machinery for vegetation management, if required, to pass through) along the proposed fence line; and,
- Consideration of logistics and cost.

Results and conclusions of the fencing surveys will be shared with the LBBGCSG in the form of a report written by the fencing contractor.

2.5 Operational plan

An Operational Plan will be produced to define and collate the following information:

- Scope and method statements;
- Landowner agreements and purchases/leases;
- Health and safety plan;
- Approach to permitting (e.g. protected mammal removal, if required);
- Source of equipment (e.g. fencing contractor, mammal removal contractor, machinery);
- Organisational arrangements;
- Specialist subcontractor engagement;
- Mitigation planning;
- Non-key species management plan (e.g. rabbits, if required);
- Adaptive management;
- Long term monitoring and biosecurity planning; and,
- Local stakeholder consultations and engagement.

3 CONSTRUCTION OF PREDATOR-PROOF FENCING

This section outlines the proposed approach to constructing a mammalian predator-proof exclusion fence. If construction of a mammalian predator-proof fence is considered an appropriate compensation measure for the site, this approach will be confirmed and agreed with the LBBGCSG when preparing the Operational Plan.

3.1 Summary description

The fence design and positioning will be informed through discussions with the LBBGCSG and in particular, with reference to the RSPB guide on predator exclusion fencing (White and Hirons 2019) and experience from other gull colony fencing work e.g. at South Walney SPA and Alde-Ore SPA.

Furthermore, it will be ensured that the fencing contractor appointed to do the work will be experienced in fence installation for similar purposes (i.e. protection of ground nesting birds from mammalian predators).

Based on previous compensation measures using predator-proof fencing to protect ground nesting seabirds in the UK (MacArthur Green and Royal HaskoningDHV, 2022; Dalrymple, 2023) and the design of modern predator-proof fencing which evolved in New Zealand (Cooper, 2013) it is likely that predator-proof fencing will have the following key aspects:

- Height of between 1.8 m and 2.0 m;
- Wire mesh with vertical wires at 50 mm spacing and horizontal wires at 100 mm spacing, and a gauge of at least 1 mm to prevent foxes or badgers from chewing through it;
- Approximately 600 mm of the wire mesh will be buried horizontally to a depth of 100-150 mm below ground to prevent foxes and badgers burrowing underneath the fence – although the depth will depend on the habitat type and assessment of ground conditions along the fence line location as determined from the pre-implementation fencing surveys (section 2.4);
- Material at the base will be scraped back using a digger to a depth of 100-150 mm and a width of no more than 1 m, into which the lower section of the fence will be laid, before being recovered with the scraped back material;
- Water crossings with mesh to the base of drainage channels to prevent access by aquatic species such as otter;
- Incorporation of a ‘floppy’ overhanging top of 300-450 mm angled at approximately 45° to the outside, comprising less tightly strained wire which inhibits foxes climbing over the fence (Dalrymple 2023);
- Metal strainer and support posts will be used, with a hollow cross-section which will be pushed (not hammered) into the ground using the arm of a digger, thereby reducing impact noise during installation and avoiding the need for excavation or use of concrete. The posts are resistant to salt-water corrosion in case of flooding events;
- Gateway crossings will take the form of a wide single gate (wide enough to allow machinery to pass through if necessary), rather than double opening gates and will be secured with a short chain and padlock so that the ends of the chain just meet and the gate can be tightly fastened. Wooden sleepers, a concrete pad or stones will be dug into the ground at the base of gates to prevent animals from digging under them; and,
- Non-electrified (although this may be used as an adaptive measure if agreed with the LBBGCSG).

A photograph of an example fence designed to exclude foxes and badgers (similar to the design used for lesser black-backed gull compensation within the Alde-Ore Estuary SPA by the Norfolk Boreas and Norfolk Vanguard offshore wind farm projects (MacArthur Green and Royal HaskoningDHV, 2022)) is provided below (~~Figure 3-1~~~~Figure 3-1~~~~Figure 3-1~~).



Figure 3-1. Example of a fox proof fence installation. Note that the vegetation along the outside edge (left hand side of the photo) has fully recovered following replacement over the buried skirt.

3.2 Maintenance schedule

An essential feature of a compensation measure involving the construction of a fence enclosure is that the constructed predator-proof fence enclosure continues to prevent entry by mammalian predators; for example, if one fox managed to get into the enclosure for just one night it would be possible for it to destroy all eggs and chicks present in the enclosure. Thus, it is critically important that the full length of the fence line is inspected on a regular basis and any damaged or weak areas are rapidly repaired.

