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MORGAN OFFSHORE WIND PROJECT GENERATION ASSETS

Habitats Regulations Assessment Stage 2 Information to Support an Appropriate Assessment

Image of an offshore wind farm

April 2023
Final

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
Rev01	Draft	RPS	bpEnBW		10/02/23
Rev02	Author updates	RPS	bpEnBW		01/03/23
Rev03	Final	RPS	bpEnBW	bpEnBW	10/03/23

Prepared by:	Prepared for:
RPS	**Morgan Offshore Wind Ltd.**

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Glossary

Term	Meaning
Annex II Species	Animal or plant species of community interest, defined in Annex II of the Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (Habitats Directive), whose conservation requires the designation of Special Areas of Conservation (SAC).
Applicant	Morgan Offshore Wind Limited.
Appropriate Assessment	A step-wise procedure undertaken in accordance with Article 6(3) of the Habitats Directive, to determine the implications of a plan or project on a European site in view of the site's conservation objectives, where the plan or project is not directly connected with or necessary to the management of a European site but likely to have a significant effect thereon, either individually or in-combination with other plans or projects.
Competent Authority	The term derives from the Habitats Regulations and relates to the duties which the Regulations impose on public bodies and individuals. Regulation 6(1) defines competent authorities as "any Minister, government department, public or statutory undertaker, public body of any description or person holding a public office".
Conservation Objectives	In its most general sense, a conservation objective is the specification of the overall target for the species and/or habitat types for which a site is designated in order for it to contribute to maintaining or reaching favourable conservation status of the habitats and species concerned, at the national, the biogeographical or the European level.
In-combination Effects	Changes to the environment caused by a combination of present and future projects, plans or activities.
Development Consent Order (DCO)	An order made under the Planning Act 2008 granting development consent for one or more Nationally Significant Infrastructure Project (NSIP).
Ensonified	Filled with sound.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment (EIA) process for the Morgan Generation Assets.
European Commission	The executive body of the European Union responsible for proposing legislation, enforcing European law, setting objectives and priorities for action, negotiating trade agreements and managing implementing European Union policies and the budget.
European site	A Special Area of Conservation (SAC), possible SAC (pSAC), or candidate SAC, (cSAC), a Special Protection Area (SPA) or potential SPA (pSPA), a site listed as a site of community importance (SCI).
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) application for the Morgan Offshore Wind Project
Evidence Plan Expert Working Group (EWG)	Expert working groups set up with relevant stakeholders as part of the Evidence Plan process.
Habitat	The environment that a plant or animal lives in.
Habitats Directive	The Habitats Directive is the short name for European Union Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora. The Directive led to the establishing of European sites and setting out how they should be protected, it also extends to other topics such as European protected species.
Habitats Regulations	The Conservation (Natural Habitats, &c.) Regulations 1994, the Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species 2017.
Habitats Regulations Assessment	A process required by the Habitats Regulations of identifying likely significant effects of a plan or project on a European site and (where likely significant effects are predicted or cannot be discounted) carrying out an appropriate assessment to ascertain whether the plan or project will adversely affect the integrity of the European site. If adverse effects on integrity cannot be ruled out, the latter stages of the process require consideration of the derogation provisions in the Habitats Regulations.
In-combination Effects	The combined effect of the Morgen Generation Assets in-combination with the effects from a number of different projects on the same feature/receptor.
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.
Likely Significant Effect	Any effect that may reasonably be predicted as a consequence of a plan or project that may affect the conservation objectives of the features for which the European site was designated but excluding trivial or inconsequential effects. A likely effect is one that cannot be ruled out on the basis of objective information. A 'significant' effect is a test of whether a plan or project could undermine the site's conservation objectives.
Local Authority	A body empowered by law to exercise various statutory functions for a particular area of the United Kingdom. This includes County Councils and District Councils.

Term	Meaning
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.
Masking	Masking occurs when sound emissions interfere with a marine animal's ability to hear a sound of interest.
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.
Mona Offshore Wind Project	The Mona Offshore Wind Project is comprised of both the generation assets and offshore and onshore transmission assets and associated activities
Morgan Array Area	The area within which the wind turbines, foundations, inter-array cables, interconnector cables, offshore export cables and offshore substation platforms (OSPs) forming part of the Morgan Generation Assets will be located.
Morgan Offshore Wind Project	The Morgan Offshore Wind Project is comprised of both the generation assets and offshore and onshore transmission assets and associated activities.
Natura 2000 Network	A coherent European ecological network of Special Areas of Conservation and Special Protection Areas comprising sites located within European Union Member States.
Offshore Substation Platform (OSP)	The offshore substation platforms located within the Morgan Array Area will transform the electricity generated by the wind turbines to a higher voltage allowing the power to be efficiently transmitted to shore.
Oligotrophic	A deficiency of plant nutrients that is usually accompanied by an abundance of dissolved oxygen
Ramsar site	A wetland site designated to be of international importance under the Ramsar Convention. The Convention on Wetlands, known as the Ramsar Convention.
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.
Special Area of Conservation (SAC)	Special Areas of Conservation (SACs) are areas designated under the European Union (EU) Habitat's Directive to help conserve certain plant and animals species listed in the Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds).
Special Protection Area (SPA)	Special Protection Areas (SPAs) are sites classified under the EU Birds Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds.to protect rare or vulnerable birds (as listed on Annex I of the Directive), as well as regularly occurring migratory species.
Species	A group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding.
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 Planning Inspectorate	The agency responsible for operating the planning process for Nationally Significant Infrastructure Projects (NSIPs).
The Secretary Of State For Business, Energy And Industrial Strategy	The decision maker with regards to the application for development consent for the Morgan Offshore Wind Project.
Wind Turbines	The wind turbine generators, including the tower, nacelle and rotor.

