

# MORGAN OFFSHORE WIND PROJECT GENERATION ASSETS

HRA Screening Report, Screening Matrices and Integrity Matrices



April 2023  
FINAL

<b>Document status</b>					
<b>Version</b>	<b>Purpose of document</b>	<b>Authored by</b>	<b>Reviewed by</b>	<b>Approved by</b>	<b>Review date</b>
Rev01	Draft for Client review	RPS	bpEnBW		08/09/22
Rev02	Addressing client comments	RPS	bpEnBW		14/10/22
Rev03	Final	RPS	bpEnBW	bpEnBW	16/12/22

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## Glossary

Term	Meaning
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Morgan Scoping Report	The Morgan Scoping Report that was submitted to The Planning Inspectorate (on behalf of the Secretary of State) for the Morgan Generation Assets.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment (EIA) process for the Morgan Generation Assets.
Morgan Offshore Wind Project (generation assets)	The Morgan Generation Assets is comprised of the generation assets and associated activities.
Morgan Array Area	The area within which the wind turbines, foundations, inter-array cables, interconnector cables and offshore substation platforms (OSPs) forming part of the Morgan Generation Assets will be located.
Applicant	Morgan Offshore Wind Limited
Wind turbines	The wind turbine generators, including the tower, nacelle and rotor.
Inter-array cables	Cables which connect the wind turbines to each other and to the offshore substation platforms. Inter-array cables will carry the electrical current produced by the wind turbines to the offshore substation platforms.
Interconnector cables	Cables that may be required to interconnect the Offshore Substation Platforms in order to provide redundancy in the case of cable failure elsewhere.
Intertidal area	The area between Mean High Water Springs (MHWS) and Mean Low Water Springs (MLWS).
Local Authority	A body empowered by law to exercise various statutory functions for a particular area of the United Kingdom. This includes County Councils, District Councils and County Borough Councils.
Local Highway Authority	A body responsible for the public highways in a particular area of England and Wales, as defined in the Highways Act 1980.
Non-statutory consultee	Organisations that an applicant may choose to consult in relation to a project who are not designated in law but are likely to have an interest in the project.
The Planning Inspectorate	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
Relevant Local Planning Authority	The Relevant Local Planning Authority is the Local Authority in respect of an area within which a project is situated, as set out in Section 173 of the Planning Act 2008. Relevant Local Planning Authorities may have responsibility for discharging requirements and some functions pursuant to the Development Consent Order, once made.
Statutory consultee	Organisations that are required to be consulted by an applicant pursuant to the Planning Act 2008 in relation to an application for development consent. Not all consultees will be statutory consultees (see non-statutory consultee definition).
The Secretary of State for Business, Energy and Industrial Strategy	The decision maker with regards to the application for development consent for the Morgan Generation Assets.

Term	Meaning
Evidence Plan	The Evidence Plan is a mechanism to agree upfront what information the Applicant needs to supply to the Planning Inspectorate as part of the Development Consent Order (DCO) applications for the Morgan Generation Assets
Evidence Plan Expert Working Group (EWG)	Expert working groups set up with relevant stakeholders as part of the Evidence Plan process.
Maximum design scenario	The scenario within the design envelope with the potential to result in the greatest impact on a particular topic receptor, and therefore the one that should be assessed for that topic receptor.
Marine licence	The Marine and Coastal Access Act 2009 requires a marine licence to be obtained for licensable marine activities. Section 149A of the Planning Act 2008 allows an applicant for a DCO to apply for 'deemed marine licences' as part of the DCO process.
NPS	The current national policy statements published by the Department of Energy and Climate Change in 2011.
Offshore Wind Leasing Round 4	The Crown Estate auction process which allocated developers preferred bidder status on areas of the seabed within Welsh and English waters.

## Acronyms

Term	Meaning
AfL	Agreement for lease
BDMPS	Biologically Defined Minimum Population Scales
CJEU	The Court of Justice of the European Union
cSAC	Candidate Special Area of Conservation
DCO	Development Consent Order
EMF	Electromagnetic Field
EnBW	Energie Baden - Württemberg
FCS	Favourable Conservation Status
HRA	Habitats Regulations Assessment
IMO	International Maritime Organisation
IMWWG	Inter-agency Marine Mammal Working Group
IROPI	Imperative Reasons of Overriding Public Interest
ISAA	Information to Support an Appropriate Assessment
LSE	Likely Significant Effect
MARPOL	International convention for the prevention for the pollution from ships
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs

**MORGAN OFFSHORE WIND PROJECT GENERATION ASSETS**

Term	Meaning
MMO	Marine Management Organisation
MU	Management Unit
NRW	National Resources Wales
NSIP	Nationally Significant Infrastructure Project
OSP	Offshore Substation Platform
OSPAR	Oslo-Paris
PEIR	Preliminary Environmental Information Report
EMP	Environmental Management Plan
pSAC	Possible Special Area of Conservation
pSPA	Possible Special Protection Area
SAC	Special Area of Conservation
SD	Standard Deviation
SOSS	Strategic Ornithological Support Services
SSC	Suspended Sediment Concentration
TCE	The Crown Estate
UXO	Unexploded Ordnance
ZOI	Zone of Influence

**Units**

Unit	Description
GW	Gigawatt
MW	Megawatt
nm	Nautical mile
km	Kilometre
km <sup>2</sup>	Square kilometre
m	Metre

# 1 MORGAN HABITATS REGULATIONS ASSESSMENT STAGE 1 SCREENING

## 1.1 Introduction

### 1.1.1 Overview

1.1.1.1 In February 2021, Energie Baden-Württemberg AG (EnBW) and bp Alternative Energy Investments Ltd. (bp) were selected by The Crown Estate (TCE) as Preferred Bidder for two 60-year leases in Offshore Wind Leasing Round 4. The projects to be developed, located in the east Irish Sea, have been named as the Morgan Offshore Wind Project and the Mona Offshore Wind Project. The Applicant entered into agreement for lease for each of the Projects in early 2023. Separate consent applications will be submitted by Morgan Offshore Wind Limited and Mona Offshore Wind Limited (the 'Applicants') for each project, each accompanied by a separate Environmental Statement.

1.1.1.2 The Morgan Offshore Wind Project has been scoped into the Pathways to 2030 workstream under the Offshore Transmission Network Review (OTNR). The OTNR aims to consider, simplify and wherever possible facilitate collaborative approach to offshore wind projects connecting to the UK National Grid. The OTNR has been led by the Department for Business, Energy and Industrial Strategy (BEIS) in conjunction with the Office of Gas and Electricity Markets (OFGEM) and the National Grid Electricity System Operator (NGESO). Under the OTNR, the NGESO are responsible for assessing options to improve the coordination of offshore wind generation connections and transmission networks. As part of the OTNR, the NGESO has undertaken a Holistic Network Design Review (HNDR). The output of the HNDR has concluded that the Morgan Offshore Wind Project will share a grid connection location at Penwortham in Lancashire with the Round 4 Morecambe Offshore Windfarm, also located in the east Irish Sea. Morgan Offshore Wind Ltd and Morecambe Offshore Windfarm Ltd are seeking consent for transmission assets comprising shared offshore export cable corridors to landfall and shared onshore export cable corridors to onshore substation(s), and onward connection to the National Grid electricity transmission network at Penwortham, Lancashire.

1.1.1.3 Given the coordinated grid connection arrangements, the proposed consenting strategy for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm is as follows:

- A stand-alone Development Consent Order (DCO) application to consent the construction, operations and maintenance, and decommissioning of the generation assets of Morgan Offshore Wind Project, hereafter referred to as the Morgan Generation Assets
- A stand-alone DCO application to consent the construction, operations and maintenance, and decommissioning of the generation assets of Morecambe Offshore Windfarm
- A separate application to consent the construction, operations and maintenance and decommissioning of the Morgan and Morecambe Offshore Wind Farms: Transmission Assets required to enable the export of electricity

from both the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the existing National Grid substation at Penwortham.

1.1.1.4 This Habitats Regulations Assessment (HRA) Stage 1 Screening for Likely Significant Effects (LSE) has been prepared for the Morgan Generation Assets.

### 1.1.2 Habitats Regulations Assessment

1.1.2.1 This document has been produced to inform the HRA process for the Morgan Generation Assets. It provides information to enable the screening of the Morgan Generation Assets with respect to its potential to have a LSE on designated nature conservation sites (hereafter 'European sites'). The scope of this document covers all relevant European sites and relevant qualifying interest features. European sites are proposed to be "screened out" where no LSE from the Morgan Generation Assets is predicted. Where LSE cannot be ruled out at this stage the European sites will be "screened in" and assessed further.

1.1.2.2 The requirement and process for the consideration of potential impacts of plans and projects on European sites have followed the European Union's (EU) Habitats Directive. In terrestrial areas of the UK and territorial waters out to 12nm, the land and marine aspects of Habitats Directive and certain elements of the Wild Birds Directive (Directive 2009/147/EC) are transposed into UK law through The Conservation of Habitats and Species Regulations 2017 (as amended). In waters beyond 12nm, The Conservation of Offshore Marine Habitats and Species Regulations 2017 (the Offshore Habitats Regulations) apply, which transpose the Habitats and Birds Directives into national law. These regulations are together referred to as the Habitats Regulations.

1.1.2.3 The Habitats Regulations require that an HRA must be carried out on all plans and projects that are likely to have significant effects on European sites, which include Special Areas of Conservation (SACs), candidate SACs (cSACs), Sites of Community Importance (SCI), Special Protection Areas (SPAs) and as a matter of policy, possible SACs (pSACs), potential SPAs (pSPAs) and Ramsar sites (listed under the Ramsar Convention on Wetlands of International Importance – where also designated as a European site).

1.1.2.4 In this report, and in accordance with guidance issued by the UK Government on the changes made by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, the term "European site" has been retained to refer to the above sites protected in European Member States, England and Wales (Defra, 2021). However, where these sites are located in the UK, they no longer form part of the EU's Natura 2000 ecological network and now form part of the National Site Network. European sites are defined in full in section 1.3.

1.1.2.5 The Defra (2021) guidance identifies that the HRA process can have up to three stages as outlined below:

1. Screening - to check if the proposal is likely to have a significant effect on the site's conservation objectives
2. Appropriate Assessment - to assess the likely significant effects of the proposal on the integrity of the site and its conservation objectives and to consider ways to avoid or minimise any effects

3. Derogation - to consider if proposals that would have an adverse effect on the integrity of a European site qualify for an exemption, subject to three legal tests being satisfied (i.e. alternative solutions, imperative reasons of overriding public interest and compensatory measures).

### 1.1.3 Purpose of the report

1.1.3.1 This document represents the Applicant's HRA Stage 1 Screening under the Habitats Regulations for the Morgan Generation Assets (as described in section 1.1.5). It comprises the screening stage and therefore provides information to enable the screening of the Morgan Generation Assets with respect to its potential to have an LSE on European sites.

1.1.3.2 The screening exercise presented in this report is based on the current understanding of the baseline environment and proposed activities associated with the Morgan Generation Assets and is based on the project and site-specific information currently available. Any changes which may arise as a result of further environmental surveys, assessment work, consultee responses, Evidence Plan process for the Morgan Generation Assets, and/or refinements to the design of the Morgan Generation Assets will be reflected in the Information to Support Appropriate Assessment (ISAA), and/or subsequent HRA reporting.

1.1.3.3 In summary, the purpose of this report is:

- To identify the relevant European sites which may include features (Annex I habitats, Annex I birds and Annex II species) which may be sensitive or vulnerable to potential impacts arising from the construction, operations and maintenance and decommissioning of the Morgan Generation Assets
- To consider the features of the relevant European sites and to identify those which are not considered likely to be at risk of significant effects arising from the Morgan Generation Assets, either alone or in combination with other plans or projects, so that they can be eliminated from further consideration within the process
- To consider the features of the relevant European sites and to identify those which are considered likely to be at risk of significant effects arising from the Morgan Generation Assets, either alone or in combination with other plans or projects, so that they can be taken forward for appropriate assessment
- To consider which of the potential impacts arising from the Morgan Generation Assets are considered likely to result in LSEs to features of European sites and which impacts can be eliminated from consideration in further stages of the HRA.

### 1.1.4 Structure of the report

1.1.4.1 The structure of this HRA Screening Report is as follows:

- Section 1.2– a brief summary of the HRA process and legislative framework including implications of the UK's departure from the EU
- Section 1.3 – the initial identification of European sites and features which have the potential to be affected by the Morgan Generation Assets

- Section 1.4 – HRA screening tables and the determination of the potential for LSEs to arise with regard to the designated features of the European sites under consideration
- Section 1.5– a summary of the approach to the in-combination assessment
- Section 1.6 – a summary of the European sites and features for which the screening process has identified potential for LSEs.

### 1.1.5 Project overview

1.1.5.1 An overview of the Morgan Generation Assets is outlined in the paragraphs below, and the full project description is provided in volume 1, chapter 3: Project description of the PEIR.

1.1.5.2 The PEIR Project Description (volume 1, chapter 3: Project description of the PEIR) has been prepared for the Morgan Generation Assets only. The Morgan Array Area (i.e. the area within which the offshore wind turbines will be located) is 322.2km<sup>2</sup> in area and is located in the east Irish Sea, 22.3km (12nm) from the Isle of Man and 36.3km (19.6nm) from the northwest coast of England (when measured from Mean High Water Springs (MHWS)). The Morgan Generation Assets is located wholly within English offshore waters (beyond 12nm from the English coast).

1.1.5.3 The Morgan Generation Assets will be comprised of up to 107 wind turbines. The offshore infrastructure will also include up to 500km of inter-array cables and 60km of inter-connector cables. Key components of the Morgan Generation Assets are likely to include:

- Offshore wind turbines
- Foundations and support structures
- Scour protection and cable protection
- Inter-array cables
- Interconnector cables
- Offshore substation platforms.

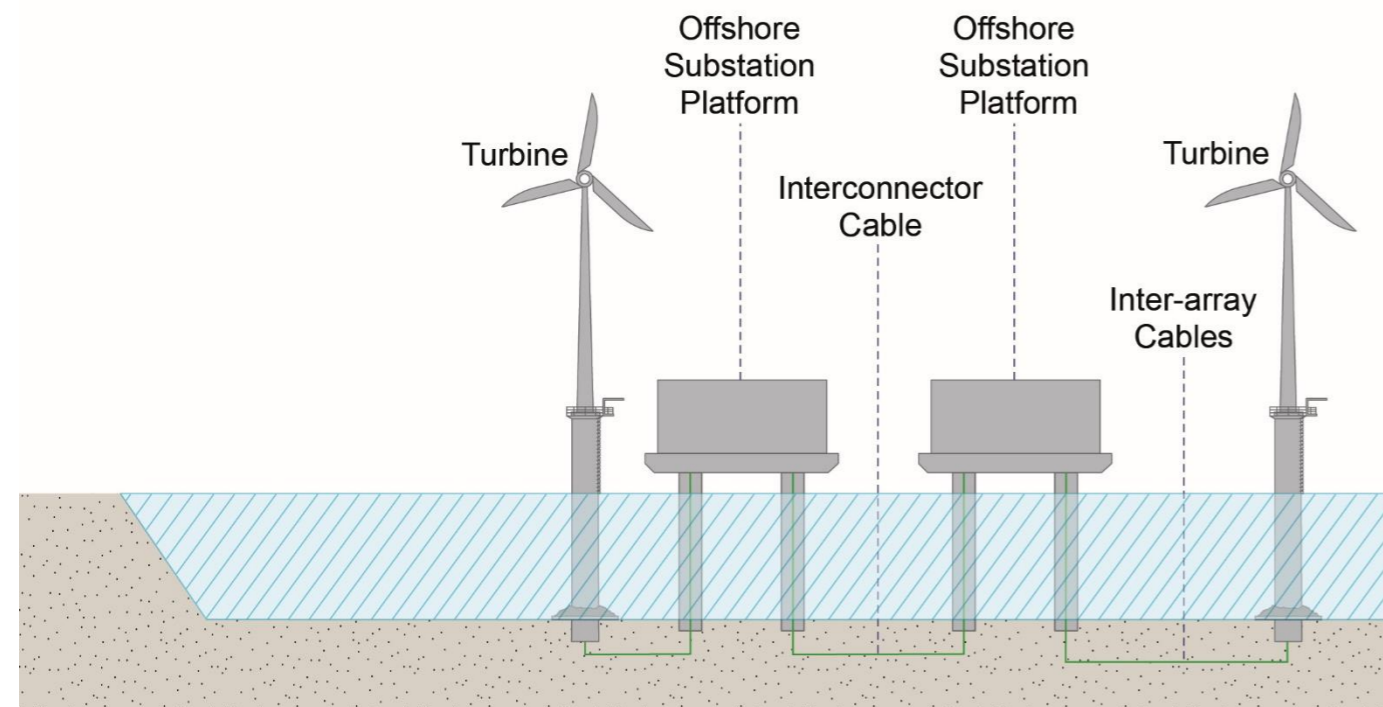
1.1.5.4 The key components of the Morgan Generation Assets are shown in Figure 1.1 and presented in Table 1.1.

1.1.5.5 The Applicant intends to commence construction of the Morgan Generation Assets in 2026 and for it to be fully operational by 2030 in order to help meet the UK Government renewable energy targets.



**Table 1.1: Key parameters for the Morgan Generation Assets.**

Parameter	Value
Morgan Array Area (km <sup>2</sup> )	322.2
Average water depth (m LAT)	-37.8
Maximum number of wind turbines	107
Maximum blade tip height above LAT (m)	324
Maximum number of OSPs	4
Maximum length of inter-array cables (km)	500
Maximum length of interconnector cables (km)	60



**Figure 1.1: Overview of the Morgan Generation Assets infrastructure.**

1.1.5.6 As the Morgan Generation Assets is an offshore generating station with a capacity of greater than 100MW located in English waters, it is a Nationally Significant Infrastructure Project (NSIP), requiring a DCO under the Planning Act 2008. The application for development consent for the Morgan Generation Assets will cover all offshore aspects of the Morgan Generation Assets included within the Morgan Array Area.

1.1.5.7 The application for development consent will comprise full details of the Morgan Generation Assets and will be accompanied by an Environmental Statement, which will present the findings of the EIA process and will be prepared in accordance with

The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 2017 EIA Regulations).

### 1.1.6 Relevant consultations

1.1.6.1 The Applicant is facilitating an Evidence Plan Process for the Morgan Generation Assets. Evidence plans are formal mechanisms to agree what information the Applicant needs to supply to the Planning Inspectorate as part of an application for development consent. This also helps to ensure compliance with the Habitats Regulations and helps ensure Applicants provide sufficient information as part of their DCO application.

1.1.6.2 An evidence plan steering group has been established for the Morgan and Mona Offshore Wind Projects. It was determined appropriate to have a joint evidence plan process across the Morgan and Mona Offshore Wind Projects to ensure common issues and cumulative/in-combination issues are appropriately addressed. The steering group is comprised of the Applicant, the Planning Inspectorate, NRW, Natural England, the Joint Nature Conservation Committee (JNCC) and the Marine Management Organisation (MMO) as the key regulatory bodies and Statutory Nature Conservation Body (SNCBs). The steering group has met and will continue to meet at key milestones throughout the EIA process.

1.1.6.3 In addition, Expert Working Groups (EWG) have been established to discuss topic specific issues with relevant stakeholders. EWG meetings have been held and will continue to be held at key stages in the EIA process or when new information becomes available for each topic, to provide the opportunity for stakeholders to provide feedback and advice at an early stage. EWGs have been established for the following topics:

- Physical processes, benthic ecology and fish and shellfish ecology
- Marine mammals
- Offshore ornithology
- Terrestrial ecology.

1.1.6.4 A summary of the details of the key consultation on HRA screening undertaken to date is presented in Table 1.2.

1.1.6.5 The scoping opinion from the Planning Inspectorate was received on 22 July 2022 for the Morgan Generation Assets. These scoping responses were taken into account in the topic specific PEIR chapters and have in turn been accounted for in the HRA Screening also. Table 1.2 also presents relevant Scoping responses which were identified as being directly applicable to the HRA Screening.

**MORGAN OFFSHORE WIND PROJECT GENERATION ASSETS**

**Table 1.2: Summary of key consultation on HRA screening for the Morgan Generation Assets.**

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
<b>Steering Group</b>				
November 2021	NRW, Natural England, MMO, JNCC and the Planning Inspectorate.	Steering Group meeting	<ul style="list-style-type: none"> <li>Meeting purpose was to set up and establish the Evidence Plan process and to gain feedback on the EWGs.</li> </ul>	N/A
July 2022	NRW, Natural England, MMO, JNCC and the Planning Inspectorate.	Steering Group meeting	<ul style="list-style-type: none"> <li>LSE Methodology circulated to members of the Steering Group to gain feedback and agreement on the methodology to be used.</li> </ul>	Feedback has been incorporated into the HRA Screening Report and the ISAA.
<b>EWGs</b>				
<b>Marine Mammals</b>				
December 2021	NRW, Natural England, MMO, JNCC, Cefas and The Wildlife Trusts (TWT).	EWG meeting	<ul style="list-style-type: none"> <li>Meeting to introduce the Morgan Generation Assets and to establish the EWG.</li> <li>Overview of approach to baseline characterisation and study areas and ongoing surveys and preliminary findings.</li> <li>Position on the use of Marine Mammal Management Units (MUs) for impact assessment or screening, and advice on applying these marine mammal MUs during Appropriate Assessment was provided in NRW's position statement.</li> </ul>	<p>Feedback has been incorporated into the EIA.</p> <p>Marine mammal MUs have been used when screening for LSE.</p>

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
July 2022	NRW, Natural England, MMO, JNCC, Cefas and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Discussion of actions from first EWG meeting, Scoping Opinion discussion and underwater sound methodology.</li> <li>LSE Methodology presented and discussed to the EWG for agreement on the methodology to be used</li> </ul>	Feedback has been incorporated into the HRA Screening Report and the ISAA.
November 2022	NRW, Natural England, MMO, JNCC, Cefas and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Baseline characterisation</li> <li>Baseline populations</li> <li>Approach to HRA screening</li> </ul>	Discussion on marine mammals. Due to the timing of the workshop ahead of publishing the PEIR, discussion outputs will be incorporated into the HRA provided with the Environmental Statement.
<b>Ornithology</b>				
December 2021	NRW, Natural England, MMO, JNCC, TWT, Royal Society for the Protection of Birds (RSPB)	EWG meeting	<ul style="list-style-type: none"> <li>Meeting to introduce the Morgan Generation Assets and to establish the EWG.</li> <li>Discussion of ongoing surveys, preliminary findings and the approach to baseline characterisation.</li> </ul>	Feedback has been incorporated into the EIA.
July 2022	Natural England, NRW, MMO, JNCC, RSPB and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Meeting to agree the approach to baseline characterisation, collision risk modelling and displacement.</li> <li>Opportunity for discussion of the Scoping Opinion.</li> <li>LSE Methodology presented and discussed to the EWG for agreement on the methodology to be used.</li> </ul>	Feedback has been incorporated into the HRA Screening Report and the ISAA.

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
November 2022	Natural England, NRW, MMO, JNCC, RSPB and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Baseline characterisation</li> <li>Baseline populations</li> <li>Approach to HRA screening</li> </ul>	Discussion on offshore ornithology. Due to the timing of the workshop ahead of publishing the PEIR, discussion outputs will be incorporated into the HRA provided with the Environmental Statement.
<b>Benthic, Fish and Shellfish and Physical Processes</b>				
February 2022	Natural England, NRW, MMO, JNCC and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Meeting to discuss benthic survey feedback, preliminary results and desktop data sources.</li> <li>Physical Processes baseline characterisation: Site specific data and desktop data sources.</li> <li>Fish and Shellfish baseline characterisation: Site specific and desktop data sources.</li> </ul>	Feedback has been incorporated into the EIA.
April 2022	Natural England, NRW and JNCC	Email	<ul style="list-style-type: none"> <li>Benthic subtidal and intertidal survey scope of work was consulted on to gain feedback on the methodology.</li> </ul>	Advice has been incorporated into Benthic Ecology Survey Scope of Work
November 2022	Natural England, NRW, MMO, JNCC and TWT.	EWG meeting	<ul style="list-style-type: none"> <li>Baseline characterisation</li> <li>Baseline populations</li> <li>Approach to HRA screening</li> </ul>	Discussion on benthic ecology, physical processes and fish and shellfish. Due to the timing of the workshop ahead of publishing the PEIR, discussion outputs will be incorporated into the HRA provided with the Environmental Statement.

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
<b>Scoping Response</b>				
July 2022	Planning Inspectorate		<ul style="list-style-type: none"> <li>Scoping Opinion for Morgan Generation Assets. It was advised that impacts from sediment-bound contaminants should be included within the PEIR chapter for Fish and shellfish receptors.</li> </ul>	Feedback has been incorporated into the EIA, HRA Screening Report and the ISAA.

## 1.2 The Habitats Regulations Assessment process

### 1.2.1 Legislative context

1.2.1.1 The Habitats Directive together with the Birds Directive provides the EU's legal framework for the protection of wild fauna and flora and birds and establishes a network of internationally important sites, designated for their ecological status. This network of designated sites is comprised of the following:

- SACs which are designated under the Habitats Directive and promote the protection of flora, fauna and habitats
- SPAs which are designated under the Birds Directive in order to protect rare, vulnerable and migratory birds.

1.2.1.2 In terrestrial areas of the UK and territorial waters out to 12nm, the land and marine aspects of Habitats Directive and certain elements of the Birds Directive are transposed into UK law through The Conservation of Habitats and Species Regulations 2017 (as amended). In waters beyond 12nm, The Conservation of Offshore Marine Habitats and Species Regulations 2017 (the Offshore Habitats Regulations) apply, which transpose the Habitats and Birds Directives into national law.

1.2.1.3 The UK is no longer an EU Member State. Notwithstanding, the Habitats Directive as implemented by the Habitats Regulations continues to provide the legislative framework for HRA in the UK. The HRA process implemented under the Habitats Regulations continues to apply (subject to minor changes effected by the EU Exit Regulations) and the UK is bound by HRA judgments handed down by The Court of Justice of the European Union (CJEU) prior to 31 to December 2020<sup>1</sup>. The objective of the Habitats Regulations is to conserve, at a Favourable Conservation Status (FCS), those habitats and species listed in Annexes I and II of the Habitats Directive and Annex I of the Wild Birds Directive. Post EU-Exit, the Habitats Regulations continue to refer to Annexes I and II of the Habitats Directive and Annex I of the Birds

<sup>1</sup> The UK Supreme Court may depart from binding pre-EU Exit case law if they consider it 'right to do so' and the Inner House of the Court of Session may depart from such case law in certain circumstances

Directive and as such, reference is made to the annexes of the Habitats and Birds Directives in this report.

## 1.2.2 European sites post EU exit

1.2.2.1 The Europe-wide network of nature conservation areas that are the subject of the HRA process was established under the Habitats Directive. The Habitats Directive establishes a network of internationally important sites, designated for their ecological status. European sites located within an EU Member State combine to create a Europe-wide network of designated sites known the Natura 2000 network. In the UK, since exiting the EU, these are now referred to as European sites and together with other designated sites, these form part of the National Site Network.

## 1.2.3 The process

1.2.3.1 HRA is generally recognised as a progressive, staged process built around the wording of Article 6(3) of the Habitats Directive, with the outcome at each stage defining the requirement for and scope of the next. Compliance with the requirements of the Directive can be demonstrated if the stages are followed in the correct and particular sequence. These stages are summarised in Figure 1.2.

1.2.3.2 Article 6(3) of the Habitats Directive requires that:

*“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”.*

1.2.3.3 As outlined in paragraph 1.2.3.1, HRA is a multi-stage process which identifies LSE, assesses any adverse effect on integrity of a European site, and considers the derogations (as required). The Defra (2021) guidance describes that the process can have up to three stages as outlined below:

- Screening – the first stage involves a screening for LSE which is a simple assessment to check or screen if, in the absence of mitigation, a proposal:
  - is directly connected with or necessary for the conservation management of a European site
  - risks having a significant effect on a European site on its own or in combination with other proposals
- Appropriate assessment – the second stage is an appropriate assessment, which must be carried out if it is decided that there is a risk of a likely significant effect on a European site or if there is not enough evidence to rule out a risk. The appropriate assessment should assess the likely significant effects of a proposal on the integrity of the site and its conservation objectives and consider ways to avoid or reduce (mitigate) any potential for an ‘adverse effect on the integrity of the site’

- Derogations - the third stage is known as a derogation where, in certain circumstances, a proposal that has failed the integrity test may be allowed to go ahead. To decide if the proposal qualifies for a derogation, three legal tests must be applied. All three tests must be passed in sequence for a derogation to be granted:
  - There are no feasible alternative solutions that would be less damaging or avoid damage to the site
  - The proposal needs to be carried out for imperative reasons of overriding public interest (IROPI)
  - The necessary compensatory measures can be secured.

1.2.3.4 This report considers the first ‘screening for LSE’ step in the HRA process which encompasses the ‘screening’ stage shown in Figure 1.2.

1.2.3.5 The Habitats Regulations make it clear that the person applying for the consent of the plan or project must provide such information as the Competent Authority may reasonably require for the purposes of the assessment. It is intended that this report and the subsequent HRA reporting including the ISAA provides this information.