During the breeding season a proposed maintenance schedule would be:

- Inspected on a two-weekly basis (March to August) as recommended by White and Hirons (2019); and,
- Any damaged or weak areas will be rapidly repaired if essential to maintain integrity or if possible, to do so with minimal disturbance.

During the non-breeding season, the following maintenance schedule is proposed:

- Less regular inspections (e.g., 2-3 times between September to February), but inspections will also take place following periods of severe weather;
- More substantive maintenance, such as replacing rusted sections of wire or weak posts will be undertaken at this time to avoid undue disturbance to the breeding birds; and
- Routine inspections will take place at such times to allow sufficient time for any substantive repairs to be completed prior to the return of breeding birds (i.e., before the end of February).

At any time, if a breach in the fence is found, careful monitoring would be conducted to check for the presence of mammals within the fenced area.

4 MAMMAL REMOVAL

This section outlines the proposed approach to control the presence of mammalian predators within a fenced off area, if provided by the Project as a compensation measure. This approach will be confirmed and agreed with the LBBGCSG when preparing the Operational Plan where appropriate.

4.1 Initial fence enclosure inspection.

Immediately prior to completion of the mammalian predator-proof exclusion fence, a thorough inspection of the enclosure area will be undertaken to attempt, as far as possible, to ensure there are no large mammals (e.g. deer, foxes) present inside. This is expected to take the form of a group of people, walking a line across the (mostly complete) enclosed area, in a manner which flushes any large mammals in front and out through the last unfenced section of the enclosure. Several passes will be conducted (e.g. over the course of a day) to increase confidence that all large mammals have been flushed out.

The inspection will include efforts to ensure no otters are present in any water courses. As a first step, an inspection for the presence of otter holts as well as badger setts will be conducted prior to fence installation (section 2.3), with appropriate follow up actions to be taken if any are found.

4.2 Mammal monitoring

Once the fence is fully installed, as well as regular fence inspections it will be important that the presence of predators inside the fence, should they manage to penetrate, are detected rapidly. Monitoring for predators during the breeding season will be combined with fence inspections (section 3.2). A combination of monitoring options will be used:

- Sand traps will be placed at intervals around the inside of the fence to help the detection of pawprints. These may also be placed on the outside of the fence to record the presence of foxes patrolling the fence;
- Camera traps located at corners and/or gateways, checked at least weekly, possibly twice per week; and,
- Weekly night vision surveys from suitable vantage points.

During the non-breeding season, monitoring for predators will use the same methods as above, but at a reduced frequency of once per month (September to January). During February, a concerted effort to ensure the enclosure is predator free will be undertaken, with twice weekly checks and night-time visits until such time as monitoring staff are confident no predators are present within the fence.

4.3 Mammal removal protocol

Should the presence of predators be detected inside the fence enclosure it will be necessary to take steps to ensure their rapid and safe removal. The nature of these steps will depend on the

species in question. Mammal removal protocols will be drawn up and agreed with the LBBGCSG. Protocols will be produced as standalone documents for the monitoring staff.

Removal protocols will be developed for fox and badger and any other predatory mammals (e.g. otter and mink) if present in the selected site. Any such measures will consider the legal protection of some predators (e.g. badgers and otters), as well as the likely effects of such control on other species.

The time of year when a mammal is detected (or suspected) inside the enclosure will determine the speed of response required. If the detection is between September and January, then there will be a slightly lower urgency than if the detection is between February and August. In the case of the latter there would be an immediate and concerted effort to address the situation.

Irrespective of when the mammal is detected, or which species, the fence itself would be inspected in the first instance to determine the entry point and quickly repaired to prevent any further ingress.

Following first detection, or indication that mammals may have gained entry to the enclosure it will be necessary to:

- 1) Determine the species of mammal(s) inside the enclosure, by way of camera traps, footprints and scats;
- 2) Determine, as far as possible if the mammal(s) are still within the enclosure; and,
- 3) Establish the remedial steps to be taken (if required) and refer to the appropriate mammal removal protocol(s).

The mammal removal protocols will take into account statutory considerations, such as any licensing requirements. Removal of species for which a licence is required will adhere to existing licensing requirements, such as those for removal of otters from fisheries¹. If it is considered feasible, efforts will be made to flush out individuals from within the enclosure, rather than attempting to trap and release animals. However, this course of action will only be attempted if it is permitted under relevant legislation (e.g., The Invasive Alien Species (Enforcement and Permitting) Order 2019²), there are no welfare concerns (e.g. causing additional stress or a risk the animal will harm themselves by running at the fence) and the level of disturbance to any nesting lesser black-backed gull is considered to be low.