Acronyms

Acronym	Description
AC	Alternating Current
ADD	Acoustic Deterrent Device
AON	Apparently Occupied Nests
AOS	Apparently Occupied Sites
BDMPS	Biologically Defined Minimum Population Scales
CAP	Conservation Advice Package
CBRA	Cable Burial Risk Assessment
Cefas	Centre for Environment Fisheries and Aquaculture Science

Acronym	Description
CJEU	The Court of Justice of the European Union
CPT	Cone Penetration Test
cSAC	Candidate Special Areas of Conservation
CSIP	Cable Specification and Installation Plan
CTV	Crew Transfer Vessel
DAERA	Department for Environment, Food and Rural Affairs
DC	Direct Current
DCO	Development Consent Order
Defra	Department for Environment Food and Rural Affairs
EC	European Commission
EDR	Effective Deterrence Range
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMF	Electromagnetic Fields
EMP	Environmental Management Plan
EnBW	Energie Baden-Württemberg AG
ESAS	European Seabirds At Sea
EU	European Union
EWG	Expert Working Group
FCS	Favourable Conservation Status
GPS	Global Positioning System
HF	High Frequency
HRA	Habitats Regulations Assessment
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IAMMWG	Inter-Agency Marine Mammal Working Group
iPCoD	Interim Population Consequences of Disturbance Model
IROPI	Imperative Reasons of Overriding Public Interest
ISAA	Information to Support an appropriate Assessment
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
MBES	Multi-Beam Echo-Sounder
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs

Acronym	Description
MLWS	Mean Low Water Springs
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MMOs	Marine Mammal Observers
MNR	Marine Nature Reserve
MPCP	Marine Pollution Contingency Plan
MU	Management Unit
NAS	Noise Abatement System
NEQ	Net Explosive Quantity
NIEA	Northern Ireland Environment Agency
NMFS	National Marine Fisheries Service
NPWS	National Parks and Wildlife Service
NRW	Natural Resources Wales
NSIP	Nationally Significant Infrastructure Project
OSP	Offshore Substation Platform
OSPAR	Oslo-Paris
PAM	Passive Acoustic Monitoring
PCW	Phocid Carnivores in Water
PEIR	Preliminary Environmental Information Report
pSAC	Possible Special Area of Conservation
pSPA	Potential Special Protection Area
PTS	Permanent Threshold Shift
RIAA	Report to Inform Appropriate Assessment
rms	Root mean square
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SBES	Single Beam Echosounder
SBP	Sub-Bottom Profiler
SCANS	Small Cetacean Abundance in the North Sea
SCI	Site of Community Importance
SD	Standard Deviation
SEL	Sound Exposure Level
SEL_{cum}	Cumulative Sound Exposure Level
SEL_{ss}	Sound Exposure Level Single Strike

Acronym	Description
SMP	Seabird Monitoring Programme
SNCB	Statutory Nature Conservation Bodies
SOV	Service Operation Vessel
SPA	Special Protection Area
SPL_{pk}	Peak Sound Pressure Levels
SSC	Suspended Sediment Concentration
SSS	Sidescan Sonar
SSSI	Site of Special Scientific Interest
TCE	The Crown Estate
TTS	Temporary Threshold Shift
TWT	The Wildlife Trusts
UHRS	Ultra High Resolution Seismic
UK	United Kingdom
UXO	Unexploded Ordnance
VHF	Very High Frequency
ZOI	Zone of Influence

Unit	Description
μPa^2s	Micro Pascal Squared Second
µT	Microtesla
nm	Nautical Mile
V/m	Volt per metre

Units

Unit	Description
%	Percentage
dB	Decibel
ha	Hectare
Hz	Hertz
kHz	Kilohertz
kJ	Kilojoule
km	Kilometres
km^2	Square kilometres
kV	Kilovolts
m	Metres
m^2	Square metres
mG	Milligaus
Ml/d	Megalitres per day
µPa	MicroPascal

1 HABITATS REGULATIONS ASSESSMENT STAGE 2 INFORMATION TO SUPPORT AN APPROPRIATE ASSESSMENT

1.1 Non-technical summary

1.1.1 Introduction

1.1.1.1 This report sets out the findings of a study to inform the second stage of the Habitats Regulations Assessment (HRA) required for the Morgan Generation Assets to ensure compliance with the Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (referred to together as the ”Habitats Regulations”).

1.1.1.2 The study set out in this report (an HRA Stage 2 Inform to Support an Appropriate Assessment (ISAA) Report) considers whether the Morgan Generation Assets could have adverse effects, either alone or in-combination with other plans or projects, on the integrity of 53 designated European sites for which the potential for Likely Significant Effects (LSE) has been previously established in the HRA Stage 1 Screening Report (Morgan Offshore Wind Ltd., 2022).

1.1.1.3 This HRA Stage 2 ISAA Report assesses the potential environmental effects resulting from the Morgan Generation Assets. An assessment of adverse effects of the Morgan Generation Assets alone and in-combination has been carried out against the conservation objectives for each relevant European site screened into the assessment. This assessment has taken account of the best available baseline information and has been undertaken in view of the measures proposed to be adopted as part of the Morgan Generation Assets to mitigate the potential for adverse effects.

1.1.1.4 The consideration of the potential for adverse effects on the integrity of European sites is made with reference to the overall ecological functions and the lasting preservation of the constitutive characteristics of the sites.