1.2.3.6 To determine whether an appropriate assessment is required it must first be ascertained whether or not the plan/project is directly connected with or necessary to the management of the European site. As this is not the case for the Morgan Generation Assets, it must therefore be determined whether the plan or project, either alone or in-combination with other plans and projects, is likely to have a significant effect on a European site(s). This constitutes the HRA screening stage which removes from the assessment protected features of European sites which have no connectivity to the Morgan Generation Assets or those where the impacts are immaterial or inconsequential and the conservation objectives for the site’s qualifying interests would not be undermined (i.e. they are non-significant). All other European sites, including those where there is reasonable doubt as to the magnitude and nature of the relevant impact(s), are passed through to the next stage (appropriate assessment).

1.2.3.7 The Habitats Regulations establish management objectives for the national site network. These are called the network objectives. The objectives in relation to the National Site Network are to:

- Maintain or restore certain habitats and species listed in the Habitats Directive to FCS
- Contribute to ensuring the survival and reproduction of certain species of wild bird in their area of distribution and to maintaining their populations at levels which correspond to ecological, scientific and cultural requirements, while taking account of economic and recreational requirements.

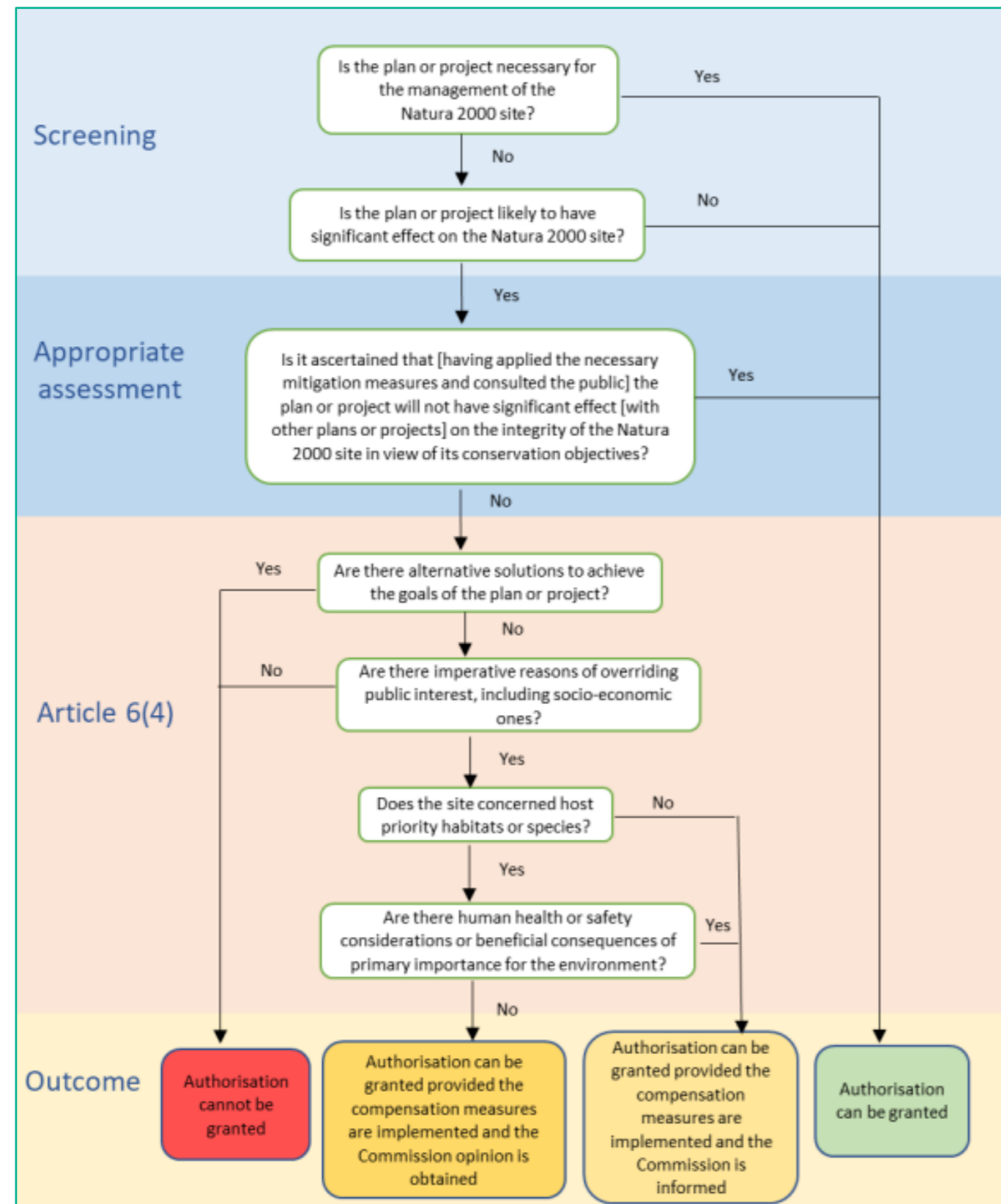


Figure 1.2: Stages in the Habitats Regulations Appraisal Process (Taken from European Commission, 2021).

1.2.4 The Crown Estate Plan-Level HRA

- 1.2.4.1 TCE, in its role as Competent Authority, conducted a Round 4 Plan-Level HRA. The Plan-Level HRA assessed the potential impacts of the six potential offshore wind projects identified through the Round 4 tender process (the “Round 4 plan”), including the Morgan Generation Assets, on the National Site Network.
- 1.2.4.2 The Plan-Level HRA process involved engagement and consultation with an EWG consisting of relevant UK statutory marine planning authorities, SNCBs and relevant non-governmental organisations.
- 1.2.4.3 TCE’s Plan-Level HRA concluded that the possibility of an Adverse Effect on Site Integrity as a result of the Round 4 Plan could not be ruled out for two protected sites forming part of the National Site Network. The two protected sites, and relevant features, are: 1) Sandbank features of the Dogger Bank SAC alone and in-combination; and 2) kittiwake feature of the Flamborough and Filey Coast SPA in-combination only. It should be noted, however, that the Morgan Generation Assets was not required to be considered in the appropriate assessment for either of these sites. Therefore, no Adverse Effect on Site Integrity was identified for the Morgan Generation Assets in the Plan-Level HRA.

1.2.5 Process for identifying sites and features

- 1.2.5.1 To facilitate the identification of the European sites and features to be considered in the HRA screening for the Morgan Generation Assets, a pre-screening of sites has been undertaken. This is considered to be appropriate due to the spatial scale of the Morgan Generation Assets, the wide-ranging nature of many of the features of European sites which may be affected (i.e. birds and marine mammals) and therefore the number of European sites which could potentially be affected.
- 1.2.5.2 The criteria adopted for the initial identification of European sites are outlined in Table 1.3. This approach takes account of the location of the European sites (including Ramsar Sites) in relation to the Morgan Generation Assets, the anticipated Zone Of Influence (ZOI) of potential impacts associated with the Morgan Generation Assets, and the ecology and distribution of qualifying interest features.
- 1.2.5.3 Table 1.3 outlines the order of consideration given to the criteria used for the identification of the list of sites to be taken forward for determination of LSE. Initial consideration is given to whether there is a physical overlap between the Morgan Generation Assets and any European sites; all sites with an overlapping boundary are screened in to be taken forward for determination of LSE.
- 1.2.5.4 Pre-screening criterion 2 next identifies any European sites, not already screened in using criterion 1, where there is an overlap between the Morgan Generation Assets and the range of any qualifying mobile species of the site. All sites where the Morgan Array Area overlaps with the range of one (or more) of its features, are taken forward for determination of LSE.
- 1.2.5.5 Criterion 3 identifies any European sites, not already screened in by criterion 1 or 2, where the potential ZOI of the Morgan Generation Assets overlaps with a European site and/or qualifying interests of the site (as per section 1.2.1). For ornithology receptors, consideration is also given to a range of factors that inform the likely extent to which the different qualifying features will occur at the Morgan Generation Assets.

**Table 1.3: Criteria for initial identification of relevant European sites.**

Order of consideration	Criteria used for initial Identification of relevant European sites
1	The Morgan Array Area overlaps with one or more European or Ramsar sites.
2	European or Ramsar site with qualifying mobile features/species (e.g. Annex I birds, Annex II marine mammals, migratory fish, otter) whose range (e.g. foraging, migratory, overwintering, breeding or natural habitat range) overlaps with the Morgan Array Area.
3	European or Ramsar sites and/or qualifying interest features located within the potential ZOI of impacts associated with the Morgan Generation Assets (e.g. habitat loss/disturbance, sound and risk of collision).

1.2.5.6 The outcome of this initial screening will be that sites where there is no potential for LSEs due to lack of potential overlap of receptor-impact pathway to occur are excluded from further consideration in this report. Sites not excluded on the basis of any of the criteria outlined in Table 1.3 (i.e. where there is a potential for a receptor-impact pathway to occur) will be taken forward for determination of LSE in section 1.4.

1.2.5.7 It should be noted that the HRA Screening may be updated, as appropriate, during the pre-application phase of the Project to account for site-specific survey data, detailed assessments and stakeholder feedback which may result in some features or sites being excluded from consideration in the Appropriate Assessment, due to a lack of LSE. Any such updates would be discussed and agreed with the Evidence Plan Steering Group and EWGs as appropriate.

## 1.2.6 Legislation and guidance

1.2.6.1 The HRA Screening Report has drawn upon a number of information sources, HRA principles, regulations and guidance documents, including:

- The Conservation of Habitats and Species Regulations 2017 and The Conservation of Offshore Marine Habitats and Species Regulations 2017 (the Offshore Habitats Regulations).
- EC (2006) Nature and Biodiversity Cases Ruling of the European Court of Justice
- EC (2007) Guidance document on Article 6(4) of the 'Habitats Directive' 92/43/EE. Clarification on the Concepts of: Alternative Solutions, Imperative Reasons of Overriding Public Interest, Compensatory Measures, Overall Coherence, Opinion of the Commission
- EC (2018) Managing Natura 2000 sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC'
- EC (2020) Guidance document on wind energy developments and EU nature legislation. European Commission Notice Brussels (2020) 7730 final
- EC (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Commission Notice Brussels C(2021) 6913 final

- Joint Defra, Welsh Government, Natural England and Natural Resources Wales guidance (2021) 'Habitat's regulations assessments: protecting a European site'
- The Planning Inspectorate Advice Note ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects (The Planning Inspectorate, 2022)
- The Planning Inspectorate Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects (The Planning Inspectorate, 2019)
- The Habitats Regulations Assessment Handbook (DTA Publications Limited, 2016)
- The Crown Estate Plan Level HRA (The Crown Estate, 2021)
- Feedback received from the Mona and Morgan Evidence Plan Process to date.

## 1.3 Identification of European sites and features

1.3.1.1 This section provides a list of European sites (including Ramsar Sites), and their features, for which there is the potential for connectivity with the Morgan Generation Assets, using the criteria outlined in Table 1.3, and therefore those which should be taken forward for consideration of LSE in section 1.4.

1.3.1.2 Due to the nature of the project infrastructure associated with the Morgan Generation Assets (i.e. no Offshore Cable Corridor or Onshore Cable Corridor), it can be concluded that there is no potential connectivity with onshore European sites and these sites are therefore screened out and not considered further in this HRA Screening Report.

1.3.1.3 Therefore, the following offshore receptor groups are considered in turn:

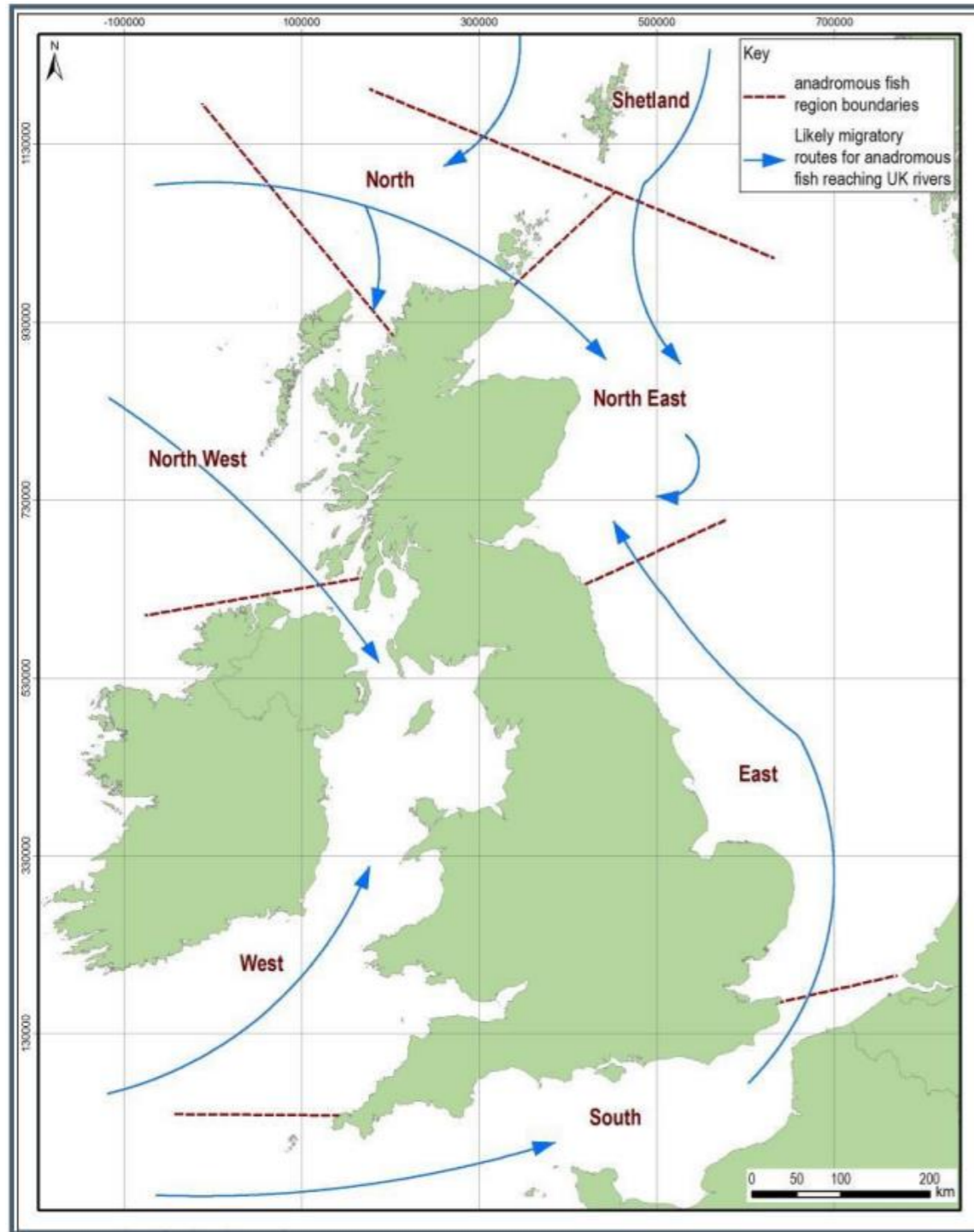
- Annex I habitats (offshore and coastal) (see section 1.3.2)
- Annex II diadromous fish species (see section 1.3.3)
- Annex II marine mammals (see section 1.3.4)
- Marine ornithological features (see section 1.3.5).

### 1.3.2 Sites designated for Annex I habitats (offshore and coastal)

1.3.2.1 The following section details the results of the stepwise process to identify the European sites with relevant Annex I habitats (offshore and coastal) to be taken forward for detailed determination of LSE based on the methodology and criteria outlined in section 1.2.5 and Table 1.3.

1.3.2.2 The approach adopted will focus on the Annex I benthic habitat qualifying interest features for which there is considered to be a potential for impact as a result of the Morgan Generation Assets. Whilst only these qualifying interest features will be screened in for further consideration, it is acknowledged that the Competent Authority must undertake the HRA screening, and any subsequent appropriate assessment, at the site level and not for individual qualifying interest features.

<b>Initial identification for Annex I habitats (offshore and coastal)</b>		
<b>Criterion 1</b>		
1.3.2.3	Criterion 1 for the identification of European or Ramsar sites to be taken forward for consideration of LSE considers those sites which overlap with the offshore and coastal boundaries of the Morgan Generation Assets. There are no European sites with relevant qualifying Annex I habitats, up to MHWS, which overlap with the Morgan Array Area.	1.3.3.2
	<b>Criterion 2</b>	
1.3.2.4	Criterion 2 considers European or Ramsar sites with qualifying mobile features/species whose range (e.g. foraging, migratory, overwintering, breeding or natural habitat range) overlaps with the Morgan Array Area. There are no European sites which meet this criterion for Annex I benthic habitats and so no sites are screened in for further consideration on this basis.	1.3.3.3
	<b>Criterion 3</b>	
1.3.2.5	Criterion 3 considers European or Ramsar sites and/or qualifying interest features which are located within the potential ZOI of impacts associated with the Morgan Generation Assets. There is the potential for indirect effects to sites designated for Annex I habitats as a result of impacts associated with increased Suspended Sediment Concentration (SSC) arising from construction activities or from changes to the hydrodynamic regime as a result of the presence of offshore infrastructure associated with the Morgan Generation Assets.	1.3.3.4
1.3.2.6	The extent of these impacts is considered likely to extend beyond the Morgan Array Area.	1.3.3.5
1.3.2.7	One mean tidal excursion in the vicinity of the Morgan Generation Assets equates to approximately 9km in the northeast and southwest direction and 3km in the northwest/southeast direction from the Morgan Array Area. For the purposes of HRA screening, a precautionary approach has been adopted and this buffer has been increased to 15km. This buffer is considered to be sufficiently precautionary to capture all sites likely to be in the ZOI from indirect effects associated with construction activities. There are no European sites which meet this criterion for Annex I benthic habitats and so no sites are screened in for further consideration on this basis.	1.3.3.6
	<b>Summary of initial screening of sites for Annex I habitats (offshore and coastal)</b>	
1.3.2.8	The initial screening process has identified no European sites with Annex I habitat features to be taken forward for determination of LSE in section 1.4 of this report.	1.3.3.7
<b>1.3.3</b>	<b>Sites designated for Annex II diadromous fish</b>	
1.3.3.1	The following sections detail the results of the stepwise process to identify the European sites with relevant Annex II diadromous fish species to be taken forward for detailed determination of LSE based on the methodology and criteria outlined in section 1.2.5 and Table 1.3.	
		The approach adopted for this HRA screening report focusses on the Annex II diadromous fish qualifying interest features for which there is considered to be a potential for impact as a result of the Morgan Generation Assets. Whilst only these qualifying interest features will be screened in for further consideration, it is acknowledged that the Competent Authority must undertake the HRA screening, and any subsequent appropriate assessment, at the site level and not for individual qualifying interest features.
		<b>Initial identification for Annex II fish</b>
		<b>Criterion 1</b>
		Criterion 1 considers European or Ramsar sites which overlap with the Morgan Array Area. As there are no European sites with Annex II diadromous fish species as qualifying features which overlap with the Morgan Array Area, no sites are screened in for further consideration for diadromous fish on the basis of this criterion.
		<b>Criterion 2</b>
		Criterion 2 considers European or Ramsar sites with qualifying mobile features/species whose range (e.g. foraging, migratory, overwintering, breeding or natural habitat range) overlaps with the Morgan Array Area.
		There is the potential for activities associated with the construction, operations and maintenance and decommissioning of the Morgan Generation Assets to result in impacts on Annex II diadromous fish species at a distance from the European sites for which they are qualifying interest features on the basis that these species are mobile and utilise both freshwater and marine environments throughout their life cycles.
		A precautionary approach to the identification of relevant sites has been adopted in order to capture all sites with the potential for connectivity with the Morgan Generation Assets, and in particular to consider the potential for disruption to migration (i.e. barriers to migration) of diadromous fish (including but not limited to Atlantic salmon) to/from natal rivers (river of origin). For the purposes of HRA screening, a precautionary approach has been adopted using a preliminary buffer of 100km from the Morgan Array Area for all Annex II diadromous fish species except Atlantic salmon and freshwater pearl mussel where the regional area has been considered (see Figure 1.3). These screening buffers take into account the likely migratory routes and distances for diadromous fish as outlined in ABPmer (2014) (see Figure 1.3), and follow the methodology outlined in the Plan Level HRA (The Crown Estate, 2021) and following feedback from stakeholders.
		Given the location of the project within the east Irish Sea it is unlikely that any SACs located along the west Irish Sea coast would be affected by any of the predicted impacts, for example SACs located on the east Coast of Ireland (e.g. River Slaney SAC and River Boyne and River Blackwater SAC), will be unaffected by the Morgan Generation Assets due to its location within the east Irish Sea not presenting a barrier to migration as shown in Figure 1.3. Similarly, only SACs located along the east Irish Sea coast have been included where the Morgan Generation Assets has the potential to create a barrier to migration for designated Annex II fish features (Figure 1.3).



**Figure 1.3: Likely migratory routes for anadromous fish reaching UK rivers (ABPmer, 2014).**

1.3.3.8 On this basis, a total of nine European sites have been screened in using this criterion and must, therefore, be taken forward for determination of LSE in section 1.4.3. These are:

- River Ehen SAC
- Dee Estuary/Aber Dyfrdwy SAC
- River Derwent and Bassenthwaite Lake SAC

- River Kent SAC
- Solway Firth SAC
- River Bladnoch SAC
- River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC
- Afon Gwyrfai a Llyn Cwellyn SAC
- River Eden SAC.

**Criterion 3**

1.3.3.9 Criterion 3 considers European or Ramsar sites and/or qualifying interest features which are located within the potential ZOI of impacts associated with the Morgan Generation Assets (e.g., habitat loss/disturbance, sound and risk of collision). Given the large buffer proposed for criterion 2 above (100km), the ZOI for key impacts to migratory fish species (i.e., underwater sound, habitat loss and increased SSC) are anticipated to be well within this range. No additional European sites with Annex II diadromous fish as qualifying features, beyond those already identified for criterion 2, are therefore screened in for further consideration on the basis of criterion 3.

**Summary of initial screening of sites for Annex II diadromous fish**

1.3.3.10 The initial screening process has identified five European sites with Annex II diadromous fish species as qualifying features to be taken forward for detailed determination of LSE in section 1.4.3 of this report. The sites are listed in Table 1.4 and illustrated in Figure 1.4.

**Table 1.4: European and Ramsar sites designated for Annex II diadromous fish species taken forward for determination of LSE.**

Note: All distances are measured as the marine route to the site (i.e., not the distance as the crow flies).

<sup>1</sup> The Annex I offshore and coastal Annex I habitats which are also qualifying features of this site are screened out of further assessment on the basis of no receptor-impact pathway.  
<sup>2</sup> All terrestrial habitats (i.e., above MHWS) and species have been screened out of further assessment on the basis of no receptor-impact pathway.  
<sup>3</sup> Site is also designated for brook lamprey *Lampetra planeri* and bullhead *Cottus gobio* and white-clawed crayfish *Austropotamobius pallipes* (River Eden SAC only), but as these are not diadromous fish species (i.e., confined to the freshwater section of the river and do not migrate to the marine environment) there is no potential for connectivity with the Morgan Generation Assets and the features are screened out.  
<sup>4</sup> Otter *Lutra lutra* is also a feature of this site, however this feature has been screened out of further assessment on the basis of no receptor-impact pathway.  
<sup>5</sup> Although the freshwater pearl mussel is not a diadromous fish, Atlantic salmon are host species during a critical parasitic phase of the mussel's lifecycle. There could therefore, be an indirect impact upon the freshwater pearl mussel feature of the site if the salmon population is adversely affected.  
<sup>6</sup> This site is only designated for freshwater pearl mussel, brown trout *Salmo trutta* is thought to be the host species within the River Kent SAC, however Atlantic salmon are also present within the river Natural England (2019), the site is therefore screened in.

European site	Relevant Annex II features identified through initial screening of sites	Distance to Morgan Array Area (km)	Additional designated features
River Ehen SAC	Atlantic salmon <i>Salmo salar</i> Freshwater pearl mussel <i>Margaritifera margaritifera</i> <sup>5</sup>	62.77	N/A



European site	Relevant Annex II features identified through initial screening of sites	Distance to Morgan Array Area (km)	Additional designated features
Dee Estuary/Aber Dyfrdwy SAC	Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra fluviatilis</i>	70.09	Estuaries <sup>1</sup> Mudflats and sandflats not covered by seawater at low tide <sup>1</sup> <i>Salicornia</i> and other annuals colonising mud and sand <sup>1</sup> Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritima</i> ) <sup>1</sup> Annual vegetation of drift lines <sup>2</sup> Vegetated sea cliffs of the Atlantic and Baltic Coasts <sup>2</sup> Embryonic shifting dunes <sup>2</sup> Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes") <sup>2</sup> Fixed coastal dunes with herbaceous vegetation ("grey dunes") <sup>2</sup> Humid dune slacks <sup>2</sup> Petalwort <i>Petalophyllum ralfsii</i> <sup>2</sup>
River Derwent and Bassenthwaite Lake SAC	Sea lamprey <i>Petromyzon marinus</i> Atlantic salmon <i>Salmo salar</i> River lamprey <i>Lampetra fluviatilis</i>	71.28	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the Isoëto-Nanojuncetea <sup>2</sup> Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation <sup>2</sup> Marsh fritillary butterfly <i>Euphydryas (Eurodryas, Hypodryas) aurinia</i> <sup>2</sup> Brook lamprey <i>Lampetra planeri</i> <sup>3</sup> Otter <i>Lutra lutra</i> <sup>4</sup> Floating water-plantain <i>Luronium natans</i> <sup>2</sup>
River Kent SAC	Freshwater pearl mussel <i>Margaritifera margaritifera</i> <sup>6</sup>	82.44	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation <sup>2</sup> White-clawed (or Atlantic stream) crayfish <i>Austropotamobius pallipes</i> <sup>2</sup> Bullhead <i>Cottus gobio</i> <sup>3</sup>

European site	Relevant Annex II features identified through initial screening of sites	Distance to Morgan Array Area (km)	Additional designated features
Solway Firth SAC	Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra fluviatilis</i>	84.32	Sandbanks which are slightly covered by sea water all the time <sup>1</sup> Estuaries <sup>1</sup> Mudflats and sandflats not covered by seawater at low tide <sup>1</sup> <i>Salicornia</i> and other annuals colonizing mud and sand <sup>1</sup> Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritima</i> ) <sup>1</sup> Reefs <sup>1</sup> Perennial vegetation of stony banks <sup>2</sup> "Fixed coastal dunes with herbaceous vegetation ("grey dunes")" <sup>2</sup>
River Bladnoch SAC	Atlantic salmon <i>Salmo salar</i>	89.57	N/A
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	Sea lamprey <i>Petromyzon marinus</i> Atlantic salmon <i>Salmo salar</i> River lamprey <i>Lampetra fluviatilis</i>	91.60	Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation <sup>2</sup> Floating water-plantain <i>Luronium natans</i> <sup>2</sup> Brook lamprey <i>Lampetra planeri</i> <sup>3</sup> Bullhead <i>Cottus gobio</i> <sup>3</sup> Otter <i>Lutra lutra</i> <sup>4</sup>
Afon Gwyrfai a Llyn Cwellyn SAC	Atlantic salmon <i>Salmo salar</i>	118.05	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the Isoëto-Nanojuncetea <sup>2</sup> Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation <sup>2</sup> Floating water-plantain <i>Luronium natans</i> <sup>2</sup> Otter <i>Lutra lutra</i> <sup>4</sup>

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European site	Relevant Annex II features identified through initial screening of sites	Distance to Morgan Array Area (km)	Additional designated features
River Eden SAC	Sea lamprey <i>Petromyzon marinus</i> Atlantic salmon <i>Salmo salar</i> River lamprey <i>Lampetra fluviatilis</i>	125.73	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the Isoëto-Nanojuncetea <sup>2</sup> Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation <sup>2</sup> Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) <sup>2</sup> White-clawed (or Atlantic stream) crayfish <i>Austropotamobius pallipes</i> <sup>2</sup> Brook lamprey <i>Lampetra planeri</i> <sup>3</sup> Bullhead <i>Cottus gobio</i> <sup>3</sup> Otter <i>Lutra lutra</i> <sup>4</sup>

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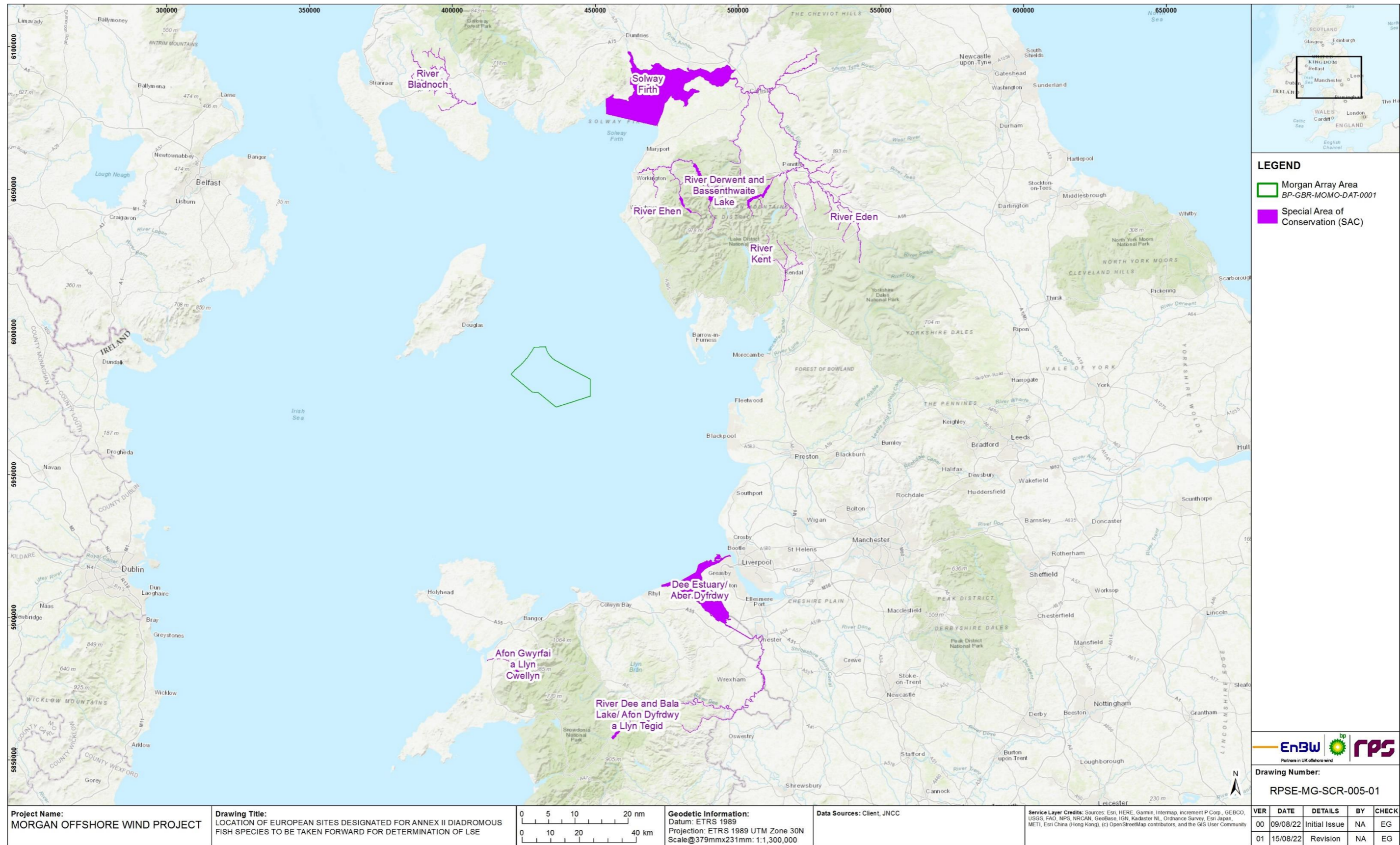


Figure 1.4: Location of European sites for Annex II diadromous fish species to be taken forward for determination of LSE.