It is not anticipated that smaller mammal species, such as rats, will require control measures. However, should it become apparent that rats are limiting gull productivity in the compensation colony (e.g., through direct observation, indirect observation (e.g. tooth marks in plasticine eggs) or monitoring camera footage of rat predation of eggs or chicks) it may be necessary to undertake control efforts. A rat control protocol will be developed should this occur, noting that it will not be appropriate to use rodenticides for this purpose as this could result in secondary poisoning of non-target species, including lesser black-backed gulls. A proposed rat eradication operation would be assessed using the internationally recognised ethical principles of Humane Vertebrate Pest Control

¹ [Otters: licence to capture and transport those trapped in fisheries to prevent damage \(CL36\) - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/news/otters-licence-to-capture-and-transport-those-trapped-in-fisheries-to-prevent-damage-cl36)

² [The Invasive Alien Species \(Enforcement and Permitting\) Order 2019 \(legislation.gov.uk\)](https://www.legislation.gov.uk/uksi/2019/101/contents/made)

developed by RSPCA Australia (Humane Vertebrate Pest Control Working Group, 2004) and would follow advice and guidance presented in the UK Rodent Eradication Best Practice Toolkit (Thomas et al.2017) which provides guidelines adapted from international standards for use in the UK³.

All cases of predatory mammal entry to the enclosure will be noted, communicated to the LBBGCSG and included in the annual reporting.

5 HABITAT MANAGEMENT

Depending on the location of the selected compensation site, management of encroaching scrub may be the key compensatory measure required. This is the case on the potential compensation site of Steep Holm (refer to Annex 2A). In the most recent count (in 2023) the lesser black-backed gull population on Steep Holm was recorded at 340 AON, the colony has declined from 596 AON in 2018 and a peak count of 880 AON in 1997 (BTO Seabird Monitoring Programme⁴) and it is considered that scrub encroachment is likely to be a contributory factor in the decline (Natural England, 18 April 2024). For other potential compensation sites where mammalian predation occurs (e.g. Barrow Gas Terminal, Lagoon Complex on South Walney and Banks Marsh, Annex 2A), depending on the nature of existing management, there may be a requirement to manage the vegetation within the newly constructed mammalian predator-proof enclosure to provide and maintain suitable habitat for the gulls to nest. The enclosure fence may also exclude grazing animals which keep vegetation in an ideal condition for gull nesting and so another means of managing vegetation within the fence may be required.

For either situation, habitat management would be undertaken outside the breeding season to avoid disturbance to the lesser black-backed gull compensation colony and would also need to be done in accordance with suitable management for other designated features if present. This vegetation management will also offer a degree of flexibility in how the area is maintained. For example, it may be considered that a mosaic of vegetation types will provide the most suitable conditions, and this may be best achieved by varying the locations cut back each year. It will only become apparent what management is required once the site location has been finalised and pre-implementation field studies have been conducted. Thereafter the habitat will be monitored on an annual basis and managed accordingly.

³ UK Rodent Eradication Best Practice Toolkit is available at: <https://www.nonnativespecies.org/non-native-species/management-guidance/hydrocotyle-ranunculoides-floating-pennywort/#UKrodentredication>

⁴ Seabird Monitoring Programme database is available at: <https://app.bto.org/seabirds/public/index.jsp>

6 COMPENSATION IMPACTS, MONITORING AND REPORTING

6.1 Compensation potential impacts

Potential impacts of the proposed compensation measures (sections 3 to 5) and potential measures that may be required to mitigate any impacts are presented in **Table 6-1**. This confirms that there would be no likely significant effects on any environmental receptors as a result of the proposed compensation measures.