1.1.2 River Ehen SAC

1.1.2.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the River Ehen Special Area of Conservation (SAC). The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II diadromous fish that are qualifying features of this European site, and were screened into assessment include:

- Atlantic salmon
- Freshwater pearl mussel

1.1.2.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound
- Electromagnetic fields (EMF) from subsea electric cables
- In-combination effects.

1.1.2.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the River Ehen as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.3 Dee Estuary/Aber Dyfrdwy SAC

1.1.3.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Dee Estuary/Aber Dyfrdwy SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II diadromous fish that are qualifying features of this European site, and were screened into assessment include:

- Sea lamprey
- River lamprey.

1.1.3.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound
- EMF from subsea electric cables
- In-combination effects.

1.1.3.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Dee Estuary/Aber Dyfrdwy SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.4 River Derwent and Bassenthwaite Lake SAC

1.1.4.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the River Derwent and Bassenthwaite Lake SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II diadromous fish that are qualifying features of this European site, and were screened into assessment include:

- Atlantic salmon
- Sea lamprey
- River lamprey.

1.1.4.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound
- EMF from subsea electric cables
- In-combination effects.

1.1.4.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the River Derwent and Bassenthwaite Lake SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.5 River Kent SAC

1.1.5.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the River Kent SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II diadromous fish that are qualifying features of this European site, and were screened into assessment include:

- Freshwater pearl mussel.

1.1.5.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound
- EMF from subsea electric cables
- In-combination effects.

1.1.5.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the River Kent SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.6 Solway Firth SAC

1.1.6.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Solway Firth SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II diadromous fish that are qualifying features of this European site, and were screened into assessment include:

- Sea lamprey
- River lamprey.

1.1.6.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound
- EMF from subsea electric cables
- In-combination effects.

1.1.6.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Solway Firth SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.7 River Bladnoch SAC

1.1.7.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the River Bladnoch SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II diadromous fish that are qualifying features of this European site, and were screened into assessment include:

- Atlantic salmon.

1.1.7.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound
- EMF from subsea electric cables
- In-combination effects.

1.1.7.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the River Bladnoch SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

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

1.1.8.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II diadromous fish that are qualifying features of this European site, and were screened into assessment include:

- Atlantic salmon
- Sea lamprey
- River lamprey.

1.1.8.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound
- EMF from subsea electric cables
- In-combination effects.

1.1.8.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.9 Afon Gwyrfai a Llyn Cwellyn SAC

1.1.9.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Afon Gwyrfai a Llyn Cwellyn SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II diadromous fish that are qualifying features of this European site, and were screened into assessment include:

- Atlantic salmon.

1.1.9.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound
- EMF from subsea electric cables
- In-combination effects.

1.1.9.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Afon Gwyrfai a Llyn Cwellyn SAC as a**

result of the Morgan Generation Assets alone, or in combination with other plans and projects.

1.1.10 River Eden SAC

1.1.10.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the River Eden SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II diadromous fish that are qualifying features of this European site, and were screened into assessment include:

- Atlantic salmon
- Sea lamprey
- River lamprey.

1.1.10.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound
- EMF from subsea electric cables
- In-combination effects.

1.1.10.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the River Eden SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.11 North Anglesey Marine/Gogledd Môn Forol SAC

1.1.11.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the North Anglesey Marine/Gogledd Môn Forol SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.11.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of Unexploded Ordnance (UXO)
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- Changes in prey availability (construction only)
- In-combination effects.

1.1.11.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.12 North Channel SAC

1.1.12.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the North Channel SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.12.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- Changes in prey availability (construction only)
- In-combination effects.

1.1.12.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the North Channel SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.13 Strangford Lough SAC

1.1.13.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Strangford Lough SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour seal.

1.1.13.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.13.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Strangford Lough SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.14 Murlough SAC

1.1.14.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Murlough SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour seal.

1.1.14.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.14.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Murlough SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.15 Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC

1.1.15.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Bottlenose dolphin
- Grey seal.

1.1.15.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.15.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC as a result of the Morgan Generation Assets alone.**

1.1.15.4 On the basis of the preliminary assessments undertaken to date it is considered unlikely that there will be an adverse effect on the integrity of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects. It is not, however, possible to conclude this definitely at this stage (i.e. beyond reasonable scientific doubt) until further assessment work, on the population level effects, is complete. The final conclusion of potential adverse effect on integrity is, therefore, deferred to the assessments which will be presented in the HRA Stage 2 ISAA Report submitted with the application for consent.

1.1.16 West Wales Marine/Gorllewin Cymru Forol SAC

1.1.16.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the West Wales Marine/Gorllewin Cymru Forol SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.16.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.16.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.17 The Maidens SAC

1.1.17.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on The Maidens SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Grey seal.

1.1.17.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.17.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of The Maidens SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.18 Cardigan Bay/Bae Ceredigion SAC

1.1.18.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Cardigan Bay/Bae Ceredigion SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Bottlenose dolphin.

1.1.18.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.18.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of the Morgan Generation Assets alone.**

1.1.18.4 On the basis of the preliminary assessments undertaken to date it is considered unlikely that there will be an adverse effect on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects. It is not, however, possible to conclude this definitively at this stage (i.e. beyond reasonable scientific doubt) until further assessment work, on the population level effects, is complete. The final conclusion of potential adverse effect on integrity is, therefore, deferred to the assessments which will be presented in the HRA Stage 2 ISAA Report submitted with the application for consent.