### 1.3.4 Sites designated for Annex II marine mammals

1.3.4.1 Based on data collected to date during aerial surveys and information on marine mammal species in the Irish Sea from desk-based studies for the Morgan Generation Assets, the Annex II marine mammal species likely to occur in the vicinity of the Morgan Generation Assets and therefore considered in the HRA screening are:

- Harbour porpoise *Phocoena phocoena*
- Bottlenose dolphin *Tursiops truncatus*
- Grey seal *Halichoerus grypus*
- Harbour seal *Phoca vitulina*.

1.3.4.2 The following species were included in the Morgan Generation Assets Scoping Report and are considered to have the potential to occur within the Morgan Array Area, however these species are listed under Annex IV rather than Annex II of the EC Habitats Directive and therefore do not have SACs designated for them and will be assessed within volume 2, chapter 9: Marine mammals of the Preliminary Environmental Information Report (PEIR) and are not considered further within this document:

- Minke whale *Balaenoptera acutorostrata*
- White beaked dolphin *Lagenorhynchus albirostris* (note that this species has also been scoped out of the PEIR, as agreed in the marine mammal EWG)
- Short beaked common dolphin *Delphinus delphis*
- Risso's dolphin *Grampus griseus*.

#### Initial identification for Annex II marine mammals

1.3.4.3 The following sections detail the results of the stepwise process to identify the European sites with relevant Annex II marine mammals as qualifying features to be taken forward for detailed determination of LSE based on the methodology and criteria outlined in section 1.2.5 and Table 1.3.

1.3.4.4 The approach adopted for this HRA screening report focusses on the Annex II marine mammal qualifying interest features for which there is considered to be a potential for impact as a result of the Morgan Generation Assets. Whilst only these qualifying interest features have been screened in for further consideration in section 1.4, it is acknowledged that the Competent Authority must undertake the HRA screening, and any subsequent appropriate assessment, at the site level and not for individual qualifying interest features.

#### Criterion 1

1.3.4.5 Criterion 1 considers European or Ramsar sites which overlap with the Morgan Array Area. There are no sites with Annex II marine mammal species as qualifying features which overlap with the Morgan Array Area, therefore no sites are screened in for further consideration for marine mammals on the basis of this criterion.

#### Criterion 2

1.3.4.6 Criterion 2 considers European or Ramsar sites with qualifying mobile species whose range (e.g., foraging, migratory, overwintering, breeding or natural habitat range) overlaps with the Morgan Array Area. There is the potential for activities associated with the construction, operations and maintenance and decommissioning of the Morgan Generation Assets to result in impacts on Annex II marine mammal species at distance from the sites for which they are qualifying interest features on the basis that these are highly mobile species which potentially forage over wide areas. The relevant ranges for the different marine mammal receptors are discussed in the following paragraphs.

#### Harbour porpoise

1.3.4.7 A precautionary approach to the identification of relevant sites for harbour porpoise has been adopted in order to capture all sites with the potential for connectivity with the Morgan Generation Assets based on criterion 2. On this basis, it has been considered that sites with harbour porpoise as qualifying interest features which are located within the same Management Unit (MU) defined by the Inter-agency Marine Mammal Working Group (IMWWG) (2015) as the Morgan Generation Assets will be screened for LSE. For harbour porpoise all sites within the Celtic and Irish Seas MU will be considered. Therefore, a total of 24 European sites for harbour porpoise have been identified for consideration at HRA screening (see Table 1.5 and Figure 1.5).

#### Bottlenose dolphin

1.3.4.8 A precautionary approach to the identification of relevant sites for bottlenose dolphin has been adopted in order to capture all sites with the potential for connectivity with the Morgan Generation Assets based on criterion 2. On this basis, it has been considered that sites with bottlenose dolphin as qualifying interest features which are located within the same MU defined by IMWWG (2015) as the Morgan Generation Assets will be screened for LSE. For bottlenose dolphin therefore all sites within the Irish Sea MU will be considered. Therefore, a total of two European sites for bottlenose dolphin have been identified for consideration at HRA screening (see Table 1.5).

#### Grey seal

1.3.4.9 All SACs designated for grey seal located within the same Seal MUs (SCOS, 2020) as the Morgan Generation Assets (i.e. the Wales MU, North West England MU, SW Scotland and Northern Ireland MU) will be screened for LSE. A preliminary screening range of 100km has also been adopted to identify sites with grey seal as a qualifying feature for inclusion in the assessment of LSE, which is based on the latest advice regarding the typical foraging range of this species from haul out sites (SCOS, 2018). However, more recent sources on seal foraging ranges presented in Carter *et al.*, 2022 and telemetry data presented in Appendix 2 volume 2, chapter 9.1: marine mammals technical report, (Wright and Sinclair, 2022) have also been considered. In line with the sources noted above, there is considered to be potential connectivity with the Isles of Scilly Complex SAC, Lundy SAC, The Maidens SAC and Saltee Islands SAC. Therefore, a total of seven European sites for grey seal have been identified for consideration at HRA screening (see Table 1.5).

#### Harbour seal

1.3.4.10 All SACs designated for harbour seal located within the same Seal MUs (SCOS, 2020) as the Morgan Generation Assets (the Wales and North West England MU) will be

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considered by the screening. In addition, a screening range has been applied to identify sites for inclusion in the assessment of LSE for harbour seal which is based on the typical foraging range of this species. Harbour seal tend to make relatively short foraging trips from haul out sites and the latest Special Committee on Seal (SCOS) report (SCOS, 2020) states that harbour seal typically forage at distances of 40 to 50km from haul out sites. However, more recent sources on seal foraging ranges presented in Carter *et al.*, (2022) and telemetry data presented in Appendix 2 volume 2, chapter 9.1: marine mammals technical report, (Wright and Sinclair, 2022) have also been considered. In line with the sources noted above, there is considered to be potential connectivity with the Strangford Lough SAC and Murlough SAC.

1.3.4.11 The screening process for harbour seal includes any European site where the species is considered as a qualifying feature. Two European sites for harbour seal have therefore been screened in using this criterion (see Table 1.5).

**Criterion 3**

1.3.4.12 Criterion 3 considers European sites and/or qualifying interest features which are located within the potential ZOI of impacts associated with the Morgan Generation Assets (e.g., habitat loss/disturbance, sound and risk of collision). Given the large buffers proposed above for both cetaceans and pinnipeds in criterion 2, the ZOI for key impacts to marine mammals (i.e., underwater sound and changes to prey species) are anticipated to be well within this area. No additional European sites have marine mammal species as qualifying features, beyond those already identified for criterion 2; therefore no additional sites have been screened in for further consideration on the basis of this criterion.

**Summary of initial screening of sites for Annex II marine mammals**

1.3.4.13 The initial screening process has identified 33 European sites with Annex II marine mammals as qualifying features to be taken forward for detailed determination of LSE in section 1.4 of this report. The sites are listed in Table 1.5 and shown in Figure 1.5.

**Table 1.5: European and Ramsar sites designated for Annex II marine mammal species taken forward for determination of LSE.**

Note: All distances are measured as the marine route to the site (i.e., not the distance as the crow flies).

<sup>1</sup> All additional designated features associated with each SAC have been screened out on the basis of distance from the Morgan Generation Assets and so there will be no receptor-impact pathway. Additional Annex II marine mammal features have been screened out on the basis that the SAC is not located within the relevant MU for that species and so there will be no receptor-impact pathway.

ID	European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
<b>UK</b>				
1	North Anglesey Marine/Gogledd Môn Forol SAC	Harbour porpoise <i>Phocoena phocoena</i>	28.22	N/A
2	North Channel SAC	Harbour porpoise <i>Phocoena phocoena</i>	63.78	N/A

ID	European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
3	Strangford Lough SAC	Harbour seal <i>Phoca vitulina</i>	94.65	Mudflats and sandflats not covered by seawater at low tide Coastal lagoons* Priority feature Large shallow inlets and bays Reefs Annual vegetation of drift lines Perennial vegetation of stony banks <i>Salicornia</i> and other annuals colonizing mud and sand Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritima</i> )
4	Murlough SAC	Harbour seal <i>Phoca vitulina</i>	98.43	"Fixed coastal dunes with herbaceous vegetation ("grey dunes")"* Priority feature Atlantic decalcified fixed dunes ( <i>Calluno-Ulicetea</i> ) * Priority feature Sandbanks which are slightly covered by sea water all the time Mudflats and sandflats not covered by seawater at low tide Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritima</i> ) Embryonic shifting dunes "Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")" Dunes with <i>Salix repens ssp. argentea</i> ( <i>Salicion arenariae</i> ) Marsh fritillary butterfly <i>Euphydryas (Eurodryas, Hypodryas) aurinia</i>
5	Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i>	119.83	Sandbanks which are slightly covered by sea water all the time Estuaries Coastal lagoons Large shallow inlets and bays Reefs Mudflats and sandflats not covered by seawater at low tide <i>Salicornia</i> and other annuals colonizing mud and sand Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritima</i> )

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ID	European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
				Submerged or partially submerged sea caves Otter <i>Lutra lutra</i>
6	West Wales Marine/Gorllewin Cymru Forol SAC	Harbour porpoise <i>Phocoena phocoena</i>	121.15	N/A
7	The Maidens SAC	Grey seal <i>Halichoerus grypus</i>	141.82	Sandbanks which are slightly covered by sea water all the time Reefs
8	Cardigan Bay/Bae Ceredigion SAC	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i>	188.22	Sandbanks which are slightly covered by sea water all the time Reefs Submerged or partially submerged sea caves Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra fluviatilis</i>
9	Pembrokeshire Marine/Sir Benfro Forol SAC	Grey seal <i>Halichoerus grypus</i>	237.61	Estuaries Large shallow inlets and bays Reefs Sandbanks which are slightly covered by sea water all the time Mudflats and sandflats not covered by seawater at low tide Coastal lagoons * Priority feature Atlantic salt meadows ( <i>Glaucopuccinellietalia maritima</i> ) Submerged or partially submerged sea caves Shore dock <i>Rumex rupestris</i> Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra fluviatilis</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i>
10	Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	Harbour porpoise <i>Phocoena phocoena</i>	300.15	N/A
11	Lundy SAC	Grey seal <i>Halichoerus grypus</i>	334.95	Reefs Sandbanks which are slightly covered by sea water all the time Submerged or partially submerged sea caves
12	Isles of Scilly Complex SAC	Grey seal <i>Halichoerus grypus</i>	464.98	Sandbanks which are slightly covered by sea water all the time

ID	European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
				Mudflats and sandflats not covered by seawater at low tide Reefs Shore dock <i>Rumex rupestris</i>
<b>Republic of Ireland</b>				
13	Rockabill to Dalkey Island SAC	Harbour porpoise <i>Phocoena phocoena</i>	123.39	Reefs
16	Saltee Islands SAC	Grey seal <i>Halichoerus grypus</i>	259.79	Mudflats and sandflats not covered by seawater at low tide Large shallow inlets and bays Reefs Vegetated sea cliffs of the Atlantic and Baltic coasts Submerged or partially submerged sea caves
14	Roaringwater Bay and Islands SAC	Harbour porpoise <i>Phocoena phocoena</i>	472.53	Grey seal <i>Halichoerus grypus</i> Large shallow inlets and bays Reefs Vegetated sea cliffs of the Atlantic and Baltic coasts European dry heaths Submerged or partially submerged sea caves Otter <i>Lutra lutra</i>
15	Blasket Islands SAC	Harbour porpoise <i>Phocoena phocoena</i>	588.40	Grey seal <i>Halichoerus grypus</i>
<b>France</b>				
17	Mers Celtiques - Talus du golfe de Gascogne SCI	Harbour porpoise <i>Phocoena phocoena</i>	559.43	Bottlenose dolphin <i>Tursiops truncatus</i> Fen orchid <i>Liparis loeselii</i> Southern damselfly <i>Coenagrion mercurial</i> Jersey tiger <i>Euplagia quadripunctaria</i>
18	Abers - Côte des legends SCI	Harbour porpoise <i>Phocoena phocoena</i>	625.97	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i>

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ID	European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
19	Ouessant-Molène SCI	Harbour porpoise <i>Phocoena phocoena</i>	626.94	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Otter <i>Lutra lutra</i> Killarney Fern <i>Trichomanes speciosum</i> Shore dock <i>Rumex rupestris</i>
20	Côte de Granit rose-Sept-Iles SCI	Harbour porpoise <i>Phocoena phocoena</i>	633.26	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> Atlantic salmon <i>Salmo salar</i> Sea lamprey <i>Petromyzon marinus</i> Quimper snail <i>Elona quimperiana</i> European <i>Lucanus cervus</i> Killarney Fern <i>Trichomanes speciosum</i> Shore dock <i>Rumex rupestris</i>
21	Anse de Goulven, dunes de Keremma SCI	Harbour porpoise <i>Phocoena phocoena</i>	636.04	Grey seal <i>Halichoerus grypus</i> Fen orchid <i>Liparis loeselii</i> Southern damselfly <i>Coenagrion mercuriale</i> Jersey tiger <i>Euplagia quadripunctaria</i>
22	Tregor Goëlo SCI	Harbour porpoise <i>Phocoena phocoena</i>	656.21	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Geoffroy's bat <i>Myotis emarginatus</i> Bechstein's bat <i>Myotis bechsteinii</i> Greater mouse-eared bat <i>Myotis myotis</i> Otter <i>Lutra lutra</i> Sea lamprey <i>Petromyzon marinus</i>

ID	European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
				River lamprey <i>Lampetra planeri</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> Atlantic salmon <i>Salmo salar</i> Chabot bullhead <i>Cottus perifretum</i> Quimper snail <i>Elona quimperiana</i> Southern damselfly <i>Coenagrion mercuriale</i> European stag beetle <i>Lucanus cervus</i> Killarney Fern <i>Trichomanes speciosum</i> Shore dock <i>Rumex rupestris</i>
23	Côtes de Crozon SCI	Harbour porpoise <i>Phocoena phocoena</i>	664.40	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Otter <i>Lutra lutra</i>
24	Chaussée de Sein SCI	Harbour porpoise <i>Phocoena phocoena</i>	675.65	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Quimper snail <i>Elona quimperiana</i> Southern damselfly <i>Coenagrion mercuriale</i> Marsh fritillary <i>Euphydryas aurinia</i> Killarney Fern <i>Trichomanes speciosum</i> Shore dock <i>Rumex rupestris</i>

ID	European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
25	Cap Sizun SCI	Harbour porpoise <i>Phocoena phocoena</i>	685.02	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Qumiper snail <i>Elona quimperiana</i> Southern damselfly <i>Coenagrion mercurial</i> Marsh fritillary <i>Euphydryas aurinia</i> Killarney fern <i>Trichomanes speciosum</i> Shore dock <i>Rumex rupestris</i>
26	Récifs du talus du golfe de Gascogne SCI	Harbour porpoise <i>Phocoena phocoena</i>	712.69	Bottlenose dolphin <i>Tursiops truncatus</i>
27	Anse de Vauville SCI	Harbour porpoise <i>Phocoena phocoena</i>	722.71	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i>
28	Cap d'Erquy-Cap Fréhel SCI	Harbour porpoise <i>Phocoena phocoena</i>	724.43	Bottlenose dolphin <i>Tursiops truncatus</i> Harbour seal <i>Halichoerus grypus</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Geoffroy's bat <i>Myotis emarginatus</i> Bechstein's bat <i>Myotis bechsteinii</i> Greater mouse-eared bat <i>Myotis myotis</i> Northern crested newt <i>Triturus cristatus</i> European stag beetle <i>Lucanus cervus</i> Shore dock <i>Rumex rupestris</i>

ID	European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
29	Baie de Saint-Brieuc – Est SCI	Harbour porpoise <i>Phocoena phocoena</i>	724.75	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Bechstein's bat <i>Myotis bechsteinii</i> Otter <i>Lutra lutra</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> Shore dock <i>Rumex rupestris</i> Moss grass <i>Coleanthus subtilis</i>
30	Banc et récifs de Surtainville SCI	Harbour porpoise <i>Phocoena phocoena</i>	726.84	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i>
31	Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI	Harbour porpoise <i>Phocoena phocoena</i>	750.07	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Geoffroy's bat <i>Myotis emarginatus</i> Bechstein's bat <i>Myotis bechsteinii</i> Greater mouse-eared bat <i>Myotis myotis</i> Otter <i>Lutra lutra</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> European stag beetle <i>Lucanus cervus</i> Shore dock <i>Rumex rupestris</i>



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ID	European site	Relevant Annex II features	Distance to Morgan Array Area(km)	Additional designated features <sup>1</sup>
32	Estuaire de la Rance SCI	Harbour porpoise <i>Phocoena phocoena</i>	764.39	Harbour seal <i>Phoca vitulina</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Western barbastelle <i>Barbastella barbastellus</i> Common bent-winged bat <i>Miniopterus schreibersii</i> Geoffroy's bat <i>Myotis emarginatus</i> Bechstein's bat <i>Myotis bechsteinii</i> Greater mouse-eared bat <i>Myotis myotis</i> Otter <i>Lutra lutra</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> European stag beetle <i>Lucanus cervus</i>
33	Baie du Mont Saint-Michel SCI	Harbour porpoise <i>Phocoena phocoena</i>	769.25	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i> Harbour seal <i>Phoca vitulina</i> Lesser horseshoe bat <i>Rhinolophus hipposideros</i> Greater horseshoe bat <i>Rhinolophus ferrumequinum</i> Western barbastelle <i>Barbastella barbastellus</i> Geoffroy's bat <i>Myotis emarginatus</i> Bechstein's bat <i>Myotis bechsteinii</i> Greater mouse-eared bat <i>Myotis myotis</i> Otter <i>Lutra lutra</i> Northern crested newt <i>Triturus cristatus</i> Sea lamprey <i>Petromyzon marinus</i> River lamprey <i>Lampetra planeri</i> Brook lamprey <i>Lampetra fluviatilis</i> Allis shad <i>Alosa alosa</i> Twaite shad <i>Alosa fallax</i> Atlantic salmon <i>Salmo salar</i> European bullhead <i>Cottus gobio</i>

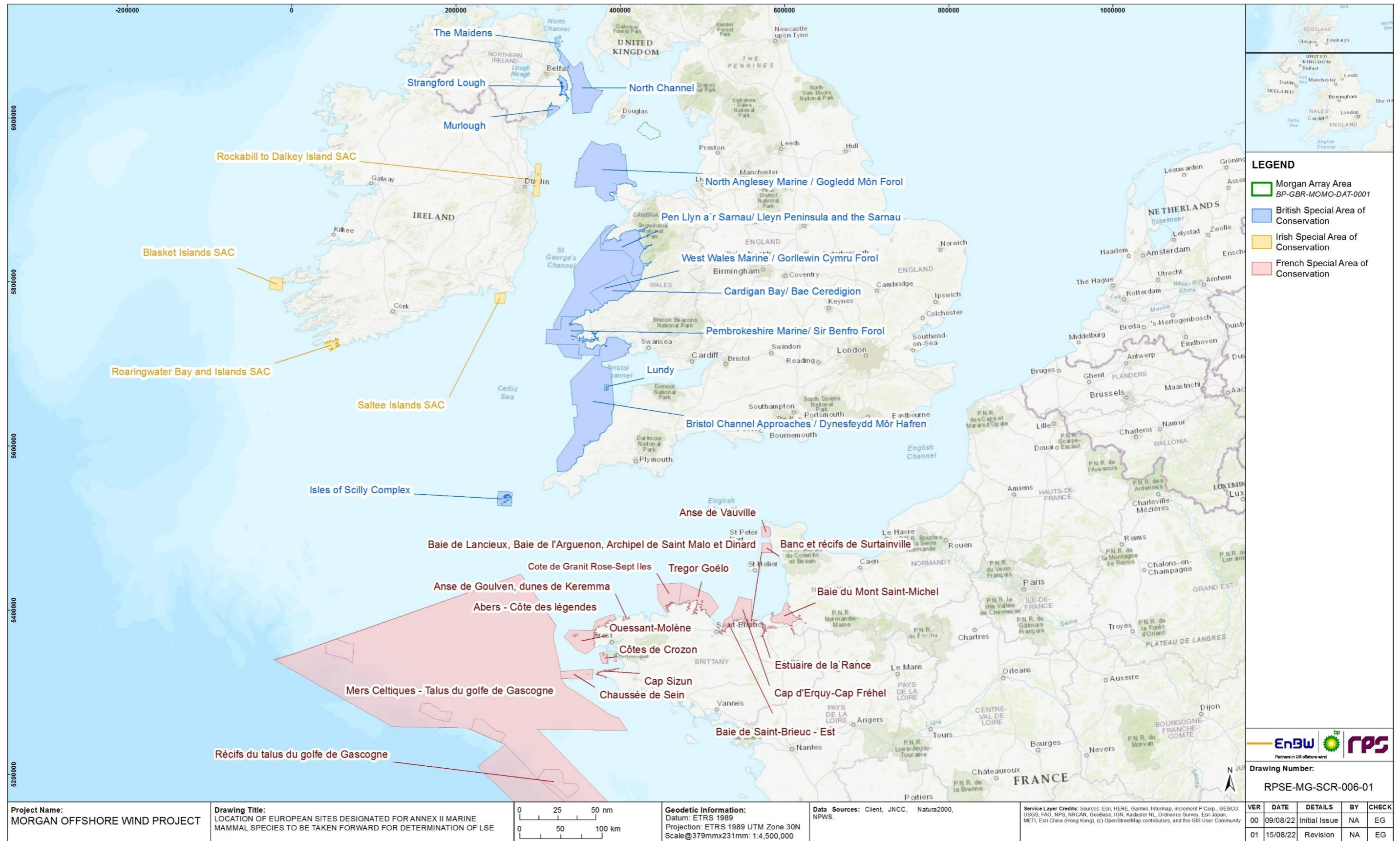


Figure 1.5: Location of European Sites designated for Annex II marine mammal species to be taken forward for the determination of LSE.

### 1.3.5 Sites designated for marine ornithological features

#### Initial identification for marine ornithological features

##### Defining the qualifying features and sites: broad-scale considerations

1.3.5.1 Birds present in offshore waters and potentially affected by the construction, operations and decommissioning of the Morgan Generation Assets will be predominantly seabirds (defined for this report as auks, gulls, terns, gannets, skuas, shearwaters, petrels, cormorants and divers) and seaducks. These species have the potential to be present in the vicinity of the Morgan Generation Assets during the breeding and non-breeding seasons (including the spring and autumn passage periods). Other bird species that may be affected by the Morgan Generation Assets include those which may fly through the area of the Morgan Generation Assets during their spring and/or autumn migration (or passage) periods (e.g., waterbirds).

1.3.5.2 Based on the above, it is considered that (in relation to marine ornithology) the SPAs (and Ramsar sites) which have the potential to be affected by the Morgan Generation Assets are those which:

- Overlap with the location of the Morgan Array Area, or with the area in which potential effects from the Morgan Generation Assets could extend (e.g., displacement effects extending beyond the Morgan Array Area)
- Include seabird qualifying features that use the waters in and around the Morgan Array Area (e.g., for foraging)
- Include qualifying features which may fly through the area of the Morgan Array Area during migration.

1.3.5.3 The SPAs (and Ramsar sites) which meet these different criteria are outlined below under the categories of:

- Marine SPAs
- Breeding seabird colony SPAs (and Ramsar sites)
- SPAs (and Ramsar sites) with migratory waterbird qualifying features (subsequently termed migratory waterbird SPAs for convenience, with waterbirds defined for this report as waders, ducks, geese, swans, grebes, divers, gulls, terns and cormorants)
- Other SPAs (and Ramsar sites) which are located within the ZOI of the Morgan Generation Assets.

##### Species considered for LSE

##### Collision risk

1.3.5.4 Detailed Collision Risk Modelling (CRM) was undertaken for the Morgan Generation Assets (volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling of the PEIR) which included consideration of 12 months of site-specific survey data and modelling inputs and parameterisation which were discussed and agreed with the Offshore Ornithology EWG (see section 1.1.6). The report considered the most abundant seabird species recorded during the digital aerial surveys carried out between April 2021 and March 2022. All other species were excluded from further

consideration in the CRM (and therefore this HRA screening) on the basis of their limited vulnerability to collision and their low abundances recorded across the Morgan Generation Assets. The following species were considered in detail in the CRM and were therefore included in HRA screening:

- Kittiwake
- Lesser black-backed gull
- Herring gull
- Great black-backed gull
- Gannet
- Fulmar
- Manx shearwater.

##### Disturbance and displacement

1.3.5.5 Displacement assessments were also conducted for the Morgan Generation Assets (volume 4, annex 10.2: offshore ornithology displacement assessment of the PEIR) which included consideration of 12 months of site-specific survey data and modelling inputs and parameterisation which were discussed and agreed with the Offshore Ornithology EWG (see section 1.1.6). The species outlined below included those species which were the most abundant within the Morgan Offshore Ornithology Array Area study area and therefore for which there were sufficient sightings to produce robust model and design-based estimates. All other species were present at abundances which were too low to undertake such modelling and assessment. The following also include those additional species which were taken forward for assessment following advice from SNCB's and the Offshore Ornithology EWG:

- Common guillemot
- Razorbill
- Atlantic puffin
- Kittiwake
- Northern gannet
- Manx shearwater.

1.3.5.6 The predicted mortalities from displacement of seabirds from the Morgan Array Area plus 2km buffer are presented in the (volume 4, annex 10.2: offshore ornithology displacement assessment). Given the sensitivity of Atlantic puffin to displacement and uncertainty around the susceptibility of Manx shearwater to disturbance, displacement impacts of both species were quantified for the population derived within the Morgan Array Area plus 2km buffer (based on 12 months of digital aerial surveys). The annual predicted number of Manx shearwater and Atlantic puffin subject to mortality due to displacement during the construction, operations and maintenance and decommissioning phases was predicted to be very small, even in the most highly conservative assessment scenarios, and thus the resulting increase in the mortality relative to the baseline mortality rate was negligible. As the effect of the Morgan Generation Assets alone or in-combination would be negligible, both species were excluded from further consideration in this HRA screening.

1.3.5.7 Furthermore, the impact of collision was assessed for lesser black-backed gull, Manx shearwater and northern fulmar in the offshore ornithology non-migratory seabird collision risk assessment (volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk assessment of the PEIR). As a result of the very small number of predicted collisions (even using the most conservative assumptions), the corresponding increase in annual baseline mortality was found to be negligible. As such, northern fulmar, alongside Manx shearwater and lesser black-backed gull, were excluded from this HRA screening with regards to collision risk.

**Changes in prey availability**

1.3.5.8 In addition to the species taken forward on the basis of collision risk and disturbance and displacement, Manx shearwater and lesser black-backed gull from SPAs located in the east Irish Sea have also been taken forward for changes in prey availability only. These species have been included in the initial list of species on a precautionary basis, as based on the SPAs proximity to Morgan Generation Assets, there is potential for underwater sound impacts to affect prey availability.