Table 6-1 Potential impacts of proposed compensation measures

Potential impacts	Details	Measures required to avoid, reduce or mitigate	Effect significance
Impacts on other protected areas and features	There is a potential that works could be undertaken within a protected designated site (SPA, SSSI) depending on the compensation site location. A fence could potentially create a barrier to movement for protected features. Connectivity to designated sites will be considered during site selection.	Fence installation and/or habitat management will be informed through discussions with the LBBGCSG and will take place outside of sensitive areas and season for designated species.	With the implementation of mitigation measures, there would be no likely significant effect on protected areas or features.
Impacts on habitat due to grazing mammal exclusion	There is a potential that exclusion of mammalian grazers (e.g. rabbits and deer) from a mammalian predator-proof exclusion fence enclosure may alter the habitat suitability for lesser black-backed gulls within the enclosure.	Habitat within the fence enclosure will be monitored and managed to provide optimal habitat for breeding lesser black-backed gulls.	With the implementation of mitigation measures, there would be no likely significant effect on habitat suitability for breeding lesser black-backed gulls.
Visual impact	Visual impacts related to the installation of a mammalian predator-proof exclusion fence are considered to be permanent and long-term. However, such impacts are considered to be outweighed by the benefits to biodiversity that are likely to result from the presence of a fence enclosure. Visual impacts associated with habitat management could cause temporary adverse visual impacts within open landscape. However, such impacts are considered to be outweighed by the landscape and visual benefits of the related restoration and enhancement measures once the works are complete.	Precise location and design of fence enclosure would be chosen to minimise visual impacts, and use existing fence locations as far as possible. Fence positioning will avoid areas where public recreation activity is greatest and potentially fences could be placed in ditches to reduce visibility. The design will be informed through discussions with the LBBGCSG, with reference to the RSPB guide on predator exclusion fencing (White and Hirons 2019) and with reference to predator exclusion fence designs used in the same area.	With the implementation of mitigation measures, there would be no likely significant effect on protected areas or features.
Impacts to public footpaths	There is a potential that works could be undertaken in areas close to public foot paths.	Works will not take place over public foot paths or obstruct access to public foot paths. For a fence enclosure visible from a public footpath, a	There would be no likely significant effect on public footpaths.

Potential impacts	Details	Measures required to avoid, reduce or mitigate	Effect significance
		signboard will be put in place to explain the biodiversity benefits of the fence enclosure.	
Impact on cultural heritage assets	Works are expected to be undertaken outside any areas with statutory heritage designations.	A desk review will be undertaken to identify and avoid any areas with statutory heritage designations.	There would be no likely significant effect on cultural heritage receptors.
Increase to flood risk	Depending on the compensation site location, potentially, installation of a mammalian predator-proof exclusion fence could involve crossing a water course which may trap vegetation and affect flow and also cause localised flooding.	Crossing water courses with a fence enclosure will be avoided. A Flood Risk Assessment will be undertaken for the area chosen for the compensatory measure.	There would be no likely significant effect in relation to flood risk.

6.2 Monitoring

Following the programme of pre-implementation field surveys, erecting predator-proof fencing, removal of mammals and/or habitat management, the Project will undertake a programme of monitoring to demonstrate the compensatory measure has been successful and to address any mammalian re-incursions if a fence enclosure is constructed.

The following activities derived from Gilbert et al. (1998) will form the core requirements for monitoring which will be undertaken annually following installation of the mammalian predator-proof exclusion fence and/or habitat management and continue for the period the compensation is required:

- Breeding success will be estimated at the compensation colony by monitoring the number of breeding pairs (AON) as well as the number of chicks fledged at a representative sample of nests throughout the colony (to measure productivity). Mapped pairs will be monitored until such time as chicks can no longer be associated with their nest. The frequency of observations and total (per year) will be subject to agreement with the LBBGCSG. Surveys may be more numerous in the first three years following implementation of the compensation measure and then reduced in later years on the understanding that the quality of data collection is not compromised (this would be informed by review of the data collected to date);
- Consideration will be given to the use of drones to obtain aerial images of monitored nests and suitable breeding habitat across the site; it may be important to monitor lesser black-backed gulls in different locations across the site as adults nesting on the periphery of the colony might be of poorer quality than birds at the centre of the colony, so only monitoring from the edge of the colony might underestimate breeding success. However, drones will only be used if the use of them is agreed with the landowner and can be done without causing disturbance. A review of best practice drone use indicates

that nesting gulls can be intolerant of drones (Edney et al. 2023), although disturbance can be limited with the use of smaller modern drones with better cameras (Natural England, 18 April 2024); the use of drones will be progressed with great caution and will only be undertaken if there is high degree of confidence that it will not have any detrimental effects;

- Information will also be collected to document which nests fail and, where possible, why they failed. Surveyors will record any observation that could have a bearing on the productivity of a colony, such as signs of disease or starvation within the colony, changes in behaviour (e.g. birds flushing from nests at an increasing distance on surveyor approach), appearance of plastic (or other sources of pollution) within the colony and any sign of nest disturbance or gaps appearing within a colony etc;
- Observations to obtain both count data and productivity will be conducted in such a way as to minimise disturbance. Where possible, observations will be made from within a vehicle as this will cause much less disturbance, although portable hides (e.g. fabric tent style) may also be considered;
- Because it is unlikely that all nests will be visible from any given location it will be necessary to map observed nests to cross-check between vantage points. This will also permit tracking of nest success over the course of the breeding season;
- The availability of suitable breeding ground will be monitored annually at the compensation site. If a phased approach to scrub clearance on Steep Holm is carried out, the number of breeding pairs of lesser black-backed gulls could be measured against the area of cleared scrub to assess the effectiveness of the scrub clearance measure against breeding activity;
- Monitoring will be conducted during the daytime (0900-1600) and during conditions of good visibility; poor weather (heavy rain, fog, high winds) will be avoided;
- Surveyors will also collect opportunistic observations, such as instances of predation by avian species (e.g., other large gull species and corvids), in particular if these appear to be related to disturbance events such human activity (e.g., people walking and dogs) which may highlight the need for management changes or temporary access restrictions. Any observations of avian predation (or suspected avian predation), for example egg stealing by corvids or other large gulls, will also be noted and included in the annual report;
- If access is agreed with the owner, the roofs of any adjacent buildings to the compensation colony will also be surveyed to collect the same data as above. Although since the presence of people will cause disturbance to birds which nest on the buildings, the number of visits will be minimised (no more than three per season) and combined with monitoring of these birds; and,
- The above methods will be complemented with high resolution photography, to provide a permanent record of how the site is being used.