1.1.19 Pembrokeshire Marine/Sir Benfro Forol SAC

1.1.19.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Pembrokeshire Marine/Sir Benfro Forol SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Grey seal.

1.1.19.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.19.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.20 Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

1.1.20.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.20.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.20.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.21 Lundy SAC

1.1.21.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Lundy SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Grey seal.

1.1.21.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.21.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Lundy SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.22 Isles of Scilly Complex SAC

1.1.22.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Isles of Scilly Complex SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Grey seal.

1.1.22.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.22.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Isles of Scilly Complex SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.23 Rockabill to Dalkey Island SAC

1.1.23.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Rockabill to Dalkey Island SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.23.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.23.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Rockabill to Dalkey Island SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.24 Saltee Islands SAC

1.1.24.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Saltee Islands SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Grey seal.

1.1.24.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.24.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Saltee Islands SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.25 Roaringwater Bay and Islands SAC

1.1.25.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Roaringwater Bay and Islands SAC. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.25.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.25.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Roaringwater Bay and Islands SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects**.

1.1.26 Blasket Islands SAC

1.1.26.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Blasket Islands SAC. The impacts of the Morgan Generation Assets have been assessed with

respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.26.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.26.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Blasket Islands SAC as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.27 Mers Celtiques - Talus du golfe de Gascogne SCI

1.1.27.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Mers Celtiques - Talus du golfe de Gascogne Site of Community Importance (SCI). The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.27.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.27.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Mers Celtiques - Talus du golfe de Gascogne SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.28 Abers - Côte des legends SCI

1.1.28.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Abers - Côte des legends SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.28.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.28.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Abers - Côte des legends SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.29 Ouessant-Molène SCI

1.1.29.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Ouessant-Molène SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.29.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.29.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Ouessant-Molène SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.30 Côte de Granit rose-Sept-Iles SCI

1.1.30.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Côte de Granit rose-Sept-Iles SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.30.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling

- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.30.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Côte de Granit rose-Sept-Iles SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects**.

1.1.31 Anse de Goulven, dunes de Keremma SCI

1.1.31.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Anse de Goulven, dunes de Keremma SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.31.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.31.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Anse de Goulven, dunes de Keremma SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.32 Tregor Goëlo SCI

1.1.32.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Tregor Goëlo SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.32.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.32.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Tregor Goëlo SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.33 Côtes de Crozon SCI

1.1.33.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Côtes de Crozon SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.33.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.33.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Côtes de Crozon SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.34 Chaussée de Sein SCI

1.1.34.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Chaussée de Sein SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.34.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.34.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Chaussée de Sein SCI as a result of the**

Morgan Generation Assets alone, or in combination with other plans and projects.

1.1.35 Cap Sizun SCI

1.1.35.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Cap Sizun SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.35.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.35.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Cap Sizun SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.36 Récifs du talus du golfe de Gascogne SCI

1.1.36.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Récifs du talus du golfe de Gascogne SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.36.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.36.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Récifs du talus du golfe de Gascogne SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.37 Anse de Vauville SCI

1.1.37.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Anse de Vauville SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.37.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.37.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Anse de Vauville SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects**.

1.1.38 Cap d'Erquy-Cap Fréhel SCI

1.1.38.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Cap d'Erquy-Cap Fréhel SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.38.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.38.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Cap d'Erquy-Cap Fréhel SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.39 Baie de Saint-Brieuc – Est SCI

1.1.39.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Baie de Saint-Brieuc – Est SCI. The impacts of the Morgan Generation Assets have been

assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.39.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.39.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Baie de Saint-Brieuc – Est SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.40 Banc et récifs de Surtainville SCI

1.1.40.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Banc et récifs de Surtainville SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.40.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.40.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Banc et récifs de Surtainville SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.41 Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.1.41.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCII. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.41.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.41.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.42 Estuaire de la Rance SCI

1.1.42.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Estuaire de la Rance SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.42.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.42.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Estuaire de la Rance SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.43 Baie du Mont Saint Michel SCI

1.1.43.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Baie du Mont Saint Michel SCI. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Annex II marine mammals that are qualifying features of this European site, and were screened into assessment include:

- Harbour porpoise.

1.1.43.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Underwater sound from piling
- Underwater sound from clearance of UXO
- Underwater sound from pre-construction site investigation surveys
- Underwater sound from vessels and other vessel activities
- In-combination effects.

1.1.43.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Baie du Mont Saint Michel SCI as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.44 Liverpool Bay/Bae Lerpwl SPA

1.1.44.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Liverpool Bay/Bae Lerpwl Special Protection Area (SPA). The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Seabird species that are qualifying features of this European site, and were screened into assessment include:

- Red-throated diver
- Little gull
- Common scoter
- Little tern
- Common tern

1.1.44.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Changes in prey availability (construction only)
- In-combination effects.

1.1.44.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Liverpool Bay/Bae Lerpwl SPA as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.** The conclusions of no risk of an adverse effect on the integrity of the Liverpool Bay/Bae Lerpwl SPA have been made with reference to the conservation objectives detailed in Natural England (2019a). Whilst it is considered that these conclusions would also be applicable to the conservation objectives detailed in the latest Conservation Advice Package (CAP) for the Liverpool Bay/Bae Lerpwl SPA (Natural England, NRW and JNCC, 2022), these will be fully reviewed and considered in the HRA Stage 2 ISAA Report submitted with the application for consent.

1.1.45 Morecambe Bay and Duddon Estuary SPA

1.1.45.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Morecambe Bay and Duddon Estuary SPA. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Seabird species that are qualifying features of this European site, and were screened into assessment include:

- Lesser black-backed gull
- Herring gull.