1.3.5.9 On this basis the following species are considered for potential LSE in relation to the Morgan Generation Assets:

- Black-legged kittiwake
- Herring gull
- Great black-backed gull
- Common guillemot
- Razorbill
- Northern gannet
- Manx shearwater (considered for changes in prey availability only)
- Lesser black-backed gull (considered for changes in prey availability only)

**Marine SPAs**

1.3.5.10 There are no marine SPAs within 10km of the Morgan Array Area boundary (a deliberate development exclusion zone decision was made by the Applicant to maintain a minimum 10km buffer from the Liverpool Bay/Bae Lerpwl SPA), however the Liverpool Bay/Bae Lerpwl SPA is located 10km away. Consequently, all qualifying features of this SPA (as detailed in Table 1.6) subject to the various exclusions (outlined in the text above) are considered for determination of LSE in section 1.4.5. The Irish Sea Front SPA and the Skomer and Skokholm and the Seas off Pembrokeshire SPA are also located within the initial area of search and are therefore also considered for LSE in section 1.4.5.

1.3.5.11 No other marine SPAs occur within sufficient proximity of the Morgan Generation Assets for connectivity to be likely.

**Breeding seabird colony SPAs**

1.3.5.12 Seabird species may have large foraging ranges during the breeding season (Table 1.6, Woodward *et al.*, 2019). Therefore, the Morgan Generation Assets could potentially have an effect on the seabird qualifying features outlined above from a

large number of SPA breeding colonies. The area within which the Morgan Generation Assets may be used by these qualifying features when foraging or when commuting between the colony and foraging areas. Furthermore, seabird qualifying features from SPA breeding colonies may use, or fly through, the area occupied by the Morgan Generation Assets during the non-breeding and migratory seasons, when these populations are widely distributed and not constrained by the need to return to the colony. More details are provided in the section below covering non-breeding season and migration periods.

1.3.5.13 To determine the breeding seabird colony SPAs which may have connectivity with the Morgan Generation Assets, those SPAs located in UK Western Waters, the Channel and Ireland were considered (Table 1.7). A number of SPAs located on the west coast of Ireland have breeding features within foraging range (e.g., fulmar, Manx shearwater, Leach’s petrel, northern gannet). However, these have been screened out as although the Morgan Generation Assets is within the foraging range of several species (as mentioned above), birds from the west coast colonies are highly unlikely to make frequent movements into the Irish Sea and interact with the Morgan Generation Assets and therefore there is no potential for significant effects to occur to these species from these SPAs.

**Table 1.6: Mean maximum foraging ranges of breeding seabirds (from Woodward *et al.*, 2019).**

1 - Excluding data from Fair Isle where foraging range may have been unusually high as a result of reduced prey availability during the study year.

Species	Mean maximum foraging range (km) ± 1 SD	Maximum foraging range (km)
Black-legged kittiwake <i>Rissa tridactyla</i>	156.1 ± 144.5	770
Common guillemot <i>Uria aalge</i>	73.2 ± 80.5	338 (135) <sup>1</sup>
Great black-backed gull <i>Larus marinus</i>	73.0	73
Herring gull <i>Larus argentatus</i>	58.8 ± 26.8	92
Northern gannet <i>Morus bassanus</i>	315.2 ± 194.2	709
Razorbill <i>Alca torda</i>	88.7 ± 75.9	313 (191) <sup>1</sup>

**Connectivity in the breeding season**

1.3.5.14 The initial stage in establishing potential connectivity during the breeding season involved determining whether the Morgan Array Area is within (i) the mean maximum foraging range plus one SD of each qualifying feature from each of the SPAs (ii) the maximum foraging range of each qualifying feature from each of the SPAs (Table 1.6, Woodward *et al.*, 2019).

1.3.5.15 Given the above, it is considered that 25 marine SPAs or breeding seabird colony SPAs identified in Table 1.7 have potential connectivity with the Morgan Generation Assets during the breeding season.

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**Table 1.7: Seabird connectivity in the breeding season.**

Notes:

1 Measured as the closest, straight line, distance from the SPA (irrespective of the presence of land masses).

2 Relevant qualifying features are seabird species only, and non-seabird qualifying features of these SPAs (e.g. cough, corncrake etc.) are not listed.

3 Relevant to qualifying features of breeding seabird colony SPAs only (and not applicable (N/A) to the qualifying features of other SPAs). Breeding seabird foraging ranges are from Woodward et al., (2019).

4 For a small number of species no estimate of the mean maximum foraging range is available, with the mean or maximum foraging range being used instead (see Woodward et al., 2019 for details).

5 Only species which are to be taken forward for consideration of LSE are listed here, as outlined in section 1.3.5

ID	European Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features <sup>2,5</sup>	Breeding colony sites	
					Within mean maximum foraging range +1SD <sup>3,4</sup>	Within max foraging range <sup>3,4</sup>

**Marine SPAs**

1	Liverpool Bay/Bae Lerpwl SPA	UK9020294	10.0	Red-throated diver <i>Gavia stellata</i> Little gull <i>Hydrocoloeus minutus</i> Common scoter <i>Melanitta nigra</i> Little tern <i>Sternula albifrons</i> Common tern <i>Sterna hirundo</i> Waterbird assemblage	N/A	N/A
2	Irish Sea Front SPA	UK9020328	56.7	Manx shearwater <i>Puffinus puffinus</i> <sup>2</sup>	N/A	N/A
3	Skomer Skokholm and the Seas off Pembrokeshire SPA	UK9014051	251.89	Seabird assemblage (breeding) including the components: Razorbill <i>Alca torda</i> Guillemot <i>Uria aalge</i> Kittiwake <i>Rissa tridactyla</i>	N N Y	Y N/A Y

**Seabird Colony SPAs**

4	Morecambe Bay and Duddon Estuary SPA	UK9020326	30.09	Herring gull <i>Larus argentatus</i>	Y	Y
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<sup>2</sup> Irish Sea Front SPA designated for Manx shearwater which are likely to use the area as a foraging location during the breeding season, considered for impacts from potential changes in prey availability.

ID	European Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features <sup>2,5</sup>	Breeding colony sites	
					Within mean maximum foraging range +1SD <sup>3,4</sup>	Within max foraging range <sup>3,4</sup>
				Lesser black-backed gull <i>Larus fuscus</i> <sup>3</sup>	Y	Y
5	Ribble and Alt Estuaries SPA	UK9005103	50.90	Lesser black-backed gull <i>Larus fuscus</i> <sup>3</sup>	Y	Y
6	Lambay Island SPA	004069	130.16	Herring gull <i>Larus argentatus</i>	N	N
				Kittiwake <i>Rissa tridactyla</i>	Y	Y
				Guillemot <i>Uria aalge</i>	Y	Y
7	Ireland's Eye SPA	004117	138.46	Razorbill <i>Alca torda</i>	Y	Y
				Herring gull <i>Larus argentatus</i>	N	N
				Kittiwake <i>Rissa tridactyla</i>	Y	Y
8	Howth Head Coast SPA	004113	139.02	Guillemot <i>Uria aalge</i>	Y	Y
				Kittiwake <i>Rissa tridactyla</i>	Y	Y
				Razorbill <i>Alca torda</i>	Y	Y
9	Ailsa Craig SPA	UK9003091	141.29	Gannet <i>Morus bassanus</i>	Y	Y
				Kittiwake <i>Rissa tridactyla</i>	Y	Y
10	Wicklow Head SPA	004127	165.16	Seabird assemblage including the components: • Gannet <i>Morus bassanus</i> • Kittiwake <i>Rissa tridactyla</i>	Y	Y
				Kittiwake <i>Rissa tridactyla</i>	Y	Y
11	Rathlin Island SPA	UK0030055	185.66	Kittiwake <i>Rissa tridactyla</i>	Y	Y

<sup>3</sup> Qualifying feature lesser black backed gull of a coastal breeding seabird colony SPA within the eastern Irish Sea, considered for impacts from potential changes in prey availability.

ID	European Site	Site Code	Distance to Morgan Array Area (km) <sup>1</sup>	Relevant Qualifying Features <sup>2,5</sup>	Breeding colony sites	
					Within mean maximum foraging range +1SD <sup>3,4</sup>	Within max foraging range <sup>3,4</sup>
12	North Colonsay and Western Cliffs SPA	UK9003171	256.72	Kittiwake <i>Rissa tridactyla</i>	Y	Y
13	Grassholm SPA	UK9014041	260.22	Gannet <i>Morus bassanus</i>	Y	Y
14	Saltee Islands SPA	004002	260.55	Gannet <i>Morus bassanus</i>	Y	Y
				Kittiwake <i>Rissa tridactyla</i>	Y	Y
15	Helvick Head to Ballyquin SPA	004192	310.73	Kittiwake <i>Rissa tridactyla</i>	Y	Y
16	Rum SPA	UK9001341	340.07	Kittiwake <i>Rissa tridactyla</i>	N	Y
17	Canna and Sanday SPA	UK9001431	358.75	Kittiwake <i>Rissa tridactyla</i>	N	Y
18	Old Head of Kinsale SPA	004021	394.86	Kittiwake <i>Rissa tridactyla</i>	N	Y
19	Shiant Isles SPA	UK9001041	441.15	Kittiwake <i>Rissa tridactyla</i>	N	Y
20	Handa SPA	UK9001241	478.54	Kittiwake <i>Rissa tridactyla</i>	N	Y
21	St Kilda SPA	UK9001031	489.61	Gannet <i>Morus bassanus</i>	N	Y
				Kittiwake <i>Rissa tridactyla</i>	N	Y
22	Cape Wrath SPA	UK9001231	500.66	Kittiwake <i>Rissa tridactyla</i>	N	Y
23	Flannan Isles SPA	UK9001021	509.71	Kittiwake <i>Rissa tridactyla</i>	N	Y
24	Sule Skerry and Sule Stack SPA	UK9002181	546.97	Gannet <i>Morus bassanus</i>	N	Y
25	North Rona and Sula Sgeir SPA	UK9001011	566.16	Gannet <i>Morus bassanus</i>	N	Y
				Kittiwake <i>Rissa tridactyla</i>	N	Y

**Connectivity in the non-breeding season**

1.3.5.16 As well as true pelagic seabirds (e.g. gannet, fulmar and auk), other species that spend part of their annual life cycle at sea (e.g. divers, gulls and seaducks) may be present in the vicinity of the Morgan Generation Assets during the non-breeding season and migration periods.

1.3.5.17 Seabird species that are breeding interest features at SPA sites further north or west of the Morgan Generation Assets may pass through the area or reside in the area in winter. The identification of migrating corridors and wintering areas for seabirds can be drawn from the Migration Atlas (Wernham *et al.*, 2002) and the Eurasian African Migration Atlas (Franks *et al.*, 2022). Furthermore, the SOSS-05 report for The Crown Estate (Wright *et al.*, 2012) details bird migration routes for key migratory birds in relation to offshore wind developments (Round 3, Round 1 and 2 and Scottish Territorial Waters developments). Furness (2015) presents the total number of birds present in all UK territorial waters during the defined season (e.g., migration periods and winter) for each spatially distinct Biologically Defined Minimum Population Scales (BDMPS) (e.g., UK Western Waters).

1.3.5.18 However, most seabirds (i.e., northern fulmar, Manx shearwater, petrel and auks) are dispersive in their migration rather than following migratory corridors, and the above guidance is therefore limited. With the advance of modern telemetry, there is a better understanding of seabird migration routes and the use of wintering areas, although it is difficult to generalise movements and usage given the relatively low sample size of tracked birds.

1.3.5.19 Nevertheless, there is potential for breeding interest features at SPA colonies along the Irish Sea or from further north (i.e., west and north coast of Scotland) to travel through and winter in the vicinity of the Morgan Generation Assets.

1.3.5.20 The Offshore Ornithology Apportioning Assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) sets out the approach and assessment conclusions to apportioning the impacts from collision and displacement on the relevant seabird species to individual colonies, including SPAs during the breeding season (discussed further in section 1.4.5) and during the non-breeding season. For all species considered within the Apportioning Assessment, mortalities due to collision and/or displacement (for kittiwake and gannet the combined impacts of these were considered) were low, with the increase in baseline mortality being <1% for all SPA populations. Due to the very low percentage of seabird mortalities estimated during the non-breeding season and in line with the TCE (2021) Plan Level HRA, effects during the non-breeding season are not considered further in this HRA screening.

**Migratory waterbird SPAs (and Ramsar sites)**

1.3.5.21 The British Isles are located along the East Atlantic Flyway - a migration route that connects bird species' breeding sites to wintering sites (Boere *et al.*, 2006). Therefore, the British Isles are of key importance for many over-wintering and migrating birds that move through the area in large numbers during the spring and autumn passage periods. Whilst some bird species will follow the coastline during their migration journey, other groups of species (e.g., waders) will undertake long journeys across open seas, often flying at high altitudes depending on the weather conditions. Wildfowl species are known to follow a coastal route during their migration (when in sight of the

- land). However, many wildfowl species do undertake open-sea movements to reach their wintering or moulting grounds (e.g. shelduck (*Tadorna tadorna*) (Green *et al.*, 2019)).
- 1.3.5.22 Waterbirds (e.g. wildfowl and waders) may therefore pass through the Morgan Array Area periodically in spring and autumn. Many of these migrants will originate from the Arctic and sub-Arctic regions (e.g., Iceland and Scandinavia) and winter at SPA sites in the UK. Although migration occurs over a broad front and often at high altitude at sea, there is a potential for migratory waterbirds to cross the Morgan Array Area twice per year. The connectivity is more likely to occur with SPA sites nearest to the Morgan Array Area, as it is assumed that migration routes will be broader and more dispersed with increased distance to/from the wintering sites.
- 1.3.5.23 SPAs with migratory waterbird qualifying features have been identified by conducting a thorough review of the SPAs and associated qualifying features within the vicinity of the Morgan Generation Assets and consideration of whether the direction of migratory pathways could have the potential to interact with the Morgan Generation Assets. Broadly, a buffer of approximately 100km has been used to identify sites which is considered large enough to encapsulate all SPAs with potential connectivity with the Morgan Generation Assets, although the decision to screen sites into the LSE will depend on the location of the Morgan Generation Assets relative to migratory routes for the relevant qualifying interest features.
- 1.3.5.24 The migratory non-seabird collision risk modelling technical report (volume 4, annex 10.4: offshore ornithology migratory non-seabird collision risk modelling of the PEIR) provides numbers of predicted collisions of migratory non-seabird species (excluding 'true seabirds', gull, cormorant and diver species) based on the species/populations identified to be at risk of crossing the Morgan Generation Assets.
- 1.3.5.25 Migratory birds CRM showed that migratory birds would not be significantly impacted. At avoidance rates of 98%, the numbers of birds predicted to be affected were <1 individual for most species, the species for which the numbers affected are estimated to be >1 are European golden plover (breeding), dunlin (sub-species *schinzii* and *arctica*), common snipe, and common redshank. The largest number of individuals predicted to be impacted are up to three common snipe, however common snipe is not a qualifying feature of any of the SPAs identified within the 100km buffer. Furthermore, when considering the baseline populations of waders and waterbirds associated with SPAs in the region and the number of SPAs from which these birds could have originated, these estimates would not lead to a likely significant effect on any SPA populations and therefore migratory waterbirds are not considered further for potential LSE.
- Other SPAs (and Ramsar sites) within the ZOI**
- 1.3.5.26 The potential ZOI of impacts associated with the Morgan Generation Assets (e.g., habitat loss/disturbance, sound and risk of collision) is considered to be limited to the area within 2km of the Morgan Array Area for most bird species, which is the area over which displacement effects are potentially considered to occur. This may extend to considerably greater distances for some species, notably red-throated diver which shows particular sensitivity to various sources of anthropogenic disturbance (e.g., Mendel *et al.*, 2019, Dorsch *et al.*, 2020).
- 1.3.5.27 No SPAs or Ramsar sites occur within 2km of the Morgan Generation Assets and therefore no additional SPAs or ramar sites are considered for LSE.
- Summary of initial screening of sites for marine ornithological features**
- 1.3.5.28 As detailed above, the initial screening process identified European sites with seabirds or migratory waterbirds as qualifying features to be taken forward for detailed determination of LSE. These sites are identified, together with their distance to the Morgan Generation Assets and the qualifying features of relevance in Table 1.7. The locations of these sites are shown in Figure 1.6.

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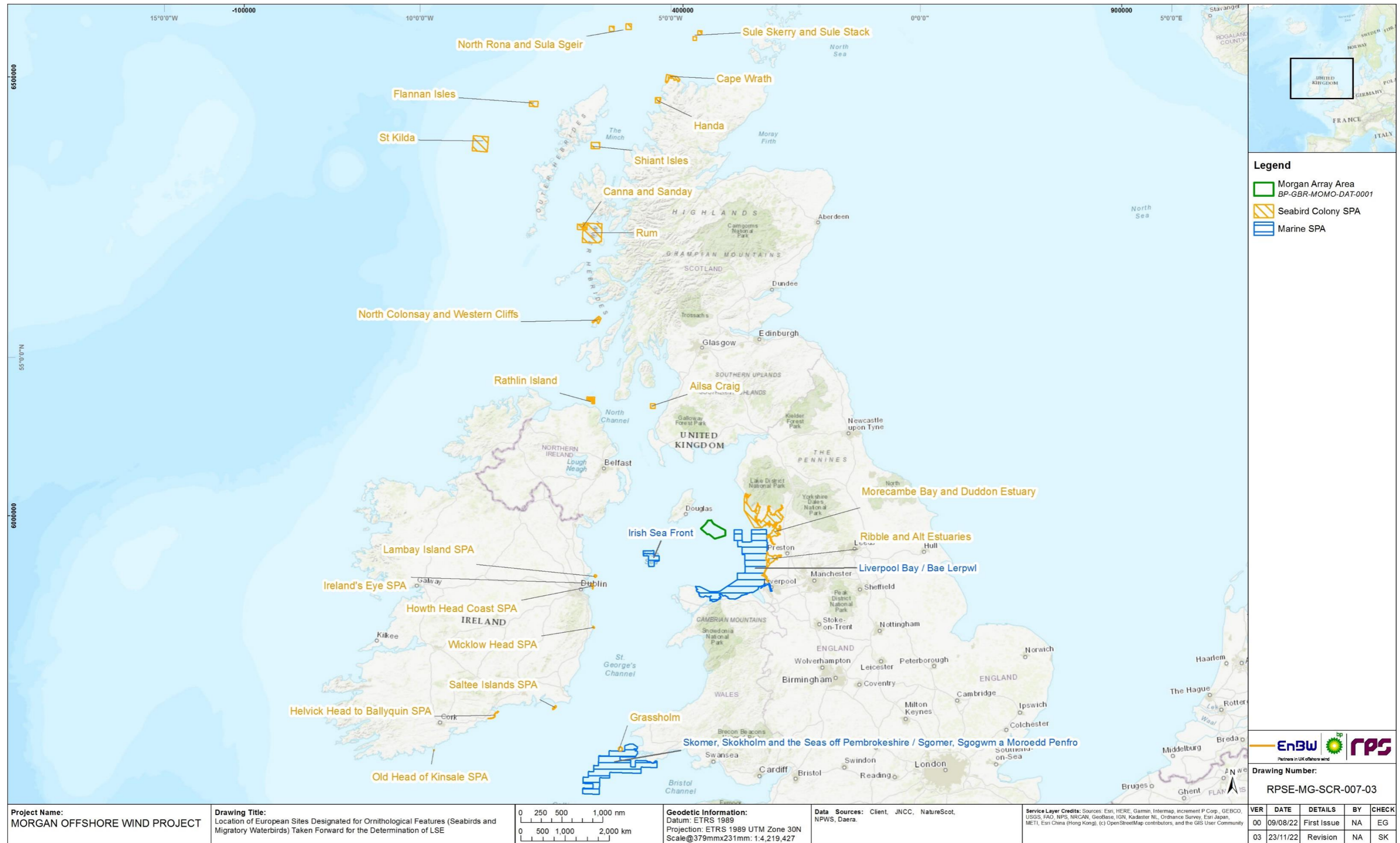


Figure 1.6: Location of European Sites designated for marine ornithological features to be taken forward for the determination of LSE.



## 1.4 Determination of likely significant effects

1.4.1.1 The initial screening process documented in section 1.3, generated a list of designated sites and qualifying interest features (Table 1.4) for further determination of LSE as a result of the Morgan Generation Assets. This section of the HRA screening process therefore documents the determination of LSE for those European sites which have been identified for further consideration through section 1.4.

### 1.4.2 Methodology

1.4.2.1 The assessment of LSE in the following sections is presented as a series of matrices setting out whether no LSE can be concluded for the relevant features of the European sites identified in section 1.3.

1.4.2.2 The matrix approach adopted is based upon an approach set out within the Planning Inspectorate's Advice Note 10 on HRA (The Planning Inspectorate, 2022; Version 9) relating to Nationally Significant Infrastructure Projects (NSIPs). The matrix approach used is considered to be a pragmatic approach and useful in defining the extent of impacts from the Morgan Generation Assets on identified designated sites' qualifying interest features, in relation to the sites' conservation objectives. It also provides a clear audit trail for agreement with the statutory consultees on the scope of the HRA and the features and impacts to be taken forward into the appropriate assessment for each site.

1.4.2.3 The following matrix key is applicable to the matrices presented in the subsequent sections:

- ✓ - Potential for a LSE/LSE cannot be excluded
- ✖ – No potential for an LSE
- C = Construction
- O&M = Operations and Maintenance
- D = Decommissioning.

1.4.2.4 With respect to the consideration of mitigation at the HRA screening stage, in April 2018, the European Court of Justice issued a judgement in the People Over Wind and Sweetman case (Case C323/17) clarifying the stage in a HRA process when mitigation measures can be taken into account when assessing impacts on a European site. The ruling stated that "...in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site."

### 1.4.3 Assessment of LSE for Annex II diadromous fish

1.4.3.1 A total of nine European sites were identified in the initial screening process (section 1.3.3) to be taken forward for determination of LSE for Annex II diadromous fish species. These sites are:

- Dee Estuary/Aber Dyfrdwy SAC

- River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC
- River Ehen SAC
- River Eden SAC
- Derwent and Bassenthwaite Lake SAC
- Solway Firth SAC
- River Kent SAC
- River Bladnoch SAC
- Afon Gwyrfaï a Llyn Cwellyn SAC.

#### Site overviews

1.4.3.2 The following sections provide a brief overview of each of the sites brought forward for consideration of LSE and a summary of their designated features.

#### River Ehen SAC

1.4.3.3 The River Ehen forms the outfall from Ennerdale Water and flows some 20km to Sellafield where it meets the Irish Sea. The SAC is located between Ennerdale Water and the convergence with the River Keekle. This part of the river supports outstanding populations of the freshwater pearl mussel *Margaritifera margaritifera* for which the SAC is designated, likely resulting from high amount of tree shade along the banks, which is thought to be of importance for mussel habitat. The SAC is also designated for Atlantic salmon which plays an important role in the lifecycle of the freshwater pearl mussel.

#### Dee Estuary/Aber Dyfrdwy SAC

1.4.3.4 The overview relating to Annex I features of this SAC is detailed in section 1.3.3. The subtidal area of the SAC provides important breeding and nursery areas for coastal fish species, the Dee is also used as a migratory passage for species such as migratory fish species including river lamprey *Lampetra fluviatilis*, sea lamprey *Petromyzon marinus*, Atlantic salmon *Salmo salmar*, sea trout *S. trutta*, twaite shad *Alosa fallax*, smelt *Osmerus eperlanus*, and eels *Anguilla anguilla* to and from their spawning and nursery grounds in the River Dee upstream of the estuary or open sea.

#### River Derwent and Bassenthwaite Lake SAC

1.4.3.5 The SAC consists of the River Derwent, a large oligotrophic river system with high water quality and a natural channel. The Derwent flows through two lakes Derwentwater and Bassenthwaite, with presence of aquatic flora is typical of oligotrophic/mesotrophic lake. Designated fish species present within the SAC include salmon *Salmo salar*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis* and brook lamprey *Lampetra planeri*. The site encompasses various important salmon spawning areas as well as extensive sea and river lamprey nursery grounds.

### River Kent SAC

- 1.4.3.6 The River Kent's main tributaries have their catchments in the southeast Lake District fells which provide natural mineral enrichment in the form the calcium necessary for growth. Due to high water quality, heavy rainfall on the catchment fells and a short distance from the headwaters to the mouth of the river, a high degree of flushing occurs throughout the river which maintains the river bed free of silt and algal growth. This provides suitable habitat for populations of bullhead *Cottus gobio*. The high water quality, this headwater also provides the moderate, fast flow regime, cool temperatures and suitable areas of stable river channel, also provide sufficient habitat for freshwater pearl mussels *Margaritifera margaritifera* found primarily in one of the upper tributaries.

### Solway Firth SAC

- 1.4.3.7 The Solway is a large, complex estuary with moderately strong tidal streams and wave action. The sediment habitats present throughout the estuary consist mainly of dynamic sandflats and subtidal reefs. There are unusually large areas of upper marsh which is predominantly characterised by saltmarsh rush *Juncus gerardii* community with smaller areas of the saltmarsh-grass/fescue *Puccinellia/Festuca* communities. The sublittoral sediment communities are typically sparse in the inner estuary, due to high levels of sediment mobility coupled with low and variable salinity whilst intertidal sediments are characterised by flats of fine sands, rather than muds. The estuary also provides a migratory passage for sea lamprey *Petromyzon marinus* and river lamprey *Lampetra fluviatilis* to and from their spawning and nursery grounds.

### River Bladnoch SAC

- 1.4.3.8 The River Bladnoch flows from Mayberry Loch in South Ayrshire for seven miles to Wigtown Bay. The River Bladnoch is designated for Atlantic salmon and the site supports a high-quality salmon population and a spring run of salmon. The river's ecological and water quality characteristics are influenced by a moderate-sized catchment with diverse upland and lowland areas.

### River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC

- 1.4.3.9 The SAC extends from Llyn Tegid encompassing the Bala lake and its banks and outfalls into the River Dee. The site extends downstream to where it joins the Dee Estuary SSSI. Several Dee tributaries are also included within the site, specifically the Ceiriog, Meloch, Tryweryn, and Mynach. The River Dee is designated for Atlantic salmon *Salmo salar*, with the Mynach, Meloch and Ceiriog tributaries being the most prevalent salmon spawning tributaries in the Dee catchment. Other diadromous fish species present as qualifying features of the site are river lamprey *Lampetra fluviatilis* and sea lamprey *Petromyzon marinus*. The Dee also supports populations of bullhead *Cottus gobio*, brook lamprey *Lampetra planeri* and otter *Lutra lutra*.

### River Ehen SAC

- 1.4.3.10 The River Ehen forms the outfall from Ennerdale Water and flows some 20km to Sellafield where it meets the Irish Sea. The SAC is located between Ennerdale Water and the convergence with the River Keekle. This part of the river supports outstanding

populations of the freshwater pearl mussel *Margaritifera margaritifera* for which the SAC is designated, likely resulting from high amount of tree shade along the banks, which is thought to be of importance for mussel habitat. The SAC is also designated for Atlantic salmon which plays an important role in the lifecycle of the freshwater pearl mussel.

### Afon Gwyrfai a Llyn Cwellyn SAC

- 1.4.3.11 This SAC encompasses the Afon Gwyrfai and Llyn Cwellyn. The Gwyrfai flows out of Llyn y Gader near Rhyd Ddu and passes through Llyn Cwellyn before reaching the sea at Caernarfon Bay. Llyn Cwellyn is a deep oligotrophic lake, recognised for its conservation importance. The Gwyrfai river system is recognised for outstanding ecological and water quality and is designated for an extensive salmon population, one of the best supporting rivers in the United Kingdom.

### River Eden SAC

- 1.4.3.12 The River Eden SAC is designated for Atlantic salmon *Salmo salar*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis* and brook lamprey *Lampetra planeri*. The River Eden maintains a large population of salmon owing to the extensive suitable habitat available including areas of gravel and finer silt owing to the highly erodible nature of the rock within the river, which provide conditions for spawning and nursery areas. The River Eden also supports brook and river lampreys and a large population of sea lamprey in the middle to lower regions of the river. The extensive areas of gravel outlined above, and generally good quality water, also provide habitat for bullhead *Cottus gobio*, the tributaries, specifically those flowing over limestone, support high numbers of bullhead.

### Pathways for LSE: potential impacts on Annex II fish

- 1.4.3.13 A list of potential impacts and effects on diadromous fish that may result from the Morgan Generation Assets has been provided below. These are the impacts which must be taken into account when determining the potential for LSE on the designated sites and qualifying fish features identified in section 1.3.3. The list of potential impacts has been compiled using the experience and knowledge gained from previous offshore wind farm projects and Natural England's 'Advice on Operations' (NRW (2010), Countryside Council For Wales (2022a), Countryside Council For Wales (2022b), Natural England (2019a), Natural England (2019b), Natural England (2019c), NatureScot (2022a) and NatureScot (2022b) for individual features of sites. Consideration of the potential impacts identified for Annex II diadromous fish species is presented in the following sections to inform the determination of LSE below.

### Construction phase

#### Temporary habitat loss/disturbance

- 1.4.3.14 There is potential for temporary, direct habitat loss and disturbance as a result of seabed preparation activities in advance of foundation installation, cable installation activities (including pre-cabling seabed clearance and anchor placements), and placement of spud-can legs during jack-up operations during the construction phase of the Morgan Generation Assets. This impact will be spatially restricted to within the footprint of the Morgan Array Area. No European sites with Annex II diadromous fish

species physically overlap with the Morgan Array Area (see Figure 1.4) and so there is no potential for direct impacts to supporting habitats for Annex II diadromous fish species within any site. There is the potential for migratory fish to be present in the waters in and around the Morgan Array Area, and to be affected by temporary habitat loss/disturbance (e.g. effects on feeding grounds). Similar habitats are however widespread within the wider Irish Sea region and it is considered that there would be no barrier effects to migratory fish reaching the designated sites as a result of this impact. Furthermore, any impacts to supporting habitats such as foraging grounds outside the designated sites would be temporary and would not be expected to result in any long-term effects on the availability of food in the area. On this basis there is considered to be no potential for LSE on any Annex II fish species of any of the European sites screened in as a result of temporary habitat loss/disturbance. This impact is screened out for all sites.