In the first three years following implementation of the compensation measure, and subject to any restrictions on work within bird colonies due to avian influenza, the following additional monitoring will be undertaken:

- Ringing of chicks (BTO metal and colour rings), linked with resighting efforts (for birds colour-ringed as chicks);
- Diet studies, through collection of pellets and/or regurgitated material during handling of birds for ringing (note this aspect will be opportunistic and it is not proposed that efforts to force regurgitation will be made);
- Ringing (BTO and colour rings) of chicks produced at other local and regional populations may also be undertaken, at a sample of locations where such work is considered feasible or contributing to ongoing studies. This will enable the origins of ringed birds which recruit to the compensation population to be determined; and,
- GPS tagging adults to investigate where gulls are foraging. This will help to explain any rise or fall of breeding success within the colony.

Additional monitoring will be considered during the operational phase of the Project, subject to discussions and agreement with the LBBGCSG.

All monitoring and bird handling will be undertaken by qualified and experienced ornithologists holding required licences and endorsements to ensure it is conducted to a high standard and causes the minimum of disturbance. In particular, all ringing efforts will be undertaken in a careful manner as disturbance in gull colonies can often result in chicks being predated.

The Project will engage with other parties (e.g. the North West England Gull Project or the warden/ecologist for Steep Holm, South Walney or Banks Marsh, refer to Annex 2A) undertaking lesser black-backed gull monitoring in the region in order to ensure consistency in methods and to avoid duplication of effort which would be both inefficient and also could result in unnecessary additional disturbance to breeding birds.

6.3 Timescales for reporting

The monitoring programme outlined above will be detailed in annual monitoring reports that will be produced following each breeding season and provided to the LBBGCSG and the Secretary of State. At least one LBBGCSG meeting will be organised prior to writing the report to present the findings and discuss how these will be reported. The anticipated stages and timing for producing the annual reports are as follows:

- 1) Field data collated after the monitoring season (August to September);
- 2) Findings presented to the LBBGCSG including discussion on reporting and adaptive management triggers (late October);
- 3) Draft report circulated to LBBGCSG for comment (late November);
- 4) Address comments and hold further meetings if required (December);
- 5) Finalise the report and issue to the LBBGCSG and Secretary of State (January); and,
- 6) Secretary of State to approve report (end of February).

6.4 Annual report content

The annual monitoring report is likely to follow this structure:

- Overview of the results from lesser black-backed gull colony monitoring including colony counts, mapped nest locations and productivity monitoring;
- Overview of any evidence of mammalian presence within the fenced enclosure (if implemented);
- Assessment of whether lesser black-backed gull breeding success targets are being met;
- Actions delivered;
- Identification of emerging issues;
- Overall consideration of whether the compensation measure is effective or not; and,
- Approach to monitoring for the following year.

The results of the monitoring report would be used to update the adaptive management measures.

7 DELIVERY TIMETABLE

As lesser black-backed gulls typically start breeding at four years of age⁵, the objective will be to complete the compensation measure before the breeding season commences four years before the start of operation of Morecambe Offshore Windfarm. Allowing four years to elapse between implementation of the compensation measure and the start of the Project's operational phase will allow for the 'additional' juveniles at the compensation colony to become adults by the start of operation of the windfarm.

Where possible the compensation measure will be implemented outside of the lesser black-backed gull breeding season (September to February) to minimise disturbance to breeding birds, although potentially some vegetation management (depending on the type of vegetation to be controlled) may need to be conducted early or late in the breeding season. The aim would be to construct the fenced enclosure and/or carry out habitat management between September to February.