1.1.45.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Changes in prey availability (construction only)
- In-combination effects.

1.1.45.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Morecambe Bay and Duddon Estuary SPA as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.46 Ribble and Alt Estuaries SPA

1.1.46.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Ribble and Alt Estuaries SPA. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Seabird species that are qualifying features of this European site, and were screened into assessment include:

- Lesser black-backed gull.

1.1.46.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Changes in prey availability (construction only)
- In-combination effects.

1.1.46.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Ribble and Alt Estuaries SPA as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.47 Irish Sea Front SPA

1.1.47.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Irish Sea Front SPA. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Seabird species that are qualifying features of this European site, and were screened into assessment include:

- Manx shearwater.

1.1.47.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Changes in prey availability (construction only)

- In-combination effects.

1.1.47.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Irish Sea Front SPA as a result of the Morgan Generation Assets alone, or in combination with other plans and projects**.

1.1.48 Lambay Island SPA

1.1.48.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Lambay Island. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Seabird species that are qualifying features of this European site, and were screened into assessment include:

- Common guillemot.

1.1.48.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only).

1.1.48.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Lambay Island SPA as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.49 Ireland's Eye SPA

1.1.49.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Ireland's Eye SPA. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Seabird species that are qualifying features of this European site, and were screened into assessment include:

- Common guillemot.

1.1.49.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only).

1.1.49.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Ireland's Eye SPA as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.50 Ailsa Craig SPA

1.1.50.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Ailsa Craig SPA. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Seabird species that are qualifying features of this European site, and were screened into assessment include:

- Northern gannet.

1.1.50.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk (in-combination effect only).

1.1.50.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Ailsa Craig SPA as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.1.51 Grassholm SPA

1.1.51.1 The HRA Stage 1 Screening Report could not rule out the risk of LSE on the Grassholm SPA. The impacts of the Morgan Generation Assets have been assessed with respect to the conservation objectives of this site. Seabird species that are qualifying features of this European site, and were screened into assessment include:

- Northern gannet.

1.1.51.2 The HRA Stage 2 ISAA Report assessed the following impacts:

- Disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision risk (in-combination effect only).

1.1.51.3 Based on the evidence set out in this report the assessment concluded that the conservation objectives for the site would not be undermined and there would be **no adverse effect on the integrity of the Grassholm SPA as a result of the Morgan Generation Assets alone, or in combination with other plans and projects.**

1.2 Introduction

1.2.1 Overview

1.2.1.1 Morgan Offshore Wind Limited (the Applicant), a joint venture of bp Alternative Energy Investments Ltd. (bp) and Energie Baden-Württemberg AG (EnBW) is developing the Morgan Offshore Wind Project: Generation Assets (hereafter Morgan Generation Assets (Figure 1.2).

1.2.1.2 This HRA Stage 2 ISAA Report has been prepared for the generation assets of the Morgan Offshore Wind Project. The key components of the Morgan Generation Assets include:

- Offshore wind turbines
- Foundations (for wind turbines and Offshore Substation Platforms (OSPs))
- Scour protection and cable protection
- Inter-array cables linking the individual wind turbines to the OSPs
- OSPs
- Offshore interconnector cables.

1.2.1.3 Morgan Offshore Wind Ltd and Morecambe Offshore Windfarm Ltd are seeking a separate consent for the Morgan and Morecambe Offshore Wind Farms Transmission Assets. The consent is sought for the shared offshore export cable corridors to landfall and the shared onshore export cable corridors to onshore substation(s), and onward connection to the National Grid electricity transmission network. Therefore, a separate HRA Stage 1 Screening Report and a HRA Stage 2 ISAA Report are required for the consent of the construction, operations and maintenance and decommissioning of the Morgan and Morecambe Transmission Assets. Morgan and Morecambe Transmission Assets include the offshore infrastructure to export the electricity generated from the offshore wind turbines to an onshore National Grid substation and the onshore infrastructures. This will enable the export of electricity from both the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the National Grid entry point.

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

1.2.1.5 The consents, licences and permissions (in addition to the DCO) that will be sought by the Applicant for the Morgan Generation Assets include:

- A marine licence under the Marine and Coastal Access Act 2009, deemed under the DCO, for licensable activities in English waters (i.e. all licensable activities related to the offshore wind farm infrastructure located within the Morgan Array Area).

1.2.1.6 This HRA Stage 2 ISAA Report has been prepared to inform the statutory consultation alongside the Preliminary Environmental Information Report (PEIR).

1.2.2 Project Summary

1.2.2.1 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.

1.2.2.2 The Morgan Array Area (i.e. the area within which the offshore wind turbines will be located) is 322.2km^2 in area and is located in the east Irish Sea, 22.3km (12 nautical miles (nm)) 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).

1.2.2.3 The Morgan Generation Assets will consist of up to 107 wind turbines. The final capacity of the Morgan Generation Assets will be determined based on available technology and constrained by the design envelope presented in volume 1, chapter 3: Project description of the PEIR. The offshore infrastructure will also include up to 60km of interconnector cable and 500km of inter-array cable.

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

1.2.2.5 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 United Kingdom (UK) Government renewable energy targets. The Morgan Generation Assets will have a lifetime of 35 years.

Table 1.1: Key parameters for the Morgan Generation Assets.