#### Increases in SSC and sediment deposition

1.4.3.15 Sediment disturbance arising from construction activities (e.g. foundation and cable installation, and seabed preparation works) may result in temporary, indirect impacts on diadromous fish as a result of temporary increases in SSC. The extent of this impact will be spatially restricted to within the Morgan Array Area and the surrounding area. This distance will be refined through physical processes modelling to be undertaken for the EIA but for the purposes of this HRA screening is defined as a precautionary distance of 15km from the Morgan Array Area (see section 1.3.2).

1.4.3.16 On this basis, effects associated with the Morgan Array Area are screened out as the Morgan Array Area is located over 15km from all sites (see Table 1.4) and therefore outside the ZOI.

#### Underwater sound

1.4.3.17 There is potential for mortality, injury and/or disturbance to migratory fish as a result of construction activities including pile-driving to install foundations and clearance of UXOs, as well as construction/installation vessel sound. The greatest potential for sound to be generated will occur within the Morgan Array Area as a result of piling activities and UXO clearance. It is acknowledged that there will be stages when fish do not move much at all, for example salmon are likely to aggregate in the open sea near river mouths, prior to the upriver migration (e.g., Matz, 2014). The nearest European site to the Morgan Array Area with Annex II diadromous fish qualifying interest features is the Dee Estuary/Aber Dyfrdwy SAC which is located 70km from the Morgan Array Area (see Figure 1.4), but there is potential for migratory species to be present within, or transiting through, the Morgan Array Area and potential area of impact. The zone of impact will be determined for the EIA through sound modelling and therefore, at this stage of the development process, the potential for LSE on any Annex II features of European sites as a result of underwater sound arising from construction activities cannot be excluded. Underwater sound is therefore screened in for further consideration for diadromous fish for all sites.

#### Disturbance/remobilisation of sediment-bound contaminants

1.4.3.18 Seabed disturbance associated with construction (e.g. foundation and cable installation) could lead to the remobilisation of sediment-bound contaminants that may result in harmful and adverse effects on fish and shellfish communities. There is comprehensive desktop information available to characterise the Irish Sea region (e.g. sediment chemistry data for Rhiannon Offshore Wind Farm), although there is no data

available specifically for the Morgan Array Area. However, as the nearest SAC with Annex II designated diadromous fish features is located 63km away (River Eden SAC) this impact can be screened out as a result of the distance from the Morgan Generation Assets. All SACs are located outside the ZOI and the potential for LSE can be discounted for all sites.

#### Accidental pollution

1.4.3.19 There is a risk of pollution being accidentally released during the construction phase of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. Pollution events are considered unlikely, and given the volumes associated with offshore wind farm development, should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g. due to the expected low volumes of pollutants associated with offshore wind). Furthermore, considering the large distances to the SACs identified, (the nearest site being the River Eden SAC which is located 63km from the Morgan Array Area) any effects, should they occur, will not directly affect the SACs. As noted above, any indirect effects on Annex II diadromous fish qualifying interests from accidental release of pollutants would be unlikely and should they occur these would be unlikely to lead to a significant effect on conservation objectives of the site (e.g. disruption to/from migration to SACs). On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.

1.4.3.20 In addition, it is anticipated that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans (e.g. an Environmental Management Plan (EMP) including a Marine Pollution Contingency Plan (MPCP)) which will be implemented as part of the Morgan Generation Assets. These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. It will also set out industry good practice and OSPAR (Oslo-Paris), IMO (International Maritime Organization) and MARPOL (International Convention for the Prevention of Pollution from Ships) guidelines for preventing pollution at sea. These management plans are not taken into account at this screening stage of the HRA. They will however be taken into account in as part of the ISAA.

#### Operations and maintenance phase

##### Temporary habitat disturbance

1.4.3.21 Temporary habitat disturbance may occur during the operations and maintenance phase of the Morgan Generation Assets as a result of maintenance operations (e.g. cable repair/reburial, use of jack-up vessels to facilitate wind turbine component repairs etc.). This impact will be spatially restricted to within the footprint of the Morgan Generation Assets and there is no physical overlap with the Morgan Array Area and any European sites and so there is no potential for direct impacts to supporting habitats for Annex II diadromous fish species within any site. There is the potential for migratory fish to be present in the waters in and around the Morgan Array Area, and to be affected by temporary habitat loss/disturbance (e.g. effects on feeding grounds). Similar habitats are however widespread within this part of the Irish Sea and it is considered that there would be no barrier effects to migratory fish reaching the designated sites as a result of this impact. Furthermore, any impacts to supporting habitats such as foraging grounds outside the designated sites would be temporary

and would not be expected to result in any long-term effects on the availability of food in the area. On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of temporary habitat loss/disturbance and so this impact is screened out from further consideration.

#### Increases in SSC and sediment deposition

1.4.3.22 Temporary increases in SSC and associated sediment deposition may arise during maintenance activities (e.g. cable reburial or replacement works). The magnitude of this impact will be substantially less than that during construction as no seabed preparation will be required for these activities. The extent of the impact will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). This distance will be refined through physical processes modelling to be undertaken for the EIA but for the purposes of this HRA screening is defined as a precautionary distance of 15km from the Morgan Array Area (see section 1.3.2).

1.4.3.23 On this basis, effects associated with the Morgan Array Area are screened out as the Morgan Array Area is located over 15km from all sites (see Table 1.4) and therefore outside the ZOI.

#### 1.4.3.24 Underwater sound

1.4.3.25 During the operations and maintenance phase there is the potential for sound generated by the operations wind turbines, and from vessels undertaking operations and maintenance activities to result in disturbance to migratory fish as they pass through the Morgan Generation Assets. The operational sound from wind turbines is however of a very low frequency and low sound pressure level (Andersson *et al.*, 2011). Studies have found that sound levels are only high enough to have the potential to cause a behavioural reaction within metres from a wind turbine (Sigray and Andersson 2011; Andersson *et al.*, 2011) and therefore such levels are not considered likely to result in significant effects on diadromous fish species. Similarly, underwater sound generated from operations and maintenance vessels is likely to be at a low level and effects would only occur if fish remain within the immediate vicinity of the vessel (i.e. within metres) for a number of hours which is unlikely given the likely movements that the majority of vessels (e.g. crew transfer vessels etc.) will be making within the Morgan Generation Assets. It is therefore considered that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of underwater sound during the operations and maintenance phase and this impact is screened out of further consideration for all sites.

#### Long-term habitat loss

1.4.3.26 There is the potential for long-term habitat loss to occur directly under all foundation structures and associated scour protection for the duration of the operations and maintenance phase. This impact will be spatially restricted to within the footprint of the Morgan Array Area and there is no physical overlap between the Morgan Array Area and any European sites (see Figure 1.4). As such, there is no potential for direct impacts to supporting habitats for Annex II diadromous fish species within any site.

1.4.3.27 There is the potential for migratory fish to be present in the waters in and around the Morgan Array Area, and to be affected by long-term habitat loss (e.g. loss of feeding grounds). Similar habitats are however widespread within this region of the Irish Sea

and the areas of seabed impacted by long-term loss will be discreet and small in the context of the habitats present in the wider area. Furthermore, it is considered that there would be no barrier effects to migratory fish reaching the designated sites as a result of this impact. Any impacts to supporting habitats such as foraging grounds outside the designated sites would be localised and would not be expected to result in any long-term effects on the availability of food in the area. On this basis, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of long-term habitat loss, and this impact is screened out from further consideration.

#### Electromagnetic Fields (EMF)

1.4.3.28 The presence of subsea electrical cabling has the potential to emit a localised EMF which may interfere with the navigation of migratory fish, particularly in shallow nearshore waters (Gill and Bartlett, 2010). At this stage, the potential for LSE on Annex II features of European sites as a result of EMF from subsea cabling cannot be excluded.

#### Colonisation of hard structures

1.4.3.29 Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) in the offshore environment are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. These structures may also facilitate the spread of INNS. Further, the introduction of hard substrate into the marine environment could increase the time fish spend in the vicinity of the structures (known as the fish aggregation (or reef) effect). It is anticipated that the risk of bio-invasion and the spread of marine INNS is low and that colonisation of hard substrates will lead to limited effects on fish and shellfish populations. Further, effects on migratory fish are expected to be highly limited, given offshore areas coinciding with the Morgan Generation Assets are unlikely to be particularly important for diadromous fish species. On this basis, there is no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of colonisation of hard substrates, and this impact is screened out from further consideration.

#### Disturbance/remobilisation of sediment-bound contaminants

1.4.3.30 Seabed disturbance associated with the during maintenance activities (e.g. cable reburial or replacement works) could lead to the remobilisation of sediment-bound contaminants that may result in harmful and adverse effects on benthic communities. Due to the highly localised nature of maintenance activities associated with the operations phase there is considered to be no potential for LSE on Annex II diadromous fish features of any of the SACs identified and this impact is screened out.

#### Accidental pollution

1.4.3.31 There is a risk of pollution being accidentally released during the operations and maintenance phase of the Morgan Generation Assets from sources including vessels/vehicles and equipment/ machinery. Pollution events are considered unlikely, and given the volumes associated with offshore wind farm development, should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g. due to the expected low volumes of pollutants associated with offshore wind). Furthermore, considering the large distances to the SACs identified, (the nearest site being the River Eden SAC which is located 63km from the Morgan Array Area) any

effects should they occur, will not directly affect the SACs. As noted above, any indirect effects on Annex II diadromous fish qualifying interests from accidental release of pollutants would be unlikely and should they occur these would be unlikely to lead to a significant effect on conservation objectives of the site (e.g. disruption to/from migration to SACs). On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.

1.4.3.32 In addition, it is anticipated that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. It will also set out industry good practice and OSPAR, IMO and MARPOL guidelines for preventing pollution at sea. These management plans are not taken into account at this screening stage of the HRA. They will however be taken into account in as part of the ISAA.

**Decommissioning phase**

1.4.3.33 The potential for impacts during the decommissioning phase are considered to be similar and potentially less than those outlined above in the construction phase (section 5.3.3 - Construction Phase) and have not been reiterated.

**Determination of LSE for Annex II fish**

1.4.3.34 Table 1.8 to Table 1.16 present the results of the LSE determination assessment as a result of the Morgan Generation Assets on relevant qualifying interest features of the Dee Estuary/Aber Dyfrdwy SAC, River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC, River Ehen SAC, River Eden SAC, River Derwent and Bassenthwaite SAC, Solway Firth SAC, River Kent SAC, River Bladnoch SAC and the Afon Gwyrfai a Llyn Cwellyn SAC, respectively. These assessments are made in the absence of mitigation measures. The footnotes to the following tables provide a brief assessment to support the screening in or out of each of the likely significant effects on the identified SAC features.

**LSE In-combination**

1.4.3.35 The LSE test requires consideration of the Morgan Generation Assets alone and/or in-combination with other plans and projects. Therefore, it is not necessary at the LSE stage to consider sites/features for which an LSE 'alone' has already been identified, as in-combination effects will be considered at the Appropriate Assessment. The focus at this stage should be to identify sites/features for which no LSE alone was concluded, but there is potential for a LSE in-combination with other plans and projects (e.g. due to wide foraging ranges resulting in a species interacting with a large number of projects).

1.4.3.36 Given the highly precautionary method for site selection applied during this Screening assessment, it is considered that the consolidation of information regarding external plans and projects would not likely result in additional European sites or new effect pathways being identified for the Screening assessment.

1.4.3.37 For diadromous fish species, the potential for LSE alone is identified for all sites with the potential to be affected, therefore effects in-combination will be considered at Appropriate Assessment.

**Table 1.8: LSE matrix for Annex II diadromous fish species of the River Ehen SAC.**

European Qualifying Features	Temporary Habitat Loss/Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment-bound contaminants			Accidental Pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Atlantic salmon <i>Salmo salar</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
Freshwater pearl mussel <i>Margaritifera margaritifera</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Array Area and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish and freshwater pearl mussel qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (63km) based on distance from River Ehen SAC and the highly mobile nature of migratory fish. It is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.
- c. **Underwater sound** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish and freshwater pearl mussel qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e., foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish and freshwater pearl mussel qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** – The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (63km) based on distance from River Ehen SAC and the highly mobile nature of migratory fish. It is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g., an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the

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large distance to the SAC (63km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

**Table 1.9: LSE matrix for Annex II diadromous fish species of the Dee Estuary/ Aber Dyfrdwy SAC.**

European Qualifying Features	Temporary Habitat Loss/Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D				C	O&M	D	C	O&M	D
Sea lamprey <i>Petromyzon marinus</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
River lamprey <i>Lampetra fluviatilis</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area due to the distance between the Morgan Array Area and this site (70.09km) and the highly mobile nature of migratory fish.
- Underwater sound** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- Colonisation of hard structures** - Artificial structures placed on the seabed (i.e., foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area due to the distance between the Morgan Array Area and this site (70.09km) and the highly mobile nature of migratory fish.
- Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g., an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (70km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution.



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- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

**Table 1.10: LSE matrix for Annex II diadromous fish species of the River Derwent and Bassenthwaite SAC.**

European Qualifying Features	Temporary Habitat Loss/Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Atlantic salmon <i>Salmo salar</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e		✓f			*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
Sea lamprey <i>Petromyzon marinus</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e		✓f			*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
River lamprey <i>Lampetra fluviatilis</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e		✓f			*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (71km) based on distance from River Derwent and Bassenthwaite SAC and the highly mobile nature of migratory fish. It is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.
- c. **Underwater sound** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e., foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (71km) based on distance from River Derwent and Bassenthwaite SAC and the highly mobile nature of migratory fish. It is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the

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Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (126km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

**Table 1.11: LSE Matrix for Annex II diadromous fish species of the River Kent SAC.**

European Qualifying Features	Temporary Habitat Loss/Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Freshwater pearl mussel <i>Margaritifera margaritifera</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c	*d			*e			✓f			*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

**Note:** This site is only designated for freshwater pearl mussel and no diadromous fish species, however brown trout *Salmo trutta* is thought to be the host species within the River Kent SAC and Atlantic salmon are also present within the river (Natural England, 2019). There therefore may be an indirect effect to freshwater pearl mussel through effects on host species.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (83km) based on distance from SAC and the highly mobile nature of migratory fish which are host species for the freshwater pearl mussel, it is therefore concluded that there is no potential for LSE on any Annex II qualifying interest features of the site.
- c. **Underwater sound** - There is potential for host species of the freshwater pearl mussel (brown trout and Atlantic salmon) to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex features of the site indirectly through potential impacts to host species during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for impact on the host species of the freshwater pearl mussel and therefore no LSE on the freshwater pearl mussel qualifying feature of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish host species of the freshwater pearl mussel. It is considered that there is potential for LSE on the Annex II qualifying interest feature of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (83km) based on distance from SAC and the highly mobile nature of migratory fish which are host species for the freshwater pearl mussel, it is therefore concluded that there is no potential for LSE on any Annex II qualifying interest features of the site.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the

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large distance to the SAC (83km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

**Table 1.12: LSE matrix for Annex II diadromous fish species of the Solway Firth SAC.**

European Qualifying Features	Temporary Habitat Loss/Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Sea lamprey <i>Petromyzon marinus</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
River lamprey <i>Lampetra fluviatilis</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (84km) based on distance from SAC and the highly mobile nature of migratory fish, it is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.
- Underwater sound** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (84km) based on distance from SAC and the highly mobile nature of migratory fish, it is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site
- Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of

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such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (84km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.13: LSE matrix for Annex II diadromous fish species of the River Bladnoch SAC.

European Qualifying Features	Temporary Habitat Loss/Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Atlantic salmon <i>Salmo salar</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (89.57km) based on distance from SAC and the highly mobile nature of migratory fish, it is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.
- Underwater sound** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (89.57km) based on distance from SAC and the highly mobile nature of migratory fish, it is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.
- Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (90km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution.



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- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.14: LSE matrix for Annex II diadromous fish species of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC.

European Qualifying Features	Temporary Habitat Loss/Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance of sediment bound contaminants			Accidental Pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Atlantic salmon <i>Salmo salar</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
Sea lamprey <i>Petromyzon marinus</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
River lamprey <i>Lampetra fluviatilis</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area due to the distance between the Morgan Array Area and this site (92km) and the highly mobile nature of migratory fish.
- Underwater sound** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area due to the distance between the Morgan Array Area and this site (92km) and the highly mobile nature of migratory fish.
- Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the

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large distance to the SAC (92km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

**Table 1.15: LSE matrix for Annex II fish species of the Afon Gwyrfai a Llyn Cwellyn SAC.**

European Qualifying Features	Temporary Habitat Loss/Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment bound contaminants			Accidental Pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Atlantic salmon <i>Salmo salar</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (118km) based on distance from SAC and the highly mobile nature of migratory fish, it is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.
- c. **Underwater sound** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (118km) based on distance from SAC and the highly mobile nature of migratory fish, it is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (118km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution.

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- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.16: LSE matrix for Annex II diadromous fish species of the River Eden SAC.

European Qualifying Features	Temporary Habitat Loss/Disturbance			Increases in SSC and Sediment Deposition			Underwater sound			Long-term subtidal Habitat Loss			Colonisation of Hard Structures			EMF			Disturbance/remobilisation of sediment contaminants			Accidental Pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	/	O&M	D	C	O&M	D	C	O&M	D
Atlantic salmon <i>Salmo salar</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
Sea lamprey <i>Petromyzon marinus</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i
River lamprey <i>Lampetra fluviatilis</i>	*a	*a	*a	*b	*b	*b	✓c	*c	✓c		*d			*e			✓f		*g	*g	*g	*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance** - There is no potential for any direct physical overlap between the activities associated with all phases of the Morgan Generation Assets and the boundary of the European site. It can, therefore, be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from temporary habitat loss/disturbance.
- b. **Increases in SSC and sediment deposition** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (126km) based on distance from River Eden SAC and the highly mobile nature of migratory fish. It is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.
- c. **Underwater sound** - There is potential for migratory species to be present within or transiting through the Morgan Array Area and potential area of impact (injury and behavioural) from underwater sound during construction and decommissioning. There is therefore considered to be the potential for LSE on Annex II diadromous fish features of the site during the construction and decommissioning phases. Sound levels will be substantially lower during the operations and maintenance phase and, as such, it is concluded that there is no potential for LSE on Annex II diadromous fish qualifying interest features of the site during the operations and maintenance phase.
- d. **Long-term habitat loss** - There is no direct physical overlap between the footprint of the Morgan Array Area and the SAC. It can therefore be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from long-term habitat loss.
- e. **Colonisation of hard structures** - Artificial structures placed on the seabed (i.e. foundations and scour/cable protection) are expected to be colonised by a range of marine organisms leading to localised increases in biodiversity and potential changes in prey-predator interactions. However, effects on fish populations during the operations and maintenance phase are expected to be limited and therefore it can be concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site from the colonisation of hard structures during the operations and maintenance phase.
- f. **EMF** - EMF emitted from subsea electrical cabling has the potential to interfere with the navigation of migratory fish. It is considered that there is potential for LSE on the Annex II diadromous fish qualifying interest features of the site from EMF during the operations and maintenance phase.
- g. **Disturbance/remobilisation of sediment bound contaminants** - The extent of this impact, across all phases of the Morgan Generation Assets, will be spatially restricted to within the Morgan Array Area and the surrounding area (which will be refined through physical processes modelling to be undertaken for the EIA). The impact is screened out for the Morgan Array Area (126km) based on distance from River Eden SAC and the highly mobile nature of migratory fish. It is therefore concluded that there is no potential for LSE on any Annex II diadromous fish qualifying interest features of the site.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of

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such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (126km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II diadromous fish qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II diadromous fish qualifying interest features of the site as a result of in-combination effects across all phases. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

#### 1.4.4 Assessment of LSE for Annex II marine mammals

1.4.4.1 A total of 33 European sites were identified in the initial screening process (section 1.3.4) to be taken forward for determination of LSE for Annex II marine mammals. These sites are listed below, broken down by country:

- Twelve sites in the United Kingdom:
  - North Anglesey Marine/Gogledd Môn Forol SAC
  - North Channel SAC
  - Pen Llŷn a'r Sarnau/ Lleyrn Peninsula and the Sarnau SAC
  - West Wales Marine/Gorllewin Cymru Forol SAC
  - Cardigan Bay/ Bae Ceredigion SAC
  - Pembrokeshire Marine/Sir Benfro Forol SAC
  - Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC
  - Isles of Scilly Complex SAC
  - Lundy SAC
  - The Maidens SAC
  - Strangford Lough
  - Murlough SAC
- Four sites in Republic of Ireland:
  - Rockabill to Dalkey Island SAC
  - Roaringwater Bay and Islands SAC
  - Blasket Islands SAC
  - Saltee Islands SAC
- 17 sites in France: (see Table 1.5).

#### Site overviews

1.4.4.2 As outlined in section 1.3.4, a total of 33 European sites were identified in the initial screening process to be taken forward for determination of LSE. These sites and the associated qualifying features are set out in Table 1.17 below.

**Table 1.17: The SACs and Ramsar sites taken forward for determination of LSE, with details of associated marine mammal qualifying features.**

ID	European Site	Relevant Annex II Features
<b>UK</b>		
1	North Anglesey Marine/Gogledd Môn Forol SAC	Harbour porpoise <i>Phocoena phocoena</i>
2	North Channel SAC	Harbour porpoise <i>Phocoena phocoena</i>
3	Strangford Lough	Harbour seal <i>Phoca vitulina</i>
4	Murlough SAC	Harbour seal <i>Phoca vitulina</i>

ID	European Site	Relevant Annex II Features
5	Pen Llŷn a'r Sarnau/Lleyrn Peninsula and the Sarnau SAC	Bottlenose dolphin <i>Tursiops truncatus</i> Grey seal <i>Halichoerus grypus</i>
6	West Wales Marine/Gorllewin Cymru Forol SAC	Harbour porpoise <i>Phocoena phocoena</i>
7	Cardigan Bay/Bae Ceredigion SAC	Bottlenose dolphin <i>Tursiops truncatus</i>
8	Pembrokeshire Marine/Sir Benfro Forol SAC	Grey seal <i>Halichoerus grypus</i>
9	Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	Harbour porpoise <i>Phocoena phocoena</i>
10	Lundy SAC	Grey seal <i>Halichoerus grypus</i>
11	Isles of Scilly Complex SAC	Grey seal <i>Halichoerus grypus</i>
12	The Maidens SAC	Grey seal <i>Halichoerus grypus</i>
<b>Republic of Ireland</b>		
13	Rockabill to Dalkey Island SAC	Harbour porpoise <i>Phocoena phocoena</i>
14	Saltee Islands SAC	Grey seal <i>Halichoerus grypus</i>
15	Roaringwater Bay and Islands SAC	Harbour porpoise <i>Phocoena phocoena</i>
16	Blasket Islands SAC	Harbour porpoise <i>Phocoena phocoena</i>
<b>France</b>		
17	Mers Celtiques - Talus du golfe de Gascogne SCI	Harbour porpoise <i>Phocoena phocoena</i>
18	Abers - Côte des légendes SCI	Harbour porpoise <i>Phocoena phocoena</i>
19	Ouessant-Molène SCI	Harbour porpoise <i>Phocoena phocoena</i>
20	Côte de Granit rose-Sept-Iles SCI	Harbour porpoise <i>Phocoena phocoena</i>
21	Anse de Goulven, dunes de Keremma SCI	Harbour porpoise <i>Phocoena phocoena</i>
22	Tregor Goëlo SCI	Harbour porpoise <i>Phocoena phocoena</i>
23	Côtes de Crozon SCI	Harbour porpoise <i>Phocoena phocoena</i>
24	Chaussée de Sein SCI	Harbour porpoise <i>Phocoena phocoena</i>
25	Cap Sizun SCI	Harbour porpoise <i>Phocoena phocoena</i>
26	Récifs du talus du golfe de Gascogne SCI	Harbour porpoise <i>Phocoena phocoena</i>
27	Anse de Vauville SCI	Harbour porpoise <i>Phocoena phocoena</i>
28	Cap d'Erquy-Cap Fréhel SCI	Harbour porpoise <i>Phocoena phocoena</i>
29	Baie de Saint-Brieuc - Est SCI	Harbour porpoise <i>Phocoena phocoena</i>
30	Banc et récifs de Surtainville SCI	Harbour porpoise <i>Phocoena phocoena</i>
31	Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI	Harbour porpoise <i>Phocoena phocoena</i>
32	Estuaire de la Rance SCI	Harbour porpoise <i>Phocoena phocoena</i>
33	Baie du Mont Saint Michel SCI	Harbour porpoise <i>Phocoena phocoena</i>



### Pathways for LSE: potential impacts on Annex II marine mammals

1.4.4.3 A list of potential impacts and effects on marine mammals that may result from the Morgan Generation Assets has been provided below. These are the impacts which must be taken into account when determining the potential for LSE on the designated sites and marine mammal qualifying interest features identified. The list of potential impacts on marine mammals has been compiled using the experience and knowledge gained from previous offshore wind farm projects and Natural England's and Natural Resources Wales 'Advice on Operations' (JNCC, 2019; JNCC and DAERA, 2019; Natural Resources Wales, 2018) for individual features of sites.

1.4.4.4 No LSEs are predicted for many of the more distant sites, however, due to the location of the identified SACs within the relevant species' MU the potential for connectivity with the Morgan Generation Assets cannot be discounted and the sites are screened it for LSE and assessment within the ISAA.

1.4.4.5 Consideration of the potential impacts identified for Annex II marine mammals is presented in the following sections to inform the determination of LSE below.

#### Construction phase

##### Injury and disturbance from underwater sound generated from piling

1.4.4.6 Impact piling during construction may result in hearing damage/auditory injury or behavioural disturbance/displacement (including barrier effects) of marine mammals. Based on feedback from the marine mammal EWG, a precautionary approach has been adopted to the determination of LSE at this stage which assumes that there is the potential for connectivity with Annex II marine mammal features of all sites located within the relevant MU for each species. On this basis, it is concluded that LSE from underwater sound resulting from piling activities on marine mammals cannot be excluded at this stage. This impact is therefore screened in for further consideration in the ISAA for Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4. The ISAA will include consideration of site-specific underwater sound modelling and assessments and the distribution and abundances of the relevant Annex II marine mammal features outlined above.

##### Injury and disturbance from underwater sound generation from UXO detonation

1.4.4.7 There may be a requirement for the clearance of UXOs from the Morgan Generation Assets. The detonation of small charges as part of this process has the potential to result in hearing damage/auditory injury or behavioural disturbance/displacement (including barrier effects) of marine mammals. Based on feedback from the marine mammal EWG, a precautionary approach has been adopted to the determination of LSE at this stage which assumes that there is the potential for connectivity with Annex II marine mammal features of all sites located within the relevant MU for each species. On this basis, it is concluded that LSE from underwater sound resulting from UXO detonation on marine mammals cannot be excluded at this stage. This impact is therefore screened in for further consideration in the ISAA for Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4. The ISAA will include consideration of site-specific underwater sound modelling and assessments and the distribution and abundances of the relevant Annex II marine mammal features outlined above.

### Underwater sound from pre-construction site surveys

1.4.4.8 The impact of pre-construction related activities, and in particular geophysical surveys, may result in behavioural disturbance/displacement of marine mammals. Based on feedback from the marine mammal EWG, a precautionary approach has been adopted to the determination of LSE at this stage which assumes that there is the potential for connectivity with Annex II marine mammal features of all sites located within the relevant MU for each species. On this basis it is concluded that LSE from underwater sound resulting from pre-construction site surveys on marine mammals cannot be excluded at this stage. This impact is therefore screened in for further consideration in the ISAA for Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4. The ISAA will include consideration of site-specific underwater sound assessments and the distribution and abundances of the relevant Annex II marine mammal features outlined above.

### Underwater sound from vessels and other (non-piling) sound producing activities

1.4.4.9 Disturbance of marine mammals may also arise during the construction phase from vessel use and other construction related activities (e.g. dredging, trenching, rock placement). The extent of this potential disturbance will be spatially restricted to within the Morgan Array Area and along vessel routes to ports used in support of the Morgan Generation Assets during the construction phase. Beyond this, the movements of vessels using already established vessel routes will be dispersed and will become part of the background vessel traffic. There is the potential for connectivity with Annex II marine mammal features of all sites located within the relevant MU for each species. On this basis it is concluded that LSE from underwater sound resulting from vessels and other sound sources on marine mammals cannot be excluded at this stage. This impact is therefore screened in for further consideration in the ISAA for Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4.

#### Vessel collision risk

1.4.4.10 An increase in vessel activity, compared to baseline levels, during the construction phase, may result in increased vessel collisions with marine mammals. The extent of this potential disturbance will be spatially restricted to within the Morgan Array Area and along routes to local ports. Beyond this, the movements of vessels using already established vessel routes will be dispersed and will become part of the background vessel traffic.

1.4.4.11 As there is only a small increase in vessels against a baseline of high shipping activity, the likelihood of collisions occurring between vessels and marine mammals is considered to be low, with marine mammals likely to maintain their distance. There is therefore considered to be little potential for the increased vessel activity during construction to result in a significant effect to Annex II marine mammal features in terms of collision risk with vessels. As such, no LSEs are anticipated to occur to Annex II marine mammal features of any European site and the impact of vessel collision risk is therefore screened out of further consideration for all sites.