The Defra (2021) compensation consultation document (refer to section 3 in Annex 1A) states that compensatory measures should be secured before any impact takes place. Whilst recognising that ideally the compensation would be functioning prior to impact occurring, the guidance also states that this is not always feasible: *"Where this is not possible, it is important that necessary licences are in place, finances are secured, and realistic implementation plans have been agreed with the appropriate bodies to demonstrate that the compensatory measure is secured."* As the 'in-principle' compensation required by the Project is for a small number of birds (mean of 1.02 individuals per annum, refer to section 4 in Annex 1A) and the minimum scale of compensation necessary for the Project will over-compensate for the potential impact (for spatial scales, refer to section 2.5 Annex 2A), it may be possible to reduce the length of time (e.g. from 4 to 3 years) between construction of the fence enclosure and/or habitat management and the start of operation of the Project, subject to agreement with the Secretary of State.

If operation of the Project were to start before new adult birds have been produced at the compensation colony, a 'mortality debt' would be created, i.e. if there were no new birds aged at

⁵ BTO BirdFacts available at: <https://www.bto.org/understanding-birds/birdfacts/lesser-black-backed-gull>

least 4 years old from the compensation colony in the first year of operation, the mortality debt would be 1.02 birds. The time taken to 'pay back' a mortality debt would depend on several factors which are difficult to predict (e.g. rate of colony growth and starting size). However, as an example, a very modest number of 25 lesser black-backed gull pairs initially breeding at the compensation colony could result in 6 new adults after 4 years (assuming productivity is 0.45/pair, JNCC 2021, and 50% of chicks produced in a year would be expected to reach adult age, Ross-Smith, 2014b). If the compensation colony didn't produce new adults until the year after the start of operation (e.g. if the fence enclosure and/or habitat management measure was created in 2026 from which chicks would reach maturity in 2030, but wind farm operation started in 2029), the compensation colony could, theoretically, produce 6 birds by the second year of operation (2030) which would overtake the Project's cumulative mortality at year 2 (i.e. 2.04 birds)) and therefore the compensation colony would have paid back the mortality debt by the second year of operation.

8 ADAPTIVE MANAGEMENT

Should post-implementation monitoring reveal that the compensation measure is unsuccessful, or less successful than anticipated, an assessment will be undertaken to determine the reasons underlying the lack of success, and to inform the next steps.

Principally, next steps will consist of identifying potential improvements to the fenced enclosure and/or improvements to be made to the habitat, based on potential issues discovered during the monitoring assessment. Should the assessment determine that the compensation measures in place cannot be improved sufficiently, then alternatives, such as some additional habitat management within the enclosure or a contribution to the Marine Recovery Fund (or equivalent), may be considered in consultation with the LBBGCSG.

While breeding success targets at the compensation colony (section 1.6) are a practical goal for compensation measures, this metric should be used as a framework for monitoring and it is just as important that consideration is given to understanding the status of lesser black-backed gull colonies more widely, in order to determine the compensation colony's performance relative to other colonies not receiving compensation.

Therefore, the performance of the compensation colony should not be viewed in isolation, but should be assessed in the wider context of breeding success for this species locally (e.g. within the Morecambe Bay & Duddon Estuary SPA and Ribble & Alt Estuaries SPA), regionally (e.g. Lancashire and Cumbria) or within the wider National Site Network. Hence, poor breeding success at the compensation colony in a year when poor breeding success is also seen at most other lesser black-backed gull colonies either locally, regionally or nationally would be indicative of wider issues (e.g. reduced prey stocks, adverse weather conditions or disease etc) and would not automatically trigger remedial action at the compensation colony. However, under these circumstances the LBBGCSG would look to understand the reasons for poor reproductive performance at the compensation colony, attempt to identify potential remedies and collaborate with relevant groups to understand the wider context in terms of other local or regional colony breeding success.

Conversely, if the compensation colony performs less well than other monitored sites, this would be a strong indicator that remedial action is required to identify and address the causes.

During the first months and years of the monitoring period following the initial compensation measure, monitoring is expected to be focussed on understanding the mechanisms for colonisation. For example, there may be evidence that birds are not prospecting for nest sites at the compensation colony, or prospecting but not settling, or settling but abandoning during nest building, etc. and each of these would lead to a requirement for different remedial measures. Monitoring data will be collected with the aim of understanding what is driving the observed bird behaviour so that the most appropriate adaptive measure can be applied.

Other factors which will be monitored if feasible (e.g., if focal nests can be identified and monitored without itself causing disturbance) would include nest attendance rates and foraging trip duration, as these will indicate the degree of effort required by the breeding adults and may indicate reasons for reproductive failure. As noted above, it would also be necessary to assess breeding success at other locations surrounding the compensation site to understand if any observed patterns are replicated elsewhere using publicly available desk-based data (e.g. BTO Seabird Monitoring Programme data).