Parameter	Value
Morgan Array Area (km^2)	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

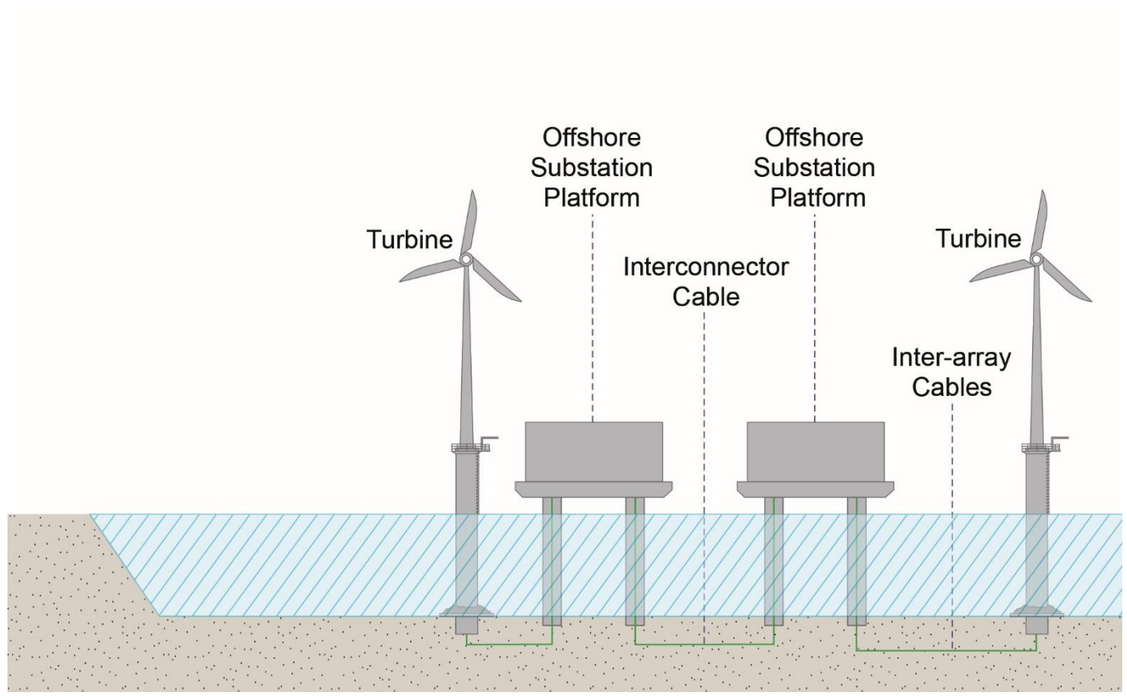


Figure 1.1: Overview of the Morgan Generation Assets infrastructure.

1.2.3 Habitats Regulations Assessment

1.2.3.1 The United Kingdom (UK) departed from the European Union (EU) on 31 December 2020 (EU Exit) and, as such, is no longer an EU Member State. The Habitats Regulations, however, continue to provide the legislative context for HRA in the UK. The 2019 (EU Exit) Regulations, including the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 ("2019 Regulations"), implemented minor changes to the HRA regime which currently have no material implication on the requirement or process for a HRA for the Morgan Generation Assets.

1.2.3.2 Under the Habitats Regulations, an Appropriate Assessment must be carried out on all plans and projects that are likely to have a significant effect on a European site. European sites include SACs, candidate SACs (cSACs), SCI, SPAs and as a matter of policy (Defra, 2021), possible SACs (pSACs) and potential SPAs (pSPAs). In the UK, the requirements of the Habitats Regulations are also extended to consider the effects on Ramsar sites (listed under the Ramsar Convention on Wetlands of International Importance). These sites in the UK now form part of the National Site Network but the term “European site” has been retained for sites protected in European Member States, England and Wales and the rest of the UK in accordance with guidance issued by the UK Government on the 2019 (EU Exit) Regulations (Defra, 2021).

1.2.3.3 The Defra (2021) guidance outlines that the HRA process can have up the three stages are outlined below, where the outcome of each successive stage determines whether a further stage in the process is required:

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 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).

1.2.3.4 Further information on HRA methods, guidance and case law is provided in section 1.3.3.

1.2.4 Purpose of the report

1.2.4.1 This document presents the HRA Stage 2 ISAA Report under Section 63 of the Conservation of Habitats and Species Regulations 2017 and Section 28 of the Conservation of Offshore Marine Habitats and Species Regulations 2017 for the Morgan Generation Assets.

1.2.4.2 This report has been prepared by RPS on behalf of the Applicant to support the HRA of the Morgan Generation Assets in the determination of the implications for European sites. The HRA Stage 2 ISAA Report builds upon the Morgan Offshore Wind Project Generation Assets: HRA Stage 1 Screening Report (hereafter referred as “HRA Stage 1 Screening Report”) (Morgan Offshore Wind Ltd, 2022) and considers the likely significant environmental effects of the Morgan Generation Assets as they relate to relevant European site integrity. This report will provide the competent authority with the information required to undertake an HRA Stage 2 Appropriate Assessment (see section 1.3 for more detail on the HRA process).

1.2.4.3 The scope of this document covers all relevant European sites and designated features where LSEs have been identified due to the potential impacts arising from the Morgan Generation Assets. This includes potential impacts of the offshore infrastructure on ‘offshore’ European sites and features (seaward of MHWS) and potential impacts of offshore infrastructure seaward of MHWS on ‘onshore’ European sites (landward of mean low water springs (Mean Low Water Springs (MLWS)).