#### Changes in prey availability

1.4.4.12 There is the potential for changes in marine mammal prey abundance and distribution to arise as a result of construction activities which physically disturb the seabed, result in increased SSC or which generate underwater sound. Potential impacts to prey species may result in changes in the ability/success of marine mammals to forage in

- the area of the Morgan Array Area. The risk of effects on prey species is expected to be greatest during the construction phase (e.g. due to seabed disturbance and/or underwater sound during construction) with effects during operations and maintenance expected to be much reduced.
- 1.4.4.13 There is the potential for connectivity with Annex II marine mammal features of all sites located within the relevant MU for each species. Any potential temporary changes to the fish community in the vicinity of the Morgan Array Area as a result of construction impacts such as underwater sound, are unlikely to result in significant effects to Annex II marine mammal features given prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. As such, no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of the majority of European sites with the exception of the North Anglesey Marine/Gogledd Môn Forol SAC which has been screened in on a precautionary basis, due to its proximity to the Morgan Generation Assets.
- 1.4.4.14 the potential for foraging opportunities in the wider area. The effect of underwater sound on prey species can however only be fully assessed using the result of project-specific underwater sound modelling which will be undertaken for the EIA. Until these results are available, this impact cannot be screened out for further consideration in the ISAA for the Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4.
- Increased SSC and associated sediment deposition**
- 1.4.4.15 Disturbance to water quality as a result of construction activities (e.g. foundation and cable installation, and site preparation activities) can have both direct and indirect impacts on marine mammals. Indirect impacts would include effects on prey species (this impact is screened in under “changes in prey availability” above). Direct impacts include the impairment of visibility and therefore foraging ability which might be expected to reduce foraging success. Marine mammals are well known to forage in tidal areas where water conditions are turbid and visibility conditions poor. For example, harbour porpoise and harbour seal in the UK have been documented foraging in areas with high tidal flows (e.g. Pierpoint, 2008; Marubini *et al.*, 2009; Hastie *et al.*, 2016); therefore, low light levels, turbid waters and suspended sediments are unlikely to negatively impact marine mammal foraging success. When the visual sensory systems of marine mammals are compromised, they are able to sense the environment in other ways, for example, seals can detect water movements and hydrodynamic trails with their mystacial vibrissae; while odontocetes primarily use echolocation to navigate and find food in darkness.
- 1.4.4.16 Whilst elevated SSC arising during construction of the Morgan Generation Assets may temporarily decrease light availability in the water column and produce turbid conditions, the maximum impact range is expected to be localised with sediments rapidly dissipating over one tidal excursion. In addition, there is a large natural variability in the SSC within the Irish Sea, so marine mammals living here will be tolerant of any small-scale increases, such as those associated with the construction activities.
- 1.4.4.17 As such, no LSEs are anticipated to occur to Annex II marine mammal features of any European site and the impact of increased SSC and sediment deposition is therefore screened out of further consideration for all sites.
- Accidental pollution**
- 1.4.4.18 There is a risk of pollution being accidentally released during the operations and maintenance phase of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and given the volumes associated with offshore wind farm development, should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g. due to the expected low volumes of pollutants associated with offshore wind). Furthermore, considering the large distances to the SACs identified, ((the nearest site being the North Anglesey Marine/Gogledd Môn Forol SAC which is located 28km from the Morgan Array Area) any effects, should they occur, will not directly affect the SACs. As noted above, any indirect effects on Annex II marine mammal qualifying interests from accidental release of pollutants would be unlikely and should they occur these would be unlikely to lead to a significant effect on conservation objectives of the site. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.
- 1.4.4.19 In addition, it is anticipated that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. It will also set out industry good practice and OSPAR, IMO and MARPOL guidelines for preventing pollution at sea. While these plans are not considered in the determination of no LSE, they will nevertheless further reduce the potential for LSE.
- Operations and maintenance phase**
- Underwater sound from vessels and other vessel activities**
- 1.4.4.20 Disturbance of marine mammals may arise during the operations and maintenance phase from increased vessel traffic and vessel-based activities (e.g. cable reburial etc.) associated with operations and maintenance activities. As during the construction phase, the extent of this potential disturbance will be spatially restricted to within the Morgan Array Area and along routes to local ports. Beyond this, the movements of vessels using already established vessel routes will be dispersed and will become part of the background vessel traffic. However, at this stage, project-specific underwater sound modelling has not yet been completed and therefore cannot yet be used to inform the assessment of LSE. A precautionary approach has, therefore, been adopted to the determination of LSE at this stage which assumes that there is the potential for connectivity with Annex II marine mammal features of all sites located within the relevant MU for each species. On this basis it is concluded that LSE from underwater sound resulting from vessels and other vessel activities on marine mammals cannot be excluded at this stage. This impact is therefore screened in for further consideration in the ISAA for Annex II marine mammal features of sites within the relevant MUs outlined in section 1.3.4.

### Vessel collision risk

1.4.4.21 An increase in vessel activity associated with operations and maintenance activities may result in increased collisions with marine mammals. The extent of this potential disturbance will however be spatially restricted to within the Morgan Array Area and along routes to local ports. Beyond this, the movements of vessels using already established vessel routes will be dispersed and will become part of the background vessel traffic. As such, no LSEs are anticipated to occur to Annex II marine mammal features of any European site and the impact of vessel collision risk is therefore screened out of further consideration for all sites.

### Changes in prey availability

1.4.4.22 There is the potential for changes in marine mammal prey abundance and distribution to arise as a result of operations and maintenance activities and as a result of the presence of offshore structures. The potential for any adverse effects on prey are, however, significantly reduced compared to the construction phase as underwater sound will be substantially lower (i.e. no piling will be required). As such, no LSEs are anticipated to occur to Annex II marine mammal features of any European site and the impact of changes in prey availability is therefore screened out of further consideration for all sites within the relevant MUs outlined in section 1.3.4.

### Operational sound

1.4.4.23 The Marine Management Organisation (MMO, 2014) review of post-consent monitoring at offshore wind farms found that available data on the operational wind turbine sound, from the UK and abroad, in general showed that sound levels from operational wind turbines are low. The spatial extent of the potential impact of the operational wind turbine sound on marine receptors is generally estimated to be small, and behavioural responses are only likely at ranges close to the wind turbines. This is supported by several published studies which provide evidence that marine mammals are not displaced from operational wind farms.

1.4.4.24 At the Horns Rev and Nysted offshore wind farms in Denmark, long term monitoring showed that both harbour porpoise and harbour seal were sighted regularly within the operational offshore wind farms, and within two years of operation, the populations had returned to levels that were comparable with the wider area (Diederichs *et al.*, 2008). Similarly, a monitoring programme at the Egmond aan Zee offshore wind farm in the Netherlands reported that significantly more porpoise activity was recorded within the offshore wind farm compared to the reference area during the operations phase (Scheidat *et al.*, 2011). Other studies at Dutch and Danish offshore wind farms (Lindeboom *et al.*, 2011) also suggest that harbour porpoise may be attracted to increased foraging opportunities within operating offshore wind farms. In addition, recent tagging work by Russell *et al.* (2014) found that some tagged harbour and grey seal demonstrated grid like movement patterns as these animals moved between individual wind turbines, strongly suggestive of these structures being used for foraging.

1.4.4.25 Other reviews have also concluded that operational wind farm sound will have negligible effects (Madsen *et al.*, 2006; Teilmann *et al.*, 2006a; Teilmann *et al.*, 2006b; CEFAS, 2010; Brasseur *et al.*, 2012). As such, no LSEs are anticipated to occur to any marine mammal qualifying feature of any European site and the impact of operational sound will be screened out of further consideration.

### EMF

1.4.4.26 Based on the data available to date, there is no evidence of EMF related to marine renewable devices having any impact (either positive or negative) on marine mammals (Copping, 2018). There is no evidence that seals can detect or respond to EMF, however, some species of cetaceans may be able to detect variations in magnetic fields (Normandeau *et al.*, 2011). To date, the only marine mammal known to show any response to EMF is the Guiana dolphin (*Sotalia guianensis*) which has been shown to possess an electroreceptive system, which uses the vibrissal crypts on their rostrum to detect electrical stimuli similar to those generated by small to medium sized fish (Czech-Damal *et al.*, 2013). However, this has not been shown in any other species of marine mammal and this species does not occur within the Morgan marine mammal study area for the generation assets. As such, no LSEs are anticipated to occur to any marine mammal qualifying feature of any European site and the impact of EMF will be screened out of further consideration.

### Accidental pollution

1.4.4.27 There is a risk of pollution being accidentally released during the operations and maintenance phase of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. Pollution events are considered unlikely, and given the volumes associated with offshore wind farm development, should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g. due to the expected low volumes of pollutants associated with offshore wind). Furthermore, considering the large distances to the SACs identified, ((the nearest site being the North Anglesey Marine/Gogledd Môn Forol SAC which is located 28km from the Morgan Array Area) any effects should they occur, will not directly affect the SACs. As noted above, any indirect effects on Annex II marine mammal qualifying interests from accidental release of pollutants would be unlikely and should they occur these would be unlikely to lead to a significant effect on the conservation objectives of the site. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.

1.4.4.28 In addition, it is anticipated that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. It will also set out industry good practice and OSPAR, IMO and MARPOL guidelines for preventing pollution at sea. While these plans are not considered in the determination of no LSE, they will nevertheless further reduce the potential for LSE.

### Decommissioning phase

1.4.4.29 The impacts during the decommissioning phase are considered to be similar and potentially less than those outlined above in the construction phase.

### Determination of LSE for Annex II marine mammals

1.4.4.30 Table 1.18 to Table 1.34 present the results of the LSE determination assessment as a result of the Morgan Generation Assets on relevant qualifying interest features of the European sites identified for marine mammals. Separate HRA screening tables are presented for each of the UK sites and Republic of Ireland sites and a single table

(Table 1.34) has been produced to cover the 17 French sites screened into the LSE assessment for harbour porpoise. This is because the justifications for the screening decisions were the same for all French sites on the basis of the distance of these sites from the Morgan Generation Assets.

- 1.4.4.31 These assessments have been made in the absence of mitigation measures. The footnotes to these tables provide a brief assessment to support the screening in or out of each of these likely significant effects on the identified SAC features.

**LSE in-combination**

- 1.4.4.32 The LSE test requires consideration of the Morgan Generation Assets alone and/or in-combination with other plans and projects. Therefore, it is not necessary at the LSE stage to consider sites/features for which an LSE 'alone' has already been identified, as in-combination effects will be considered at the Appropriate Assessment. The focus at this stage should be to identify sites/features for which no LSE alone was concluded, but for Table 1.18 which there is potential for a LSE in-combination to occur in combination with other plans or projects (e.g. due to wide foraging ranges resulting in a species interacting with a large number of projects).

- 1.4.4.33 Given the highly precautionary method for site selection applied during this Screening assessment, it is considered that the consolidation of information regarding external plans and projects would not likely result in additional LSEs being identified for the Screening assessment. For marine mammals, the potential for LSE alone is identified for all sites within the respective species MU, therefore effects in-combination will be considered at Appropriate Assessment.

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Table 1.18: LSE matrix for North Anglesey Marine/ Gogledd Môn Forol SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects					
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	xc	xc	xc	✓d	xd	xd	xe		xe		xf			yg		xh	xh	xh	✓i	✓i	✓i			

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✕ symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site surveys** – There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- Underwater sound from vessels and other vessel activities** – There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- Vessel collision risk** – The increase in vessel traffic across all phases of the Morgan Generation Assets is considered to be low compared to current background levels and the advice on operations for this SAC (JNCC and NRW and DAERA, 2019a) does not currently identify the pressure of death/injury by collision as a ‘high’ or significant risk. The likelihood of collisions occurring between vessels and marine mammals is considered to be low. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. The majority of impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. However, LSE associated with changes to prey species have been screened in for this SAC on a precautionary basis due to its proximity to the Morgan Generation Assets Boundary. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phases compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** – Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (28km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

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- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to the Annex II harbour porpoise feature of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.19: LSE matrix for the North Channel SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	✓d	*d	*d	*e		*e		*f			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site surveys** – There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** – There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** – The increase in vessel traffic across all phases of the Morgan Generation Assets is considered to be low compared to current background levels and the advice on operations for this SAC (JNCC and DAERA, 2019b) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. The likelihood of collisions occurring between vessels and marine mammals is considered to be low. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. The majority of impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. However, LSE associated with changes to prey species have been screened in for this SAC on a precautionary basis due to its proximity to the Morgan Generation Assets. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phases compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** – Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part

of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (64km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.



Table 1.20: LSE matrix for Strangford Lough SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Harbour seal <i>Phoca vitulina</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d		*e			*f			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site surveys** – There is the potential for the harbour seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** – There is considered to be the potential for harbour seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** – The increase in vessel traffic associated with the construction, operations and maintenance and decommissioning of the Morgan Generation Assets is likely to be low compared to background levels and likelihood of the impact occurring is considered to be low and there is therefore considered to be little potential for the increased vessel activity across all phases to result in a significant impact to harbour seal in terms of collision risk with vessels. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- a. **Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets Boundary (i.e. ~94km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE to the harbour seal features from changes in prey availability during the operations and maintenance and decommissioning phases.
- d. **Changes in water clarity** – Harbour seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- e. **Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour seal will be small. Several published studies indicate that harbour seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- f. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- g. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (95km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

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- h. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.21: LSE matrix for Murlough SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects			
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	
Harbour seal <i>Phoca vitulina</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	✓d	*d	✓d		*e			*f			*g			*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site surveys** – There is the potential for the harbour seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** – There is considered to be the potential for harbour seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** – The increase in vessel traffic associated with the construction, operations and maintenance and decommissioning of the Morgan Generation Assets is likely to be low compared to background levels and likelihood of the impact occurring is considered to be low and there is therefore considered to be little potential for the increased vessel activity across all phases to result in a significant impact to harbour seal in terms of collision risk with vessels. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets Boundary (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets Boundary (i.e. ~98km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE to the harbour seal features from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** – Harbour seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour seal will be small. Several published studies indicate that harbour seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. a EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (98km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

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- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

**Table 1.22: LSE matrix for Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Bottlenose dolphin <i>Tursiops truncatus</i>	✓a			✓a			✓a			✓b	✓b	✓b	xc	xc	xc	xd	xd	xd		xe			xf			yg		xh	xh	xh	✓i	✓i	✓i
Grey seal <i>Halichoerus grypus</i>	✓a			✓a			✓a			✓b	✓b	✓b	xc	xc	xc	xd	xd	xd		xe			xf			yg		xh	xh	xh	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site surveys** – There is the potential for bottlenose dolphin and grey seal features of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** - – There is the potential for bottlenose dolphin and grey seal features of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other non-vessel activities. It is therefore concluded that there is potential for LSE from vessel sound and other vessel related activities.
- c. **Vessel collision risk** - The uplift in vessel traffic across all phases of the Morgan Generation Assets is considered to be low compared to current background levels and the likelihood of collisions occurring between vessels and marine mammals is considered to be low. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** – Bottlenose dolphin and grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of this species. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to bottlenose dolphin will be small. Given the low abundance of bottlenose dolphin within the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence to indicate that bottlenose dolphin or grey seal respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.

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- h. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (120km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.
- i. **In-combination effects** – Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II bottlenose dolphin and grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

**Table 1.23: LSE matrix for the West Wales Marine/Gorllewin Cymru Forol SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d	*e		*e		xf			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site surveys** – There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and -pre-construction site surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** – There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** – The increase in vessel traffic across all phases of the Morgan Generation Assets is considered to be low compared to current background levels. The likelihood of collisions occurring between vessels and marine mammals is considered to be low and the advice on operations for this SAC (NRW and JNCC, 2019) does not currently identify the pressure of death/injury by collision as a 'high' or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** – Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the

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large distance to the SAC (121km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise feature of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.



Table 1.24: LSE matrix Cardigan Bay/Bae Ceredigion SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Bottlenose dolphin <i>Tursiops truncatus</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d		*e			*f			*g		*h	*h	*h	✓i	✓i	✓i
Grey seal <i>Halichoerus grypus</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d		*e			*f			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site surveys**– There is the potential for the bottlenose dolphin and grey seal features of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- Underwater sound from vessels and other vessel activities** - There is considered to be the potential for bottlenose dolphin and grey seal features from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- Vessel collision risk** - The uplift in vessel traffic across all phases of the Morgan Generation Assets is considered to be low compared to current background levels and the likelihood of collisions occurring between vessels and marine mammals is considered to be low. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** - The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** – Bottlenose dolphin and grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of this species. It is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to bottlenose dolphin and grey seal will be small. Given the distance of the SAC from the Morgan Array Area, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence to indicate that bottlenose dolphin or grey seal respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part

of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (188km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** – Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II bottlenose dolphin and grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.25: LSE matrix for Pembrokeshire Marine/Sir Benfro Forol SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Grey seal <i>Halichoerus grypus</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d		*e			*f			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site surveys**– There is the potential for the grey seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** – There is considered to be the potential for grey seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** – The increase in vessel traffic associated with the construction, operations and maintenance and decommissioning of the Morgan Generation Assets is likely to be low compared to background levels and likelihood of the impact occurring is considered to be low and there is therefore considered to be little potential for the increased vessel activity across all phases to result in a significant impact to grey seal in terms of collision risk with vessels. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** – Grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of grey seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to grey seal will be small. Several published studies indicate that grey seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the

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large distance to the SAC (238km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

**Table 1.26: LSE matrix for the Bristol Channel Approaches/Dynesfeydd Mor Hafren SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d	*e		*e		xf			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site surveys**– There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- b. **Underwater sound from vessels and other vessel activities** – There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- c. **Vessel collision risk** – The increase in vessel traffic across all phases of the Morgan Generation Assets is considered to be low compared to current background levels. The likelihood of collisions occurring between vessels and marine mammals is considered to be low and the advice on operations for this SAC (Natural England, JNCC and NRW, 2019) does not currently identify the pressure of death/injury by collision as a ‘high’ or significant risk. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** – Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. a EMP) including a MPCP) which will be implemented as part

of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (300km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.27: LSE matrix for Lundy SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Grey seal <i>Halichoerus grypus</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d		*e		*f				*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site surveys** – There is the potential for the grey seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- Underwater sound from vessels and other vessel activities** – There is considered to be the potential for grey seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- Vessel collision risk** – The increase in vessel traffic associated with the construction, operations and maintenance and decommissioning of the Morgan Generation Assets is likely to be low compared to background levels and likelihood of the impact occurring is considered to be low and there is therefore considered to be little potential for the increased vessel activity across all phases to result in a significant impact to grey seal in terms of collision risk with vessels. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** – Grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of grey seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to grey seal will be small. Several published studies indicate that grey seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.

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- h. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (335km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.
- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.



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Table 1.28: LSE matrix for Isles of Scilly Complex SAC

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Grey seal <i>Halichoerus grypus</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d		*e			*f			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site surveys**– There is the potential for the grey seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- Underwater sound from vessels and other vessel activities** – There is considered to be the potential for grey seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- Vessel collision risk** – The increase in vessel traffic associated with the construction, operations and maintenance and decommissioning of the Morgan Generation Assets is likely to be low compared to background levels and likelihood of the impact occurring is considered to be low and there is therefore considered to be little potential for the increased vessel activity across all phases to result in a significant impact to grey seal in terms of collision risk with vessels. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** – Grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of grey seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to grey seal will be small. Several published studies indicate that grey seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE.

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Furthermore, considering the large distance to the SAC (465km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.29: LSE matrix for The Maidens SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Grey seal <i>Halichoerus grypus</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d		*e			*f			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Underwater sound from piling, UXO clearance and pre-construction site surveys** – There is the potential for the grey seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- Underwater sound from vessels and other vessel activities** – There is considered to be the potential for grey seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- Vessel collision risk** – The increase in vessel traffic associated with the construction, operations and maintenance and decommissioning of the Morgan Generation Assets is likely to be low compared to background levels and likelihood of the impact occurring is considered to be low and there is therefore considered to be little potential for the increased vessel activity across all phases to result in a significant impact to grey seal in terms of collision risk with vessels. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** – Grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of grey seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to grey seal will be small. Several published studies indicate that grey seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the

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large distance to the SAC (141km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.30: LSE matrix for Rockabill to Dalkey Island SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Harbour porpoise <i>Phocoena</i> <i>Phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d	*e		*e		xf			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site surveys** – There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). There is therefore considered to be potential for LSE from underwater sound during the construction phase.
- b. **Underwater sound from vessels and other vessel activities** – There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** – The increase in vessel traffic across all phases of the Morgan Generation Assets is considered to be low compared to current background levels. The likelihood of collisions occurring between vessels and marine mammals is considered to be low. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** – Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (123km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

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- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.31: LSE matrix for Saltee Islands SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Grey seal <i>Halichoerus grypus</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d		*e			*f			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site surveys** – There is the potential for the grey seal feature of this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with piling, UXO clearance activities and pre-construction site surveys (e.g. geophysical surveys). A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- b. **Underwater sound from vessels and other vessel activities** – There is considered to be the potential for grey seal from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- c. **Vessel collision risk** – The increase in vessel traffic associated with the construction, operations and maintenance and decommissioning of the Morgan Generation Assets is likely to be low compared to background levels and likelihood of the impact occurring is considered to be low and there is therefore considered to be little potential for the increased vessel activity across all phases to result in a significant impact to grey seal in terms of collision risk with vessels. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** – Grey seal frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of grey seal. Given the distance of the SAC from the Morgan Array Area it is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to grey seal will be small. Several published studies indicate that grey seal are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that seals can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of

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such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (260km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II grey seal features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.



**Table 1.32: LSE matrix for the Roaringwater Bay and Islands SAC.**

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d	*e		*e		*f			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site surveys** – Given the significant distance of the SAC to the Morgan Array Area (473km from the Morgan array area), the Morgan Array Area is unlikely to constitute important foraging grounds for individuals from these sites and underwater sound during construction is unlikely to result in significant effects (disturbance or injury) on the harbour porpoise features of these sites. However, due to the sites being located within the Celtic and Irish seas MU for harbour porpoise there is the potential connectivity for harbour porpoise features from these sites and the Morgan Array Area. In the absence of project specific underwater sound modelling, a precautionary approach has been adopted at this stage and it is therefore concluded that there is potential for LSE on the Annex II harbour porpoise feature of the site during the construction phase from piling, UXO clearance activities or pre-construction site surveys (e.g. geophysical surveys).
- b. **Underwater sound from vessels and other vessel activities** – There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. There is therefore considered to be potential for LSE from vessel sound across all phases of the Morgan Generation Assets.
- c. **Vessel collision risk** – The increase in vessel traffic across all phases of the Morgan Generation Assets is considered to be low compared to current background levels. The likelihood of collisions occurring between vessels and marine mammals is considered to be low. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** – Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part

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of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (472.5km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.33: LSE matrix Basket Islands SAC.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	*c	*c	*c	*d	*d	*d	*e		*e		*f			*g		*h	*h	*h	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Underwater sound from piling, UXO clearance and pre-construction site surveys** – Given the significant distance of the SAC to the Morgan Array Area (588km from the Morgan array area), the Morgan Array Area is unlikely to constitute important foraging grounds for individuals from this site and underwater sound during construction is unlikely to result in significant effects (disturbance or injury) on the harbour porpoise features of this site. However, due to the site being located within the Celtic and Irish seas MU for harbour porpoise there is the potential connectivity for harbour porpoise features from this site and the Morgan Array Area. A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- b. **Underwater sound from vessels and other vessel activities** – There is considered to be the potential for harbour porpoise from this site to be present (i.e. transiting or foraging) within the Morgan Array Area and zone of potential impact (injury and behavioural) from underwater sound associated with vessels and other vessel activities. A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- c. **Vessel collision risk** – The increase in vessel traffic across all phases of the Morgan Generation Assets is considered to be low compared to current background levels. The likelihood of collisions occurring between vessels and marine mammals is considered to be low. It is therefore concluded that there is no potential for LSE from vessel collision risk across all phases of the Morgan Generation Assets.
- d. **Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- e. **Changes in water clarity** – Harbour porpoise frequently occur in turbid environments and are adapted to navigating and locating prey in such conditions through echolocation. Increases in SSC during construction and decommissioning will be localised, short-term and intermittent and unlikely to result in significant effects to the foraging ability of harbour porpoise. It is considered that there is no potential for LSE from changes in water clarity.
- f. **Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm and so there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.
- g. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence that harbour porpoise can detect or respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of

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such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (588.4km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.

- i. **In-combination effects** - Activities associated with planned projects or other activities in the vicinity of the Morgan Generation Assets have the potential to result in LSE to Annex II harbour porpoise features of the SAC as a result of in-combination effects across all phases of the Morgan Generation Assets. Where potential for LSE has been concluded alone, the potential for LSE has been concluded in-combination.

Table 1.34: LSE matrix for the 17 French sites.

European Site Qualifying Features	Underwater sound from Piling			Underwater sound from Clearance of UXO			Underwater sound from Pre-construction site surveys			Underwater sound from Vessels and other Vessel Activities			Vessel Collision Risk			Changes in Prey Availability			Changes in Water Clarity			Operational Sound			EMF			Accidental Pollution			In-combination Effects				
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D		
Harbour porpoise <i>Phocoena phocoena</i>	✓a			✓a			✓a			✓b	✓b	✓b	xc	xc	xc	xd	xd	xd	xe		xe			xf			yg			xh	xh	xh	✓i	✓i	✓i

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✕ symbol is included and highlighted green.

SACs within French waters have been assessed together, as all SACs are designated for harbour porpoise and impacts are expected to be similar across all 17 sites.

- Underwater sound from piling, UXO clearance and pre-construction site surveys** - Given the significant distance of the nearest French site to the Morgan Array Area (closest site is located 559km from the Morgan array area), the Morgan Array Area is unlikely to constitute important foraging grounds for individuals from these sites and underwater sound during construction is unlikely to result in significant effects (disturbance or injury) on the harbour porpoise features of these sites. However, due to the sites being located within the Celtic and Irish seas MU for harbour porpoise there is the potential connectivity for harbour porpoise features from these sites and the Morgan Generation Assets. A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- Underwater sound from vessels and other vessel activities** - Given the large distances of all the French sites from the Morgan Array Area (the closest site is located 559km from the Morgan array area), it is considered that vessel traffic will not result in a significant disturbance to Annex II harbour porpoise feature of any French site. However, due to the sites being located within the Celtic and Irish seas MU for harbour porpoise there is the potential connectivity for harbour porpoise features from these sites and the Morgan Generation Assets. A precautionary approach has been adopted at this stage due to potential connectivity with the designated Annex II marine mammal features of this SAC and the impact has not been screened out, however it is not anticipated that there is potential for LSE on the designated features of this SAC.
- Vessel collision risk** - The uplift in vessel traffic across all phases of the Morgan Generation Assets is considered to be low compared to current background levels and the likelihood of collisions occurring between vessels and marine mammals is considered to be low. Furthermore, the minimum distance between the Morgan Array Area and the nearest French site is 559km. There is therefore considered to be little potential for increased vessel activity to result in a significant effect in terms of collision risk and so it is concluded that there is no potential for LSE to the harbour porpoise feature of all French sites from vessel collision risk across all phases of the Morgan Generation Assets.
- Changes in prey availability** – The majority of effects on fish populations across all phases of the Morgan Generation Assets are likely to be temporary, short-term and reversible. Any impacts on prey species will be spatially limited to the Morgan Generation Assets (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the foraging opportunities within the extensive ranges for marine mammal species and the highly mobile nature of these species. Due to the distance between this SAC and the Morgan Generation Assets (i.e. >100km) no LSEs are anticipated to occur as a result of changes in prey availability to Annex II marine mammal features of this SAC during the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is also concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- Changes in water clarity** – Given the large distance between the Morgan Array Area and the French sites for harbour porpoise (closest site is 519km from the Morgan Array Area) and the fact that increases in SSC will be localised, short-term and intermittent, they are considered unlikely to result in significant effects to the foraging ability of harbour porpoise. There is no potential for LSE from changes in water clarity for any French site.
- Operational sound** – Sound levels from operational wind turbines are predicted to be low and the spatial extent of any potential behavioural impact to harbour porpoise will be small. Given the large distance between the Morgan Array Area and the French sites for harbour porpoise (closest site is 559km from the Morgan Array Area) and that several published studies indicate that harbour porpoise are not likely to be displaced from the operational wind farm, there is considered to be no potential for LSE as a result of wind turbine sound during the operations and maintenance phase.

- g. **EMF** – There is no evidence of EMF related to marine renewable devices having any impact (either beneficial or adverse) on marine mammals and there is no evidence to indicate that harbour porpoise respond to EMF. It is concluded that there is no potential for LSE from EMF during the operations and maintenance phase.
- h. **Accidental pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SAC (the closest SAC: Mers Celtiques - Talus du golfe de Gascogne is located 559km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on any Annex II marine mammal qualifying interest features of European sites as a result of accidental pollution.
- i. **In-combination effects** – Over the distances considered, all relevant effect-pathways are considered extremely weak, such that only a negligible (if even detectable) influence would be apparent. Such effects could not contribute to any material degree to an in-combination effect and as such, in-combination effects associated with planned projects or other activities in the vicinity of the Morgan Generation Assets are also not anticipated for the harbour porpoise feature of any French site.

### 1.4.5 Assessment of LSE for marine ornithological features

#### Site overview

1.4.5.1 As outlined in section 1.3.5, European sites with marine ornithological features were identified in the initial screening process to be taken forward for determination of LSE. These sites and the associated qualifying features are set out in Table 1.35 below.