If colonisation by lesser black-backed gulls at the compensation colony does occur in the initial years following the implementation of the compensation measure and initial recruits have good breeding success, but the rate of colony growth appears to be lower than would be needed for the colony to reach capacity, then reasons for this will be investigated. This may highlight avoidance of particular areas (e.g. areas of less preferred habitat), which could be targeted for (additional) habitat modification or highlight that additional effort in attracting birds would be beneficial (e.g. use of decoys and broadcasting colony calls).

The monitoring and requirements for adaptive management will be conducted on an annual basis for the duration of the Project, although monitoring may be more intensive for the first few years following implementation of the compensation measure and then scaled back for the remainder of the Project if this is appropriate and is agreed with the LBBGCSG.

As discussed above, the adaptive management measures to be considered will depend on the circumstances, however remedial actions may include:

- Additional habitat management, conducted over winter and prior to lesser black-backed gull arrival in spring, to enhance the attractiveness for this species, e.g., through additional scrub clearance, closer sward mowing, more careful patchwork strimming, creation of additional bare ground (e.g., removal of the top layer of material), placement of old sleepers (or similar) to provide structures for birds to nest against;
- If avian predation is identified as resulting in a significant loss of eggs (e.g. corvids or other gull species) then options for minimising this which are not detrimental either to other conservation objectives or have a risk to the lesser black-backed gulls themselves will be investigated;
- If initial recruitment to the enclosure (if used) is below the target level, then colony call playback and placement of decoy birds within the enclosure will be undertaken (although it should be noted that decoys may also be used to encourage birds to colonise the enclosure (if used) from the first breeding season year following fence installation (if used), in which case this would represent an enhancement of the compensation measure already delivered);

- If productivity is lower than would be anticipated for the estimated number of AON, supplementary feeding of chicks will be considered (Armstrong, 1992). This would need to be done in a manner that achieved the aim of improving chick health, whilst not encouraging other species such as rats which could be detrimental (e.g. elevated 'bird tables', although as these would also attract corvids this would need careful consideration). Furthermore, this option would require careful consideration to rule out other more systemic causes, such as collapse of prey stocks, that short-term feeding would be unable to make up for; and,
- In the event that the above methods are undertaken, and the compensation colony remains under-utilised or unused then careful consideration will be given to the potential of alternative or additional locations or potential strategic compensation options.

9 REFERENCES

- Armstrong, R. 1992. Factors affecting breeding success of the herring gull (*Larus argentatus*) at an increasing and a decreasing colony. PhD thesis available at:
<https://theses.gla.ac.uk/75457/1/13831553.pdf>
- Cooper, J. 2013. <https://www.acap.aq/news/news-archive/2013-news-archive/predator-proof-fences-are-helping-to-protect-procellariiform-seabirds-including-acap-listed-albatrosses-and-petrels>.
- Dalrymple, S. 2023. Predator exclusion fencing improves productivity at a mixed colony of Herring Gulls *Larus argentatus*, Lesser Black-backed Gulls *L. fuscus* and Great Black-backed Gulls *L. marinus*. *Seabird* 35: p18-29.
- Donehower, C.E., Bird, D.M., Hall, C.S. and Kress, S.W. 2007. Effects of Gull Predation and Predator Control on Tern Nesting Success at Eastern Egg Rock, Maine. *Waterbirds*: 30 (1): p29-39.
- Edney, A.J., Hart2, T., Jessopp, M.J., Banks, A., Clarke, L.E., Cugnière2, L., Elliot, K.H., Martinez, I.J., Kilcoyne, A., Murphy, M., Nager, R.G., Ratcliffe, N., Thompson, D.L., Ward, R.M., Wood, M.J. 2023. Best practices for using drones in seabird monitoring and research. *Marine Ornithology* 51: p265–280.
- Furness, R.W. 2021. HRA Derogation Scope B - Review of seabird strategic compensation options. Report to Crown Estate Scotland and SOWEC. Available at:
<https://www.offshorewindscotland.org.uk/media/12970/hra-derogation-scope-breport.pdf>
- Furness, R.W., MacArthur, D., Trinder, M. and MacArthur, K. 2013. Evidence review to support the identification of potential conservation measures for selected species of seabirds. Report to Defra.
- Gilbert, G., Gibbons, D.W. and Evans, J. 1998. Bird Monitoring Methods: a manual of techniques for key UK species. RSPB/British Trust for Ornithology, The Wildfowl and Wetlands Trust, Joint Nature Conservation Committee, Institute of Terrestrial Ecology and The Seabird Group.
- Guillemette, M. and Brousseau, P. 2001. Does culling predatory gulls enhance the productivity of breeding common terns? *Journal of Applied Ecology* 38: p1-8.
- Humane Vertebrate Pest Control Working Group 2004. A National Approach Towards Humane Vertebrate Pest Control. An unpublished discussion paper arising from the proceedings of an RSPCA Australia/AWC/VPC joint workshop, August 4-5, Melbourne. RSPCA Australia, Canberra, Australia.
- JNCC, 2023. UK National Site Network: site summary details, 31 October 2023. UK National Site Network (SAC and SPA): site summary details spreadsheet | JNCC Resource Hub
- JNCC. 2021. Seabird Population Trends and Causes of Change: 1986–2019 Report (<https://jncc.gov.uk/our-work/smp-report-1986-2019>). Joint Nature Conservation Committee, Peterborough. Updated 20 May 2021.