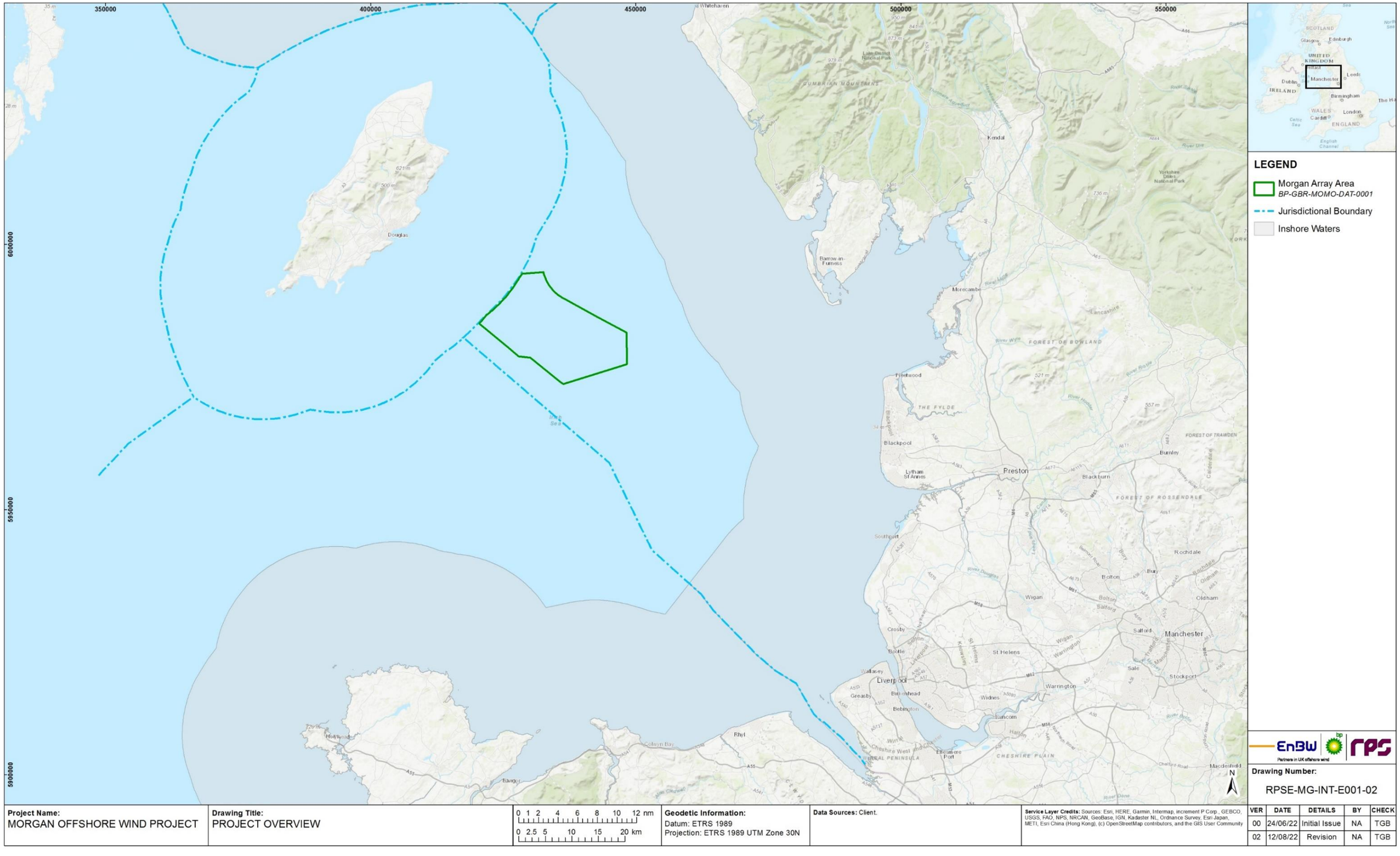


Figure 1.2: Location of the Morgan Generation Assets.

1.2.5 Progress to date

1.2.5.1 A HRA Stage 1 Screening Report for the Morgan Generation Assets has been produced to determine whether Morgan Generation Assets could result in an LSE on a European site, with reference to the conservation objectives of the site. The HRA Stage 1 Screening Report determined that, on the basis of theoretical spatial connectivity, the potential for LSEs to result from components elements of the Morgan Generation Assets could not be discounted.

1.2.5.2 The HRA Stage 1 Screening Report presents the screening exercise, the purpose of which is summarised below:

- Identification of the relevant European sites and their qualifying features which may be sensitive or vulnerable to potential impacts arising from the construction, operations and maintenance and decommissioning of the Morgan Generation Assets
- Identification of the qualifying features of relevant European sites 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 HRA process
- Identification of the qualifying features of relevant European sites which are considered likely to be at risk of significant effects so that they can be taken forward to HRA Stage 2 Appropriate Assessment
- Consideration of the supporting habitats of qualifying species of relevant European sites and identification of those which are considered likely to be at risk of significant effects so that they can be taken forward within the HRA process
- Consideration of which of the potential impacts arising from the Morgan Generation Assets, either alone or in-combination with other plans or projects, are considered likely to result in LSEs to features of European sites and which potential impacts can be eliminated from consideration in further stages of the HRA.