**Table 1.35: The SPAs and Ramsar sites taken forward for determination of LSE, with details of the associated qualifying features.**

European Site	Relevant qualifying features
<b>Marine SPAs</b>	
Liverpool Bay/Bae Lerpwl SPA	Red-throated diver <i>Gavia stellata</i>
	Little gull <i>Hydrocoloeus minutus</i>
	Common scoter <i>Melanitta nigra</i>
	Little tern <i>Sternula albifrons</i>
	Common tern <i>Sterna hirundo</i>
	Waterbird assemblage
Irish Sea Front SPA	Manx shearwater <i>Puffinus puffinus</i>
Skomer, Skokholm and the Seas off Pembrokeshire SPA	Seabird assemblage (breeding) including the components: <ul style="list-style-type: none"> <li>– Razorbill <i>Alca torda</i></li> <li>– Guillemot <i>Uria aalge</i></li> <li>– Kittiwake <i>Rissa tridactyla</i></li> </ul>
<b>Breeding Seabird Colonies</b>	
Morecambe Bay and Duddon Estuary SPA	Herring gull <i>Larus argentatus</i>
	Lesser black-backed gull <i>Larus fuscus</i>
Ribble and Alt Estuaries SPA	Lesser black-backed gull <i>Larus fuscus</i>
Lambay Island SPA	Herring gull <i>Larus argentatus</i>
	Kittiwake <i>Rissa tridactyla</i>
	Guillemot <i>Uria aalge</i>
	Razorbill <i>Alca torda</i>
Ireland's Eye SPA	Kittiwake <i>Rissa tridactyla</i>
	Guillemot <i>Uria aalge</i>
	Razorbill <i>Alca torda</i>
Howth Head Coast SPA	Kittiwake <i>Rissa tridactyla</i>
Wicklow Head SPA	Kittiwake <i>Rissa tridactyla</i>

European Site	Relevant qualifying features
Ailsa Craig SPA	Gannet <i>Morus bassanus</i>
	Kittiwake <i>Rissa tridactyla</i>
	Seabird assemblage including the components: <ul style="list-style-type: none"> <li>– Gannet <i>Morus bassanus</i></li> <li>– Kittiwake <i>Rissa tridactyla</i></li> </ul>
Rathlin Island SPA	Kittiwake <i>Rissa tridactyla</i>
Grassholm SPA	Gannet <i>Morus bassanus</i>
Saltee Islands SPA	Gannet <i>Morus bassanus</i>
	Kittiwake <i>Rissa tridactyla</i>
North Colonsay and Western Cliffs SPA	Kittiwake <i>Rissa tridactyla</i>
Helvick Head to Ballyquin SPA	Kittiwake <i>Rissa tridactyla</i>
Rum SPA	Kittiwake <i>Rissa tridactyla</i>
Old Head of Kinsale SPA	Kittiwake <i>Rissa tridactyla</i>
Canna and Sanday SPA	Kittiwake <i>Rissa tridactyla</i>
Shiant Isles SPA	Kittiwake <i>Rissa tridactyla</i>
St Kilda SPA	Gannet <i>Morus bassanus</i>
	Kittiwake <i>Rissa tridactyla</i>
Handa SPA	Kittiwake <i>Rissa tridactyla</i>
Cape Wrath SPA	Kittiwake <i>Rissa tridactyla</i>
Flannan Isles SPA	Kittiwake <i>Rissa tridactyla</i>
Sule Skerry and Sule Stack SPA	Gannet <i>Morus bassanus</i>
North Rona and Sula Sgeir SPA	Gannet <i>Morus bassanus</i>
	Kittiwake <i>Rissa tridactyla</i>

#### Pathways for LSE: potential impacts on marine ornithological features

1.4.5.2 A range of potential impacts on the marine ornithological features have been identified which may occur during the construction, operations and maintenance, and decommissioning phases of the Morgan Generation Assets. These are the impacts which are taken into account when determining the potential for LSE on the designated sites and seabirds (i.e. during the breeding, passage and non-breeding seasons) identified in section 1.3.5 and Table 1.35. The list of potential impacts on seabirds has been compiled using the experience and knowledge gained from previous offshore wind farm projects, as well as published literature. At this stage in

the Morgan Generation Assets Programme, full analysis of baseline survey information for the Morgan Generation Assets has not been completed, however collision risk modelling and displacement assessments have been undertaken using 12 months of digital aerial survey data and used to inform screening for LSE (as discussed in section 1.3.5).

- 1.4.5.3 Consideration of the potential impacts identified for the marine ornithological features is presented in the following sections to inform the determination of LSE. Some of the European sites screened in include an assemblage qualifying feature, with the named components of each of these assemblage features also being identified in Table 1.35. For the purposes of considering the potential effect pathways, these named components are treated as qualifying features (with the potential effect pathways also considered for the overall assemblage feature).

### Construction phase

#### Temporary habitat loss/disturbance and increased SSC

- 1.4.5.4 Direct habitat loss arising from the presence of infrastructure may occur during the construction phase of the Morgan Generation Assets. This is a temporary (and relatively short-term) effect in relation to the construction period and is unlikely to be significant for marine ornithological features using the Morgan Array Area due to the lack of overlap between the Morgan Array Area and any SPAs. Indirect loss of habitats used by marine ornithological features is assessed as displacement. Therefore, it is considered that there is no potential for LSE in relation to the qualifying features of any of the SPAs identified and this impact is not considered further.

#### Disturbance and displacement from airborne sound and presence of vessels and infrastructure

- 1.4.5.5 Airborne sound, the presence of vessels and construction works may disturb seabirds from offshore foraging or non-foraging areas (e.g. rafting, moulting) in the short-term, causing changes in behaviour or displacing them from the affected areas. Temporary disturbance/displacement may lead to a reduction in foraging opportunities or increased energy expenditure, resulting in decreased survival rates or productivity in the population. This would only be likely to apply to seabirds which use the area of the marine environment in which construction activities will occur. As such, there is no potential for LSE in relation to the qualifying features of any of the SPAs identified and this impact is not considered further.

#### Changes in prey availability

- 1.4.5.6 There is the potential for changes in bird prey (e.g. fish species) abundance and distribution to arise as a result of construction activities which physically disturb the seabed, result in increased SSC or which generate underwater sound. Reduction or disruption to prey availability to seabirds may cause displacement from foraging grounds in the area or reduced energy intake, affecting survival rates or productivity in the population in the short-term. The risk of effects on prey species is expected to be greatest during the construction phase (e.g. due to seabed disturbance and/or underwater sound during construction) with effects during the operations and maintenance phase expected to be much reduced.

- 1.4.5.7 As outlined in section 1.3.5 above, there is the potential for connectivity with SPA populations considered in this HRA screening. Any potential temporary changes to

the fish community in the vicinity of the Morgan Array Area as a result of construction impacts, such as underwater sound, are unlikely to result in significant effects to SPA populations bird species given that the majority of impacts on prey species will be spatially limited to the Morgan Array Area (for habitat disturbance) and surrounding area (e.g. behavioural effects from underwater sound), particularly in the context of the extensive foraging ranges for bird species and the highly mobile nature of these species. As such, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations for the majority of the SPA sites considered. The only exceptions are the Liverpool Bay/Bae Lerpwl SPA (which is located 10km from the Morgan Array Area), the Irish Sea Front SPA, the Ribble and Alt Estuaries SPA and the Morecambe Bay and Duddon Estuary SPA which are screened in on a precautionary basis, due to their proximities (i.e. within ~60km) to the Morgan Generation Assets.

### Accidental pollution

- 1.4.5.8 There is a risk of pollution being accidentally released during the construction phase of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and given the volumes associated with offshore wind farm development, should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g. due to the expected low volumes of pollutants associated with offshore wind). Furthermore, considering the large distances to the SPAs identified, (the nearest site being the Liverpool Bay/Bae Lerpwl SPA, which is located 10km from the Morgan Array Area) any effects should they occur, will not directly affect the SPAs. As noted above, any indirect effects on Annex I marine ornithological qualifying interests from accidental release of pollutants would be unlikely and should they occur, these would be unlikely to lead to a significant effect on conservation objectives of the site. On this basis, there is considered to be no potential for LSE on any Annex I marine ornithological qualifying interests features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.

- 1.4.5.9 In addition, it is anticipated that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. It will also set out industry good practice and OSPAR, IMO and MARPOL guidelines for preventing pollution at sea. While these plans are not considered in the determination of no LSE, they will nevertheless further reduce the potential for LSE.

### Operations and maintenance phase

#### Temporary habitat loss/disturbance and increased SSC.

- 1.4.5.10 Direct temporary habitat disturbance may occur during the operations and maintenance phase of the Morgan Generation Assets. Given the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. resting, moulting), direct habitat loss due to the Morgan Generation Assets is unlikely to have effects on SPA breeding seabird populations. Similarly, no effects are predicted on migratory waterbird populations as a result of birds passing through (or over) the Morgan Generation Assets site on migration.



### Disturbance and displacement from airborne sound and presence of vessels and infrastructure

1.4.5.11 The presence of operational wind turbines, as well as the associated maintenance activities, may disturb seabirds and displace them from preferred foraging areas over the long-term. This may lead to a reduction in foraging opportunities or increased competition and energy expenditure, resulting in decreased survival rates or productivity in the population. Such effects may be most likely in relation to seabirds using the marine habitats within the Morgan Array Area, although species are known to vary in their sensitivity to displacement (e.g. large gull species show little evidence of displacement from offshore wind farms whereas gannet and red-throated diver show marked displacement (Dierschke *et al.*, 2018; Dorsch *et al.*, 2020). Additionally, the effects of such displacement are likely to be minimal for species such as gannet and fulmar (irrespective of their sensitivity to the effect), which have particularly large foraging ranges, because the resultant habitat loss will represent a small proportion of the available habitat that they use.

1.4.5.12 As noted above, the effect of disturbance and displacement as a result of the Morgan Generation Assets (during all phases) has been assessed in volume 4, annex 10.2: Offshore ornithology displacement assessment of the PEIR (see section 1.3.5). The results of this assessment have been considered in the context of SPA populations within the offshore ornithology apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) which is summarised in the HRA screening tables below (see Table 1.36 to Table 1.60). The overall conclusion was that disturbance and displacement from the Morgan Generation Assets alone will not lead to LSE on any of the features of the SPAs considered in this screening (see discussion of in-combination effects below).

### Collision risk

1.4.5.13 Collisions of seabirds with the rotating blades of the wind turbines may result in the death or injury of individuals. Such mortality may be additive, so could cause population declines or, in some situations, prevent population recovery. Therefore, seabird species which forage within, or commute through, the Morgan Array Area may be vulnerable to such effects. For seabirds, collision risk may vary between species in relation to a range of factors associated with flight behaviour but with flight heights being of fundamental importance in predicting the vulnerability to this effect (Johnston *et al.*, 2014 a,b). Thus, species which fly at low heights and below the rotor swept area (e.g. fulmar and auk species) are less vulnerable to this effect pathway, in contrast to other species which generally fly at greater heights and are at risk of collision for a proportion of their flight time (e.g. kittiwake, large gull species and gannet).

1.4.5.14 The effect of collisions has been modelled in volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling of the PEIR (see section 1.3.5). The results of this assessment have been considered in the context of SPA populations within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) and, where relevant to the species, in combination with displacement effects discussed above (i.e. for gannet and kittiwake). The findings of these assessments are summarised for each SPA feature in the HRA screening tables below (see Table 1.36 to Table 1.60). The overall conclusion was that collision with wind turbines from the Morgan Generation Assets alone will not lead to LSE on any of the features of the SPAs considered in this screening (see discussion of in-combination effects below).

### Barrier to movement

1.4.5.15 Large scale offshore wind farms may act as barriers to seabird and/or migratory waterbird movements, causing individuals to fly around or over the wind turbine arrays. However, seabird species that commute frequently across the Morgan Array Area (e.g. to access foraging areas) could incur greater energetic costs as a consequence of these effects, with the potential for this to result in decreased survival rates or productivity in the population. This is particularly relevant to seabirds during the breeding season, when they frequently commute between the colony and foraging areas (e.g. Searle *et al.*, 2018).

1.4.5.16 The likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of SPAs are low, particularly in the context of the large foraging ranges used by seabirds and the large distances from the Morgan Array Area at which the SPAs are located. This impact is screened out for all sites.

### Changes in prey availability

1.4.5.17 As discussed in paragraph 1.4.5.6 above, indirect impacts on seabirds may occur as a result of changes in prey distribution, availability or abundance in the marine environment. Reduction or disruption to prey availability to seabirds may cause displacement from the area or reduced energy intake, affecting survival rates or productivity in the population in the long-term. However, impacts on fish populations during the operations and maintenance phase and decommissioning phase are expected to be considerably lower than those for construction and as such, there is no potential for LSEs associated with changes to prey availability during the operations and maintenance or decommissioning phases.

### Accidental pollution

1.4.5.18 There is a risk of pollution being accidentally released during the operations and maintenance phase of the Morgan Generation Assets from sources including vessels/ vehicles and equipment/ machinery. Pollution events are considered unlikely, and given the volumes associated with offshore wind farm development, should an event occur, effects will be temporary, reversible and limited in spatial extent (e.g. due to the expected low volumes of pollutants associated with offshore wind). Furthermore, considering the large distances to the SPAs identified, (the nearest site being the Liverpool Bay/Bae Lerpwl SPA, which is located 10km from the Morgan Array Area) any effects should they occur, will not directly affect the SPAs. As noted above, any indirect effects on Annex I marine ornithological qualifying interests from accidental release of pollutants would be unlikely and should they occur, these would be unlikely to lead to a significant effect on conservation objectives of the site. On this basis, there is considered to be no potential for LSE on any Annex I marine ornithological qualifying interests features of European sites as a result of accidental pollution and so this impact is screened out from further consideration.

1.4.5.19 In addition, it is anticipated that the risk of such events occurring will be minimised and managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. These plans include planning for accidental spills, address all potential contaminant releases and include key emergency contact details. It will also set out industry good practice and OSPAR, IMO and MARPOL guidelines for preventing pollution at sea. While these plans are not considered in the determination of no LSE, they will nevertheless further reduce the potential for LSE.

### Decommissioning phase

- 1.4.5.20 The impacts during the decommissioning phase are considered to be similar and potentially less than those outlined above for the construction phase. The impacts of direct habitat loss, collision and barriers to movement are not applicable to the decommissioning phase and will not be considered in the determination of LSE.

### Determination of LSE for marine ornithological features

- 1.4.5.21 Table 1.36 to Table 1.60 present the results of the LSE determination assessment as a result of the Morgan Generation Assets on relevant qualifying interest features of the European sites identified for marine ornithological features. When determining LSE, a similar approach to that used by The Crown Estate Plan Level HRA for breeding birds in the non-breeding season has been adopted. Where the predicted effect is less than 0.5% of the baseline mortality of the reference population, then none of the component SPAs have been screened in, on the basis that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination (i.e. the effect will be *de minimis* according to TCE, 2021).
- 1.4.5.22 These assessments have been made in the absence of mitigation measures but based on the outputs of the site-specific modelling and assessments outlined above. The footnotes to these tables provide a brief explanation to support the screening in or out of each of these likely significant effects on the identified SPA features.

### LSE in combination

- 1.4.5.23 The LSE test requires consideration of the Morgan Generation Assets alone and/or in-combination with other plans and projects. Therefore, it is not necessary at the LSE stage to consider sites/features for which an LSE 'alone' has already been identified, as in-combination effects will be considered at the Appropriate Assessment. The focus at this stage should be to identify sites/features for which no LSE alone was concluded, but for which there is potential for a LSE in-combination to occur when considering other plans or projects (e.g. due to wide foraging ranges resulting in a species interacting with a large number of projects).
- 1.4.5.24 The approach taken in TCE Plan level HRA has been broadly followed in this HRA screening, i.e. if the predicted magnitude is between 0.5% and 1% or >1% of the baseline mortality of the reference population for a qualifying feature, then further consideration will be given to the magnitude of the likely effect, including the contribution of impacts from other plans and projects, in-combination. If it cannot be concluded that the combined magnitude of the potential impact will not exceed 1% then each of the component SPAs will be screened into the assessment (with respect to the relevant feature and pressure considered) (TCE, 2021). Although these thresholds have been used as a guide for determining whether there is potential for LSE in-combination, each site and feature is considered individually based on the outputs of site-specific modelling and assessments set out above and screening conclusions based on these.
- 1.4.5.25 Given the highly precautionary method for site selection applied during this Screening assessment, it is considered that the consolidation of information regarding external plans and projects would not likely result in additional LSEs being identified for the Screening assessment.

**Table 1.36: LSE matrix for marine ornithological features of the Liverpool Bay/Bae Lerpwl SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound underwater sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Red-throated Diver <i>Gavia staeallata</i> (non-breeding)	*a	*a	*a	*b	*b	*b	*a	*c			*d		✓e	*e	*e	*f	*f	*f	✓g	*g	*g
Little gull <i>Hydrocoloeus minutus</i> (non-breeding)	*a	*a	*a	*b	*b	*b		*c			*d		✓e	*e	*e	*f	*f	*f	✓g	*g	*g
Common scoter <i>Melanita gretta</i> (non-breeding)	*a	*a	*a	*b	*b	*b		*c			*d		✓e	*e	*e	*f	*f	*f	✓g	*g	*g
Waterbird assemblage	*a	*a	*a	*b	*b	*b		*c			*d		✓e	*e	*e	*f	*f	*f	✓g	*g	*g
Little tern <i>Sternula albifrons</i> (breeding)	*a	*a	*a	*b	*b	*b		*c			*d		✓e	*e	*e	*f	*f	*f	✓g	*g	*g
Common tern <i>sterna hirundo</i> (breeding)	*a	*a	*a	*b	*b	*b		*c			*d		✓e	*e	*e	*f	*f	*f	✓g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Temporary habitat loss/disturbance and increased SSC** – Temporary habitat loss/disturbance and increased SSC can be discounted for the Morgan Array Area because of the distance to the Liverpool Bay/Bae Lerpwl SPA (10km). Therefore, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- Disturbance and displacement from airborne sound, and presence of vessels and infrastructure** – Disturbance and displacement from airborne sound and presence of vessels and infrastructure can be discounted for the Morgan Array Area because of the distance to the Liverpool Bay/Bae Lerpwl SPA (10km). Therefore, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- Collision risk** – Collision risk can be discounted for the Morgan Array Area. None of the species listed as qualifying features of the SPA were present in digital aerial surveys in high enough numbers or were deemed vulnerable to collision risk effects and were therefore not assessed within the collision risk modelling for the Morgan Generation Assets (see section 1.3.5 and volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling of the PEIR). Therefore, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- Barrier to movement** – The likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges of seabirds. In addition, the species listed as qualifying features of the SPA were excluded from collision risk modelling and displacement assessments based on either low numbers recorded within the Morgan Array Area or that the species is not considered sensitive to these effects (see section 1.3.5, volume, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling of the PEIR and volume 4, annex 10.2: offshore ornithology displacement assessment of the PEIR). Effects relating to barrier to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for any qualifying features of this SPA.
- Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. This SPA (which is located 10km from the Morgan Array Area) has been screened in on a precautionary basis for the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.

- f. **Accidental pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Accidental pollution effects can be discounted for the Morgan Array Area due to the distance to the Liverpool Bay/Bae Lerpwl SPA (10km).
- g. **In-combination effects** – Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to changes in prey availability impacts in-combination during the construction phase.

Table 1.37: LSE matrix for the Irish Sea Front SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Manx shearwater <i>Puffinus puffinus</i>	*a	*a	*a	*b	*b	*b		*c			*d		✓e	*e	*e	*f	*f	*f	✓g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Temporary habitat loss/disturbance and increased SSC due to the Morgan Generation Assets is unlikely to have effects on SPA seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for the Manx shearwater qualifying feature of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – Manx shearwater was not considered in the displacement assessment (volume 4, annex 10.2: offshore ornithology displacement assessment) as the species is not considered sensitive to displacement impacts. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from presence of vessels and infrastructure for Manx shearwater qualifying features of this SPA.
- c. **Collision risk** – Collision risk assessments conducted for Manx shearwater showed that associated mortalities were estimated to be zero (volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk assessment). On this basis, it is considered that there is no potential for LSE in relation to collision risk for Manx shearwater qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (57km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, collision risk and displacement assessments have concluded very low numbers of Manx shearwater will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the Manx shearwater qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. However, this SPA (which is located 57km from the Morgan Array Area) has been screened in on a precautionary basis for the construction phase due to its proximity. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (57km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** –Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to changes in prey availability impacts in-combination during the construction phase.

**Table 1.38: LSE matrix for marine ornithological features of the Skomer, Skokholm and the Seas off Pembrokeshire SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Seabird assemblage	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Temporary habitat loss/disturbance and increased SSC due to the Morgan Generation Assets is unlikely to have effects on SPA seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for the seabird assemblage qualifying feature of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – The combined impact of displacement and collision risk (collision risk individually is set out below) apportioned to this SPA is predicted to result in 0.2 birds subject to mortality, equating to a 0.047% increase in baseline mortality for the kittiwake population, which comprises an element of the seabird assemblage. The Skomer, Skokholm and the Seas off Pembrokeshire SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) for the other species constituting the seabird assemblage (razorbill and guillemot) due to the distance between the Morgan Generation Assets and this SPA (252km). However, all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant SPA populations (see other SPAs below). Therefore, mortalities apportioned to this SPA are likely to be much lower than those presented above. The value for kittiwake is well below 1% of the baseline mortality for the SPA population, the magnitude of the impact is too low for there to be any risk of LSE (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the seabird assemblage qualifying features of this SPA for the Morgan Generation Assets alone.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above for seabird assemblage qualifying feature and for the combined impact of displacement and collision risk apportioned to this SPA on kittiwake. Guillemot and razorbill are not considered to be vulnerable to collision risk. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the seabird assemblage qualifying features of this SPA the Morgan Generation Assets alone.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (252km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition, collision risk and displacement assessments have concluded low numbers of the assemblage species will be affected by these impacts, effects relating to barrier to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying feature of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur during the construction phase as a result of changes in prey availability to birds populations the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. a EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (252km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

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- g. In-combination effects** – As noted above SPA mortality numbers for all qualifying features of this SPA are expected to be well below 0.5% of the baseline mortality for these populations and too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.39: LSE matrix for marine ornithological features of the Morecambe Bay and Duddon Estuary SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Lesser black-backed gull <i>Larus fuscus</i>	*a	*a	*a	*b	*b	*b		*c			*d		✓e	*e	*e	*f	*f	*f	✓g	*g	*g
Herring gull <i>Larus argentatus</i>	*a	*a	*a	*b	*b	*b		*c			*d		✓e	*e	*e	*f	*f	*f	✓g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Temporary habitat loss/disturbance and increased SSC due to the Morgan Generation Assets is unlikely to have effects on SPA seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Densities of lesser black-backed gull and herring gull recorded in the Morgan Generation Assets aerial surveys were also very low with a peak density of 0.03 birds/km<sup>2</sup> recorded in September for lesser black-backed gull. For herring gull peak densities of 0.28 birds/km<sup>2</sup> were recorded in January. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for the herring gull and lesser black-backed gull qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – Lesser black-backed gull and herring gull are considered to be relatively insensitive to disturbance and displacement effects and were not considered in displacement assessments for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology EWG. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from airborne sound and presence of vessels and infrastructure for the lesser black-backed gull and herring gull qualifying feature of this SPA.
- c. **Collision risk** – The Apportioning Assessment undertaken for the Morgan Generation Assets (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) estimated that the maximum mortality numbers associated with collisions for lesser black-backed gull were 0 adult birds per annum, with a corresponding increase in annual baseline mortality of up to 0%. For herring gull the annual number of expected collisions was 0.2 adult birds, with a corresponding increase in annual baseline mortality of up to 0.134% which is well below the broad 1% or 0.5% thresholds and therefore inconsequential in the context of the natural variability in baseline mortalities associated with this SPA. On this basis, it is considered that there is no potential for LSE in relation to collision risk for lesser black-backed gull and herring gull qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (31km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded very low numbers of herring gull will be affected by these impacts, effects relating to barrier to movement are considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for herring gull features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. This SPA (which is located 31km from the Morgan Array Area) has been screened in on a precautionary basis for the construction phase. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE.



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Furthermore, considering the large distance to the SPA (30km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. In-combination effects** - Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to changes in prey availability impacts in-combination during the construction phase.

**Table 1.40: LSE matrix for the Ribble and Alt Estuaries SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Lesser black-backed gull <i>Larus fuscus</i>	*a	*a	*a	*b	*b	*b		*c			*d		✓e	*e	*e	*f	*f	*f	✓g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Temporary habitat loss/disturbance and increased SSC due to the Morgan Generation Assets is unlikely to have effects on SPA seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Densities of lesser black-backed gull recorded in the Morgan Generation Assets aerial surveys were also very low with a peak density of 0.03 birds/km<sup>2</sup> recorded in September. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for the qualifying feature of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – Lesser black-backed gull was not considered in the displacement assessment (volume 4, annex 10.2: offshore ornithology displacement assessment) as the species is not considered sensitive to displacement impacts. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement from presence of vessels and infrastructure for Manx shearwater qualifying features of this SPA.
- c. **Collision risk** – The Apportioning Assessment undertaken for the Morgan Generation Assets (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) estimated that the maximum mortality numbers associated with collisions for lesser black-backed gull were 0 adult birds per annum, with a corresponding increase in annual baseline mortality of up to 0% which is well below the broad 1% or 0.5% thresholds and therefore inconsequential in the context of the natural variability in baseline mortalities associated with this SPA. On this basis, it is considered that there is no potential for LSE in relation to collision risk for lesser black-backed gull qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (51km from the Morgan Array Area), and the low likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA, particularly in the context of the large foraging ranges used by seabirds. In addition, collision risk and displacement assessments have concluded very low numbers of lesser black-backed gull will be affected by these impacts, and effects relating to barriers to movement are considered to be of much lower magnitude compared with collision risk and displacement. Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for the lesser black-backed gull qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to birds populations for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. However, this SPA (which is located 51km from the Morgan Array Area) has been screened in on a precautionary basis for the construction phase due to its proximity. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (57km from the Morgan Array Area) any effects should they occur, will not directly affect the SPA. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** – Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Morgan Generation Assets, so that the potential for LSE cannot be excluded in relation to changes in prey availability impacts in-combination during the construction phase.

**Table 1.41: LSE matrix for marine ornithological features of the Lambay Island SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*c		*e	*e	*e	*f	*f	*f	*g	*g	*g
Guillemot <i>Uria aalge</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	✓g	✓g	✓g
Razorbill <i>Alca torda</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
Herring gull <i>Larus argentatus</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (130km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – For kittiwake the apportioned expected SPA mortality due to the combined effect of collision risk and displacement from the Morgan Generation Assets alone was a maximum of 1.5 adult birds per annum, equating to 0.152% increase in baseline mortality for kittiwake from this SPA. For guillemot, mortality numbers associated with displacement only were up to 31.7 birds equating to 0.647% increase in baseline mortality for this SPA. For razorbill mortality numbers for displacement only were up to 0.7 birds equating to 0.069% increase in baseline mortality for this SPA. Herring gull are considered to be relatively insensitive to disturbance and displacement effects and were not considered in displacement assessments for the Morgan Generation Assets, following guidance from SNCBs and the Offshore Ornithology Expert Working Group. All values are well below 1% of the baseline mortality for the SPA population, the magnitude of the impact is too low for there to be any risk of LSE (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement for all qualifying features of this SPA for the Morgan Generation Assets alone.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound, and presence of vessels and infrastructure above for kittiwake qualifying feature. Guillemot and razorbill are not considered to be vulnerable to collision risk. The Lambay Island SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) for herring gull due to the distance between the Morgan Generation Assets and this SPA (130km). However, all SPAs for which collision risk impacts on herring gull were apportioned were very low and well below 0.5% increase in baseline mortality rate for the relevant reference populations. On this basis, it is considered that there is no potential for LSE in relation to collision risk for all qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (130km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater

sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.

- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (130km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** – SPA mortality numbers for qualifying features of this SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5. With mortality rates of <1.5 birds apportioned to this SPA, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). The only exception is for guillemot where the mortality rate was 31.7 adult birds and while this was below the 1% of the baseline mortality threshold, this species will be brought through to the appropriate assessment on a precautionary basis. This is for in-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts during all phases.

Table 1.42: LSE matrix for marine ornithological features of the Ireland's Eye SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
Guillemot <i>Uria aalge</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	✓g	✓g	✓g
Razorbill <i>Alca torda</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (138km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – For kittiwake, apportioned expected SPA mortality due to the combined effect of collision risk and displacement from the Morgan Generation Assets alone was a maximum of 0.6 birds, equating to 0.134% increase in baseline mortality from this SPA. For guillemot, mortality numbers associated with displacement only were a maximum of 2.1 birds equating to 0.579% increase in baseline mortality for this SPA. For razorbill mortality numbers for displacement only were a maximum of 0.1 birds equating to 0.062% increase in baseline mortality for this SPA. All values are well below 1% of the baseline mortality for this SPA population, the magnitude of the impact is too low for there to be any risk of LSE (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement for all qualifying features of this SPA for the Morgan Generation Assets.
- Collision risk** – See justification for disturbance and displacement from airborne sound, and presence of vessels and infrastructure above for the kittiwake qualifying feature. Guillemot and razorbill are not considered to be vulnerable to collision risk. On this basis, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (138km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (138km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for qualifying features of this SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5. With mortality rates of <1.5 birds apportioned to this SPA, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). The only exception is for guillemot where the mortality rate was 2.1 adult birds and while this was below the 1% of the baseline mortality threshold, this species will be brought through to the appropriate assessment on a precautionary basis. This is for in-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts during all phases.