Kazama, K. 2007. Factors affecting egg predation in black-tailed gulls. *Ecological Research* 22: 613–618.

Kubelka, V. 2020. Review of inter and intraspecific predation by shorebirds. *Ornis Fennica* 97: p177-185.

MacArthur Green and Royal HaskoningDHV, 2022. Norfolk Projects Offshore Wind Farms Lesser black-backed gull Implementation and Monitoring Plan. Ref PB5640.009.0005.

Ross-Smith, V.H., Robinson, R.A., Banks, A.N., Frayling, T.D., Gibson, C.C., Clark, J.A. 2014a. The Lesser Black-backed Gull *Larus fuscus* in England: how to resolve a conservation conundrum. *Seabird* 27: p41–61.

Ross-Smith, V.H., Grantham, M.J., Robinson, R.A. and Clark, J.A. 2014b. Analysis of Lesser Black-backed Gull data to inform meta-population studies. BTO Research Report No. 654. Available at: https://www.bto.org/sites/default/files/shared_documents/publications/research-reports/2014/rr654.pdf.

RSPB 2024. Ribble Estuary NNR Species and Habitats Recovery 2023-2028: Project 1 – South Ribble predator exclusion fence “Mega-fence” SPA large gull colony recovery & Common tern colony restoration. Draft RSPB report.

Thomas, S., Varnham, K. & Havery, S. 2017: UK Rodent Eradication Best Practice Toolkit (Version 4.0). Available at: <https://biosecurityforlife.org.uk/resources/detail/uk-rodent-eradication-best-practice-toolkit>.

Walsh, P.M., Halley, D.J., Harris, M.P., del Nevo, A., Sim, I.M.W. & Tasker, M.L. 1995. Seabird monitoring handbook for Britain and Ireland. JNCC / RSPB / ITE / Seabird Group, Peterborough. ISBN 1 873701 73 X.

White, G. & Hirons, G. 2019. The Predator Exclusion Fence Manual: Guidance on the use of predator exclusion fences to reduce mammalian predation on ground-nesting birds on RSPB reserves Version 3, October 2019.

Young, L.C., Vanderwerf, E.A., Mitchell, C., Yeun, E., Miller, C.J., Smith, D.G. and Swenson, C. 2012. 17 The use of predator proof fencing as a management tool in the Hawaiian Islands: a case study of 18 Ka’ena Point Natural Area Reserve. University of Hawaii Pacific Cooperative Studies Unit Technical Report 180: 1-87.

Appendix 3: Letter of Support from Kenneth Allsop Memorial Trust

[REDACTED]
Chair Kenneth Allsop Memorial Trust

[REDACTED]
[REDACTED]
[REDACTED]
12 May 2024

Morecambe Offshore Windfarm Ltd
12 Alva Street
Edinburgh
EH2 4QG

To Morecambe Offshore Windfarm Generation Assets Project

This is to confirm that discussions are on-going between the Kenneth Allsop Memorial Trust and the Morecambe Offshore Windfarm Generation Assets Project to secure a habitat management scheme to enhance the habitat for breeding lesser black-backed gulls on the Trust's land at Steep Holm Island, in the Severn Estuary. It is understood that Morecambe Offshore Windfarm Ltd will be putting this proposal forward as a 'Without Prejudice' Compensation Scheme, as part of its Development Consent Order (DCO) application for the Morecambe Offshore Windfarm Generation Assets Project. The Trust confirms that they are taking this proposal forward exclusively with the Morecambe Offshore Windfarm Generation Assets Project.

Scrub clearance works on Steep Holm Island would be subject to having obtained all required permissions and consents and on having agreed commercial terms for the proposed activities. On this basis, the Kenneth Allsop Memorial Trust is content to support, in principle, the Morecambe Offshore Windfarm Generation Assets Project's involvement in the habitat management works on Steep Holm Island.

[REDACTED]