**Table 1.43: LSE matrix for marine ornithological features of the Howth Head Coast SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (139km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup>, recorded in December. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for kittiwake qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – For kittiwake the apportioned expected SPA mortality due to the combined effect of collision risk and displacement from the Morgan Generation Assets alone was a maximum of 1.2 birds, equating to 0.132% increase in baseline mortality for kittiwake of this SPA. This is well below 0.5% of the baseline mortality for the SPA, the magnitude of the impact is too low for there to be any risk of LSE (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). On this basis, it is considered that there is no potential for LSE in relation to collision risk for kittiwake qualifying features of this SPA.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound, and presence of vessels and infrastructure above for the kittiwake qualifying feature. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the kittiwake qualifying feature of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (139km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment of the PEIR). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (139km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for qualifying features of this SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5. With mortality rates of <2 bird apportioned to this SPA, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).



**Table 1.44: LSE matrix for marine ornithological features of the Wicklow Head Coast SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (165km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup>, recorded in December. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for kittiwake qualifying features of this SPA.
- Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – For kittiwake, the apportioned expected SPA mortality due to the combined effect of collision risk and displacement from the Morgan Generation Assets alone was up to 0.2 birds, equating to 0.096% increase in baseline mortality. This value is well below 0.5% of the baseline mortality of the SPA population, the magnitude of the impact is too low for there to be any risk of LSE (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). On this basis, it is considered that there is no potential for LSE in relation to collision risk for kittiwake qualifying features of this SPA.
- Collision risk** – See justification for disturbance and displacement from airborne sound, and presence of vessels and infrastructure above for the kittiwake qualifying feature. On this basis, it is considered that there is no potential for LSE in relation to collision risk for kittiwake qualifying features of this SPA.
- Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (165km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition, collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (165km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for qualifying features of this SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5. With mortality rates of <2 bird apportioned to this SPA, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.45: LSE matrix for marine ornithological features of the Ailsa Craig SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Gannet <i>Morus bassanus</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	✓g	✓g	✓g
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*e	*e	*e	*f	*f	*f	*g	*g	*g
Seabird assemblage	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (141km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – For gannet, the apportioned expected SPA mortality due to the combined effect of collision risk and displacement from the Morgan Generation Assets was a maximum of 5.6 birds, equating to 0.104% increase in baseline mortality for this SPA. For kittiwake the expected SPA mortality was 0.2 birds which equates to 0.130% increase in baseline mortality for this SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement for all qualifying features of this SPA.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound, and presence of vessels and infrastructure above for kittiwake and gannet qualifying features. On this basis, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (141km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. a EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (141km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for qualifying features of this SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5. With mortality rates of <1 birds apportioned to this SPA, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). The only exception is for gannet where the mortality rate was 5.6 adult birds and while this was below the 1% of the baseline mortality threshold, this species will be brought through to the appropriate assessment on a precautionary basis. This is for in-combination collision risk and disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts combined during all phases.

**Table 1.46: LSE matrix for marine ornithological features of the Rathlin Island SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (186km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for the kittiwake qualifying feature of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – For kittiwake, the apportioned SPA mortality due to the combined effect of collision risk and displacement effects from the Morgan Generation Assets alone was a maximum of 2.8 birds which equates to 0.069% increase in baseline mortality for this SPA (volume 4, annex 10.5: Offshore ornithology apportioning assessment). This value is well below 0.5% of the baseline mortality rate for the relevant SPA population, the magnitude of the impact is too low for there to be any risk of LSE (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for qualifying features of this SPA.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above for kittiwake qualifying feature. On this basis, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (185km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (186km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for qualifying features of this SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5. With mortality rates of 2.8 birds apportioned to this SPA, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.47: LSE matrix for marine ornithological features of the Grassholm SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D				C	O&M	D
Gannet <i>Morus bassanus</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	✓g	✓g	✓g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (260km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for the gannet qualifying feature of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – For gannet, the apportioned SPA mortality due to the combined effect of collision risk and displacement effects from the Morgan Generation Assets alone was a maximum of 2 birds which equates to 0.034% increase in baseline mortality for gannet from this SPA (volume 4, annex 10.5: Offshore ornithology apportioning assessment). This represented well below 0.5% of the baseline mortality rate for the relevant SPA population, the magnitude of the impact is too low for there to be any risk of LSE (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for qualifying features of this SPA for the Morgan Generation Assets alone.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above for gannet qualifying feature. On this basis, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (260km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (260km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.
- g. **In-combination effects** – SPA mortality numbers for the gannet qualifying feature of this SPA were well below 0.5% of the baseline mortality as outlined in section 1.4.5. However, due to the higher mortality rate of 2 birds associated with the combined effect of collision risk and displacement, this species will be brought through to the appropriate assessment on a

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precautionary basis. This is for in-combination collision risk and disturbance and displacement from airborne sound and presence of vessels and infrastructure impacts combined during all phases.



**Table 1.48: LSE matrix for marine ornithological features of the Saltee Islands SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Gannet <i>Morus bassanus</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (261km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for all qualifying features of this SPA.
- Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – For gannet, the apportioned SPA mortality due to the combined effect of collision risk and displacement from the Morgan Generation Assets alone was a maximum of 0.2 birds which equates to 0.030% increase in baseline mortality. For kittiwake, the apportioned SPA mortality due to the combined effect of collision risk and displacement from the Morgan Generation Assets alone was a maximum of 0.1 birds which equates to 0.031% increase in baseline mortality for this SPA (volume 4, annex 10.5: offshore ornithology apportioning assessment). These values are well below 0.5% of the baseline mortality for the SPA population, the magnitude of the impact is too low for there to be any risk of LSE (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for qualifying features of this SPA.
- Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure for kittiwake and gannet qualifying features. On this basis, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (261km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (261km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for qualifying features of this SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5. With mortality rates of <1 bird apportioned to this SPA, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.49: LSE matrix for marine ornithological features of the North Colonsay and Western Cliffs SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (257km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup> in December. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – For kittiwake, the apportioned SPA mortality due to the combined effect of collision risk and displacement effects from the Morgan Generation Assets alone was a maximum of 0.4 birds which equates to 0.045% increase in baseline mortality for this SPA (volume 4, annex 10.5: Offshore ornithology apportioning assessment). This value is well below 0.5% of the baseline mortality rate for the relevant SPA population, the magnitude of the impact is too low for there to be any risk of LSE (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA). On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for qualifying features of this SPA.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above for kittiwake qualifying feature. On this basis, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (257km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** – There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (130km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for qualifying features of this SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5. With mortality rates of <1 bird apportioned to this SPA, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.50: LSE matrix for marine ornithological features of the Helvick Head to Ballyquin SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (311km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup>, recorded in December. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for kittiwake qualifying features of this SPA.
- a. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – Helvick Head to Ballyquin SPA was not considered within the Apportioning Assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment) due to the distance between the Morgan Generation Assets and this SPA (311km). However as outlined in previous tables, all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant SPA populations (e.g. for Saltee Islands SPA adult mortality numbers were estimated to be 0.1 birds equating to 0.031% increase in baseline mortality for kittiwake). These SPAs assessed are located closer to the Morgan Generation Assets and therefore collision risk and displacement associated with these SPAs is considered to be higher than for the Helvick Head to Ballyquin SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for qualifying features of this SPA.
- b. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above. On this basis, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- c. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (261km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- d. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- e. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (31km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- f. **In-combination effects** – SPA mortality numbers for the kittiwake qualifying feature of the SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.51: LSE matrix for marine ornithological features of the Rum SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (340km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup>, recorded in December. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for kittiwake qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – The Rum SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment) due to the distance between the Morgan Generation Assets and this SPA (340km). However, as outlined in previous tables, all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant reference populations (e.g. for Alisa Craig SPA adult mortality numbers were 0.2 equating to a 0.130% increase in baseline mortality for kittiwake). These SPAs assessed are located significantly closer to the Morgan Generation Assets and therefore collision risk and displacement associated with these SPAs is considered to be higher than for the Rum SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for qualifying features of this SPA.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above. On this basis, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (340km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (340km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for the kittiwake qualifying feature of the SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).



**Table 1.52: LSE matrix for marine ornithological features of the Old Head of Kinsale SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (395km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup>, recorded in December. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for kittiwake qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – Old Head of Kinsale SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment) due to the distance between the Morgan Generation Assets and this SPA (395km). However, as outlined in previous tables, all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant SPA populations (e.g. for Saltee Islands SPA adult mortality numbers were estimated to be 0.1 birds equating to 0.031% increase in baseline mortality for kittiwake). These SPAs assessed are located significantly closer to the Morgan Generation Assets and therefore collision risk and displacement associated with these SPAs is considered to be higher than for the Old Head of Kinsale SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for qualifying features of this SPA.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above. On this basis, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (395km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (395km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for the kittiwake qualifying feature of the SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.53: LSE matrix for marine ornithological features of the Canna and Sanday SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (359km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup>, recorded in December. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for kittiwake qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – Canna and Sanday SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) due to the distance between the Morgan Offshore Wind Project and this SPA (359km). However, as outlined in previous tables, all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant reference populations (e.g. for Alisa Craig SPA adult mortality numbers were 0.2 equating to a 0.130% increase in baseline mortality for kittiwake). These SPAs assessed are located significantly closer to the Morgan Generation Assets and therefore collision risk and displacement associated with these SPAs is considered to be higher than for the Canna and Sanday SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for the kittiwake qualifying feature of this SPA.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the kittiwake qualifying feature of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (359km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (359km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for the kittiwake qualifying feature of the SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.54: LSE matrix for marine ornithological features of the Shiant Isles SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (441km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup>, recorded in December. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for the kittiwake qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – The Shiant Isles SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) due to the distance between the Morgan Generation Assets and this SPA (441km). However, as outlined in previous tables, all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant reference populations (e.g. for Alisa Craig SPA adult mortality numbers were 0.2 equating to a 0.130% increase in baseline mortality for kittiwake). These SPAs assessed are located significantly closer to the Morgan Generation Assets and therefore collision risk and displacement associated with these SPAs is considered to be higher than for the Shiant Isles SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for the kittiwake qualifying features of this SPA for the Morgan Generation Assets alone.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the kittiwake qualifying feature of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (441km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (441km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination** - SPA mortality numbers for the kittiwake qualifying feature of the SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.55: LSE matrix for marine ornithological features of the Handa SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (479km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup>, recorded in December. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for the kittiwake qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – The Handa SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) due to the distance between the Morgan Generation Assets and this SPA (479km). However, as outlined in previous tables, all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant reference populations (e.g. for Alisa Craig SPA adult mortality numbers were 0.2 equating to a 0.130% increase in baseline mortality for kittiwake). These SPAs assessed are located significantly closer to the Morgan Generation Assets and therefore collision risk and displacement associated with these SPAs is considered to be higher than for the Handa SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for the kittiwake qualifying features of this SPA for the Morgan Generation Assets alone.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the kittiwake qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (479km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (479km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for the kittiwake qualifying feature of the SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).



**Table 1.56: LSE matrix for marine ornithological features of the St Kilda SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g
Gannet <i>Morus bassanus</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green.

- Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (490km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake and gannet recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup> in December and 0.06 birds/km<sup>2</sup> in September, respectively. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for kittiwake and gannet qualifying features of this SPA.
- Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – The St Kilda SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) due to the distance between the Morgan Generation Assets and this SPA (490km). However, as outlined in previous tables all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant reference populations (e.g. for Alisa Craig SPA adult mortality numbers were 0.2 equating to a 0.130% increase in baseline mortality for kittiwake and 5.6 equating to a 0.104% increase in baseline mortality for gannet). These SPAs assessed are located significantly closer to the Morgan Generation Assets and therefore collision risk and displacement associated with these SPAs is considered to be higher than for the St Kilda SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for qualifying features of this SPA for the Morgan Generation Assets alone.
- Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above. On this basis, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (490km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE.

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Furthermore, considering the large distance to the SPA (490km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. In-combination effects** – SPA mortality numbers for the kittiwake qualifying feature of the SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.57: LSE matrix for marine ornithological features of the Cape Wrath SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (501km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup>, recorded in December. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for the kittiwake qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – The Cape Wrath SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) due to the distance between the Morgan Generation Assets and this SPA (501km). However, as outlined in previous tables, all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant reference populations (e.g. for Alisa Craig SPA adult mortality numbers were 0.2 equating to a 0.130% increase in baseline mortality for kittiwake). These SPAs assessed are located significantly closer to the Morgan Generation Assets and therefore collision risk and displacement associated with these SPAs is considered to be higher than for the Cape Wrath SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for the kittiwake qualifying features of this SPA for the Morgan Generation Assets alone.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the kittiwake qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (501km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (501km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for the kittiwake qualifying feature of the SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.58: LSE matrix for marine ornithological features of the Flannan Isles SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a \* symbol is included and highlighted green.

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (510km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. Densities of kittiwake recorded in the Morgan Generation Assets aerial surveys were also low with a peak density of 2.56 birds/km<sup>2</sup>, recorded in December. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for the kittiwake qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – The Flannan Isles SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) due to the distance between the Morgan Generation Assets and this SPA (501km). However, as outlined in previous tables, all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant reference populations (e.g. for Alisa Craig SPA adult mortality numbers were 0.2 equating to a 0.130% increase in baseline mortality for kittiwake). These SPAs assessed are located significantly closer to the Morgan Generation Assets and therefore collision risk and displacement associated with these SPAs is considered to be higher than for the Flannan Isles SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for the kittiwake qualifying features of this SPA for the Morgan Generation Assets alone.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the kittiwake qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (510km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (510km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for the kittiwake qualifying feature of the SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

**Table 1.59: LSE matrix for marine ornithological features of the Sule Skerry and Sule Stack SPA.**

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Gannet <i>Morus bassanus</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g
Guillemot <i>Uria aalge</i> (non-breeding)	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green

- a. **Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (547km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for gannet qualifying features of this SPA.
- b. **Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – The Sule Skerry and Sule Stack SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) due to the distance between the Morgan Generation Assets and this SPA (547km). However, as outlined in previous tables, all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant reference populations (e.g. for Alisa Craig SPA adult mortality numbers were 5.6 equating to a 0.104% increase in baseline mortality for gannet). These SPAs assessed are located significantly closer to the Morgan Generation Assets and therefore collision risk and displacement associated with these SPAs is considered to be higher than for the Sule Skerry and Sule Stack SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for the kittiwake qualifying features of this SPA for the Morgan Generation Assets alone.
- c. **Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above. On this basis, it is considered that there is no potential for LSE in relation to collision risk for the gannet qualifying features of this SPA.
- d. **Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (547km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- e. **Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- f. **Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE.

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Furthermore, considering the large distance to the SPA (547km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. In-combination effects** – SPA mortality numbers for the kittiwake qualifying feature of the SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).



Table 1.60: LSE matrix for marine ornithological features of the North Rona and Sula Sgeir SPA.

European site qualifying feature	Temporary habitat loss/disturbance and increased SSC			Disturbance and displacement from airborne sound and presence of vessels and infrastructure			Collision risk			Barrier to movement			Changes in prey availability underwater sound			Accidental pollution			In-combination effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake <i>Rissa tridactyla</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g
Gannet <i>Morus bassanus</i>	*a	*a	*a	*b	*b	*b		*c			*d		*d	*d	*d	*d	*d	*d	*g	*g	*g

The notes below explain the conclusion of whether or not LSE can be ruled out for a given impact. The impacts are categorised by letter which correspond to a letter within the table. Within the table where a LSE cannot be ruled out for a given impact a ✓ symbol is included and the box is highlighted in blue, where a LSE has been ruled out a ✗ symbol is included and highlighted green

- Temporary habitat loss/disturbance and increased SSC** – Effects resulting from temporary habitat loss/disturbance and increased SSC are considered to be low for this SPA due to the distance from the Morgan Generation Assets (566km from the Morgan Array Area). The likelihood of the Morgan Generation Assets resulting in effects for qualifying features of this SPA are low, due to the temporary and reversible nature of the relatively limited spatial extent of impacts particularly in the context of the large foraging ranges used by seabirds and the extent of marine habitats and prey available for foraging opportunities. On this basis, it is considered that there is no potential for LSE in relation to temporary habitat loss/disturbance and increased SSC for qualifying features of this SPA.
- Disturbance and displacement from airborne sound and presence of vessels and infrastructure** – The North Rona and Sula Sgeir SPA was not considered within the apportioning assessment (volume 4, annex 10.5: offshore ornithology apportioning assessment of the PEIR) due to the distance between the Morgan Generation Assets and this SPA (566km). However, as outlined in previous tables all SPAs for which collision risk and displacement impacts were apportioned, each species represented well below 0.5% of the baseline mortality rate for the relevant reference populations (e.g. for Alisa Craig SPA adult mortality numbers were 0.2 equating to a 0.130% increase in baseline mortality for kittiwake and 5.6 equating to a 0.104% increase in baseline mortality for gannet). These SPAs assessed are located significantly closer to the Morgan Generation Assets and therefore collision risk and displacement associated with these SPAs is considered to be higher than for the North Rona and Sula Sgeir SPA. On this basis, it is considered that there is no potential for LSE in relation to disturbance and displacement effects for qualifying features of this SPA for the Morgan Generation Assets alone.
- Collision risk** – See justification for disturbance and displacement from airborne sound and presence of vessels and infrastructure above. On this basis, it is considered that there is no potential for LSE in relation to collision risk for qualifying features of this SPA.
- Barrier to movement** – Effects resulting from barriers to movement are considered to be low for this SPA due to the distance from the Morgan Generation Assets (566km from the Morgan Array Area), the likelihood of the Morgan Array Area resulting in barrier effects for qualifying features of this SPA are low, particularly in the context of the large foraging ranges used by seabirds. In addition collision risk and displacement assessments have concluded low numbers of these species will be affected by these impacts, effects relating to barrier to movement are also considered to be of much lower magnitude compared with collision risk and displacement (see section 1.3.5, volume 4, annex 10.3: offshore ornithology non-migratory seabird collision risk modelling and volume 4, annex 10.2: offshore ornithology displacement assessment). Therefore, it is considered that there is no potential for LSE in relation to barrier to movement for all qualifying features of this SPA.
- Changes in prey availability** – As set out in paragraph 1.4.5.7, no LSEs are anticipated to occur as a result of changes in prey availability to bird populations during the construction phase for the majority of the SPA sites considered as effects will be temporary, reversible and relatively limited in extent when considering the large foraging ranges for these species. The potential for any adverse effects on prey are significantly reduced during the operations and maintenance phase and decommissioning phase compared to the construction phase as underwater sound will be substantially lower (i.e. no piling or similarly disturbing operations will be required). As such, it is concluded that there is no potential for LSE from changes in prey availability during the construction, operations and maintenance and decommissioning phases.
- Accidental Pollution** - There is a risk of pollution being accidentally released during all phases of the Morgan Generation Assets from sources including vessels/vehicles and equipment/machinery. However, pollution events are considered unlikely, and should an event occur effects will be temporary, reversible and limited in spatial extent. In addition, it is anticipated that the risk of such events occurring will be further managed by the implementation of measures set out in standard post consent plans (e.g. an EMP) including a MPCP) which will be implemented as part of the Morgan Generation Assets. While these plans are not considered in the determination of no LSE, they will nevertheless reduce the potential for LSE. Furthermore, considering the large distance to the SPA (566km from the Morgan Array Area) any effects should they occur, will not directly affect the SAC. On this basis, there is considered to be no potential for LSE on qualifying interest features of the SPA as a result of accidental pollution.

- g. **In-combination effects** – SPA mortality numbers for the kittiwake qualifying feature of the SPA are well below 0.5% of the baseline mortality as outlined in section 1.4.5, it can be concluded that the magnitude of the impact is too low for there to be any risk of LSE either alone or in-combination with other plans/projects (i.e. the effect will be inconsequential in the context of the natural variability in baseline mortalities associated with this SPA).

## 1.5 Approach to the in-combination assessment

- 1.5.1.1 The Habitats Regulations require the consideration of the potential effects of a project on European sites both alone and in-combination with other plans or projects.
- 1.5.1.2 The in-combination assessment will consider all other relevant plans, projects and activities where information to inform the assessment is publicly available three months prior to the Morgan Generation Assets application.
- 1.5.1.3 For the Morgan Generation Assets in-combination assessment, a tiered approach has been adopted. This approach provides a framework for placing relative weight on the potential for each project/plan to be included in the in-combination assessment to ultimately be realised, based upon the project/plan's current stage of maturity and certainty in the project's parameters. The allocation of each project, plan and activity into tiers is not affected by the screening process but is merely a categorisation applied to all projects, plans and activities that have been screened in for assessment.
- 1.5.1.4 The tiered approach uses the following categorisations:
- Tier 1
    - Under construction
    - Permitted application
    - Submitted application
    - Those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an on-going impact
  - Tier 2
    - Scoping report has been submitted and is in the public domain
  - Tier 3
    - Scoping report has not been submitted and is not in the public domain
    - Identified in a relevant development plan
    - Identified in other plans and programmes.
- 1.5.1.5 An overview of the projects or activities which will be considered for in-combination with the Morgan Generation Assets include (but are not limited to):
- Other offshore wind farms and associated cabling and infrastructure
  - Oil and gas infrastructure/development (cables and pipelines)
  - Other forms of cabling (i.e. Telecommunications and interlinks)
  - Beach replenishment schemes
  - Navigation and shipping
  - Aggregate extraction and disposal of dredging spoil.

## 1.6 Summary of LSE

- 1.6.1.1 Table 1.61 provides a summary of the European sites, qualifying interest features and potential impacts for which a potential for a LSE has been identified as a result of the Morgan Generation Assets alone and/or in combination with other plans or projects. The table excludes all features which have been screened out as no potential for LSE has been identified. These sites and features will be taken forward for consideration in the ISAA.
- 1.6.1.2 In total, 43 SACs are being taken forward for consideration in the ISAA. No European sites were considered for LSE with Annex I habitats (offshore) listed as designated features.
- 1.6.1.3 Nine SACs were considered for Annex II diadromous fish species in section 1.4.3. All nine of these sites were progressed to stage two of the HRA with respect to:
- Underwater sound
  - EMF
  - In-combination effects.
- 1.6.1.4 With respect to marine mammals, the assessment of LSE undertaken in section 1.4.4, considered 33 European sites (including 16 SACs in the UK and Ireland 17 French sites). Of these, the potential for LSE could not be discounted with respect to the following impacts for all sites considered:
- Underwater sound from piling
  - Underwater sound from clearance of UXO
  - Underwater sound from pre-construction site surveys
  - Underwater sound from vessels and other vessel activities
  - Changes in prey availability (limited to the construction phase for North Anglesey Marine/Gogledd Môn Forol SAC only)
  - In-combination effects.
- 1.6.1.5 In relation to the SPAs (and associated Ramsar sites included on the basis of their ornithological features), the assessment of LSE undertaken in section 1.4.5 above, resulted in the eight SPAs listed in Table 1.61 being taken forward for consideration in the ISAA, these include marine SPAs, and breeding seabird colony SPAs. The following impacts will be considered within the ISAA and are outlined in Table 1.61:
- Changes in prey availability (limited to construction phase for Liverpool Bay SPA, the Irish Sea Front SPA, the Ribble Alt Estuaries SPA and the Morecambe Bay and Duddon Estuary SPA only)
  - In-combination effects
    - changes in prey availability:
      - all qualifying features (Liverpool Bay SPA, the Irish Sea Front SPA, the Ribble and Alt Estuaries SPA and the Morecambe Bay and Duddon Estuary SPA)
    - disturbance and displacement:

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- guillemot qualifying feature only (Lambay Island SPA and Ireland's Eye SPA)
- gannet qualifying feature only (Grassholm SPA and Ailsa Craig SPA)
- collision risk (combined with disturbance and displacement):
  - gannet qualifying feature only (Grassholm SPA and Ailsa Craig SPA)

Table 1.61: Summary of European Sites and relevant qualifying features for which potential LSEs have been identified and screened in for further assessment in the ISAA.

ID	European Site	Relevant qualifying features	Project phase	Impact		
1	Dee Estuary/Aber Dyfrdwy SAC	Sea lamprey <i>Petromyzon marinus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Release of sediment bound contaminants (Morgan Offshore Cable Corridor only)</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>Increase in SSC and sediment deposition (Morgan Offshore Cable Corridor only)</li> <li>EMF</li> <li>In-combination effects</li> </ul>		
		River lamprey <i>Lampetra fluviatilis</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Increase in SSC and sediment deposition (Morgan Offshore Cable Corridor only)</li> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>Increase in SSC and sediment deposition (Morgan Offshore Cable Corridor only)</li> <li>EMF</li> <li>In-combination effects</li> </ul>		
2	River Dee and Bala Lake/Afon Dyfrydwy a Llyn Tegid SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		
		Sea lamprey <i>Petromyzon marinus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		
		River lamprey <i>Lampetra fluviatilis</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		
		3	River Ehen SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>
					Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>
Freshwater pearl mussel <i>Margaritifera margaritifera</i>	Construction/decommissioning			<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
	Operations and maintenance			<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		

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ID	European Site	Relevant qualifying features	Project phase	Impact		
4	River Eden SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		
		Sea lamprey <i>Petromyzon marinus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		
		River lamprey <i>Lampetra fluviatilis</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		
5	River Derwent and Bassenthwaite SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		
		Sea lamprey <i>Petromyzon marinus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		
		River lamprey <i>Lampetra fluviatilis</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		
6	Solway Firth SAC	Sea lamprey <i>Petromyzon marinus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		
		River lamprey <i>Lampetra fluviatilis</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>		
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>		
		7	River Kent SAC	Freshwater pearl mussel <i>Margaritifera margaritifera</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>
					Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>

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ID	European Site	Relevant qualifying features	Project phase	Impact
8	River Bladnoch SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>
9	Afon Gwyrfai a Llyn Cwellyn SAC	Atlantic salmon <i>Salmo salar</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>EMF</li> <li>In-combination effects</li> </ul>
10	North Anglesey Marine/Gogledd Môn Forol SAC	Harbour Porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>Changes in prey availability (construction only)</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
11	North Channel SAC	Harbour Porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>Changes in prey availability (construction only)</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
12	Pen Llŷn a'r Sarnau/Lleyn Peninsula and the Sarnau SAC	Bottlenose dolphin <i>Tursiops truncatus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
		Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>

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ID	European Site	Relevant qualifying features	Project phase	Impact
13	West Wales Marine/Gorllewin Cymru Forol SAC	Harbour Porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
14	Cardigan Bay/Bae Ceredigion SAC	Bottlenose Dolphin <i>Tursiops truncatus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
		Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
15	Pembrokeshire Marine/Sir Benfro Forol SAC	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
16	Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	Harbour Porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>



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ID	European Site	Relevant qualifying features	Project phase	Impact
17	Isles of Scilly Complex SAC	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
18	Lundy SAC	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
19	The Maidens SAC	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
20	Strangford Lough SAC	Harbour seal <i>Phoca vitulina</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
21	Murlough SAC	Harbour seal <i>Phoca vitulina</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>

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ID	European Site	Relevant qualifying features	Project phase	Impact
22	Rockabill to Dalkey Island SAC	Harbour Porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
23	Roaringwater Bay and Islands SAC	Harbour Porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
24	Blasket Islands SAC	Harbour Porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
25	Saltee Islands SAC	Grey seal <i>Halichoerus grypus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
26-43	17 French Sites	Harbour Porpoise <i>Phocoena phocoena</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Underwater sound from piling</li> <li>Underwater sound from clearance of UXO</li> <li>Underwater sound from pre-construction site surveys</li> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Underwater sound from vessels and other vessel activities</li> <li>In-combination effects</li> </ul>

ID	European Site	Relevant qualifying features	Project phase	Impact
<b>Seabird sites</b>				
1	Liverpool Bay/Bae Lerpwl SPA	Red-throated diver <i>Gavia stellata</i> Little gull <i>Hydrocoloeus minutus</i> Common scoter <i>Melanitta nigra</i> Little tern <i>Sternula albifrons</i> Common tern <i>Sterna hirundo</i> Waterbird assemblage	Construction/decommissioning	<ul style="list-style-type: none"> <li>Changes in prey availability (construction only)</li> <li>In-combination changes in prey availability (construction only)</li> </ul>
			Operations and maintenance	N/A
2	Irish Sea Front SPA	Manx shearwater <i>Puffinus puffinus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Changes in prey availability (construction only)</li> <li>In-combination changes in prey availability (construction only)</li> </ul>
			Operations and maintenance	N/A
4	Morecambe Bay and Duddon Estuary SPA	Lesser black-backed gull <i>Larus fuscus</i> Herring gull <i>Larus argentatus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Changes in prey availability (construction only)</li> <li>In-combination changes in prey availability (construction only)</li> </ul>
			Operations and maintenance	N/A
5	Ribble Alt Estuaries SPA	Lesser black-backed gull <i>Larus fuscus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Changes in prey availability (construction only)</li> <li>In-combination changes in prey availability (construction only)</li> </ul>
			Operations and maintenance	N/A
6	Lambay Island	Guillemot <i>Uria aalge</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only)</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only)</li> </ul>
7	Ireland's Eye SPA	Guillemot <i>Uria aalge</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only)</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only)</li> </ul>
9	Ailsa Craig SPA	Gannet <i>Morus bassanus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only)</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only)</li> <li>Collision risk (in-combination effect only)</li> </ul>
13	Grassholm SPA	Gannet <i>Morus bassanus</i>	Construction/decommissioning	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only)</li> </ul>
			Operations and maintenance	<ul style="list-style-type: none"> <li>Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only)</li> <li>Collision risk (in-combination effect only)</li> </ul>

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