1.2.5.3 A summary of the HRA Stage 1 Screening Report for the Morgan Generation Assets is provided in section 1.5.

1.2.6 Structure of the report

1.2.6.1 This HRA Stage 2 ISAA Report is structured as follows:

- Section 1.1: Non-technical summary
- Section 1.2: Introduction – this section describes the Morgan Offshore Wind Project and the Morgan Generation Assets, and establishes the need for, the purpose and structure of the HRA Stage 2 ISAA Report
- Section 1.3: Habitats Regulations Assessment – this section sets out the process, principles, tests, (including those established by case law) and guidance applied to the HRA Stage 2 ISAA Report
- Section 1.4: Consultation – this section provides a summary of the consultation undertaken to date of relevance to the HRA Stage 2 ISAA Report, responses provided, and how these have been addressed
- Section 1.5: Summary of LSE screening – this section presents the European sites potentially at risk of LSE and the features and pathways for which HRA Stage 2 Appropriate Assessment is required, both alone and in-combination.

1.2.6.2 Information to support the HRA Stage 2 Appropriate Assessment is provided in:

- Section 1.6: Information to support the Appropriate Assessment, including Maximum Design Scenarios (MDS), measures adopted as part of the Morgan Generation Assets, an outline of the approach taken to baseline data, conservation objectives, and the in-combination assessment
- Section 1.7: Assessment of potential adverse effects on the integrity of European sites designated for Annex II diadromous fish species, alone and in-combination
- Section 1.8: Assessment of potential adverse effects on the integrity of European sites designated for Annex II marine mammals, alone and in-combination
- Section 1.9: Assessment of potential adverse effects on the integrity of European sites designated for offshore ornithological features, alone and in-combination
- Section 1.10: Conclusions of the assessment and the overall finding of the HRA Stage 2 ISAA Report.

1.3 Habitats Regulations Assessment

1.3.1 Legislative context

1.3.1.1 The Habitats Directive (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora, protects habitats and species of European nature conservation importance. Together with Council Directive (2009/147/EC) on the conservation of wild birds (the 'Birds Directive'), the Habitats Directive provide the EU's legal framework for the protection of wild fauna and flora and birds and establishes a network of internationally important sites, known as Natura 2000 sites or European sites, designated for their ecological status. This network of designated sites includes:

- 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.

1.3.1.2 These Directives are transposed into UK law by the Conservation of Habitats and Species Regulations 2017 (as amended) – inshore/territorial waters (onshore and out to 12nm) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended) – offshore waters (12nm to Exclusive Economic Zone (EEZ) boundary). Collectively, these are known as the Habitats Regulations.

1.3.1.3 The UK is no longer an EU Member State, but 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 2019 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[1].

1.3.1.4 The objective of the Habitats Regulations is to conserve, at a favourable conservation status (FCS), those qualifying habitats and species and supporting habitats of qualifying species listed under the Habitats Directive and 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 Directive and as such, reference is made to the annexes of the Habitats and Birds Directives in this report.

1.3.1.5 In addition to sites formally defined as European sites in the Habitats Regulations, UK Government policy (ODPM Circular 06/2005) states that Wetlands of International Importance listed and proposed under the Ramsar Convention 1971 (Ramsar sites) are afforded the same protection. As a matter of policy, the UK Government also affords sites going through the formal designation process (i.e. pSPAs, cSACs and pSACs), SCIs and potential Ramsar sites, the same level of protection.

1.3.1.6 Under the Habitats Regulations, before granting approval (i.e. planning permissions, licenses and consents) for a development likely to have a significant effect on an SAC or SPA/Ramsar site, an Appropriate Assessment must be made by the competent authority, of the proposed plan or project's potential for adverse effects on integrity of the site in view of that site's conservation objectives.

1.3.2 European sites (post EU exit)

1.3.2.1 European sites (SACs and SPAs) in the UK no longer form part of the EU's Natura 2000 ecological network. The 2019 Regulations have created a National Site Network on land and at sea, including both the inshore and offshore marine areas in the UK. The National Site Network comprises of European sites (SACs and SPAs) in the UK that already existed (i.e. were established under the Habitats or Birds Directives) on 31 December 2020 (or proposed to the European Commission (EC) before that date) and any new sites designated under the Habitats Regulations under an amended designation process.

1.3.2.2 Ramsar sites do not form part of the National Site Network. Many Ramsar sites overlap with SACs and SPAs and all Ramsar sites remain protected in the same way as SACs and SPAs.

1.3.3 The HRA process

1.3.3.1 Regulation 28 of the Conservation of Offshore Marine Habitats and Species Regulations 2017 and Regulation 63 of the Conservation of Habitats and Species Regulations 2017, require that wherever a plan or project that is not directly connected to, or necessary for, the management of a European site is likely to have a significant effect on the conservation objectives of the site (directly, indirectly, alone or in-combination with other plans or projects), an 'Appropriate Assessment' of the implications of the plan or project for that site in view of that site's conservation objectives must be undertaken by the competent authority before consent or authorisation can be given for the plan or project.

1.3.3.2 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. This HRA Stage 2 ISAA Report provides this information.

1.3.3.3 HRA is a multi-stage process which helps to determine LSE, assesses adverse impact on the integrity of a European site, and examines alternative solutions and provides justification of Imperative Reasons of Overriding Public Interest (IROPI), as required. The Defra (2021) guidance describes that the process can have up to three stages as outlined below and shown in Figure 1.3:

- 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's a risk of a LSE on a European site or if there is not enough evidence to rule out a risk (as required by Article 6(3) of the Habitats Directive). 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 (as outlined in Article 6 (4) of the Habitats Directive) 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
  - The necessary compensatory measures can be secured.

1.3.3.4 This report considers the second stage 'Appropriate Assessment in the HRA process in Figure 1.3.

1.3.3.5 The 2019 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:

[1] 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

- Maintain or restore certain habitats and species listed in the Habitats Directive to favourable conservation status
- 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.

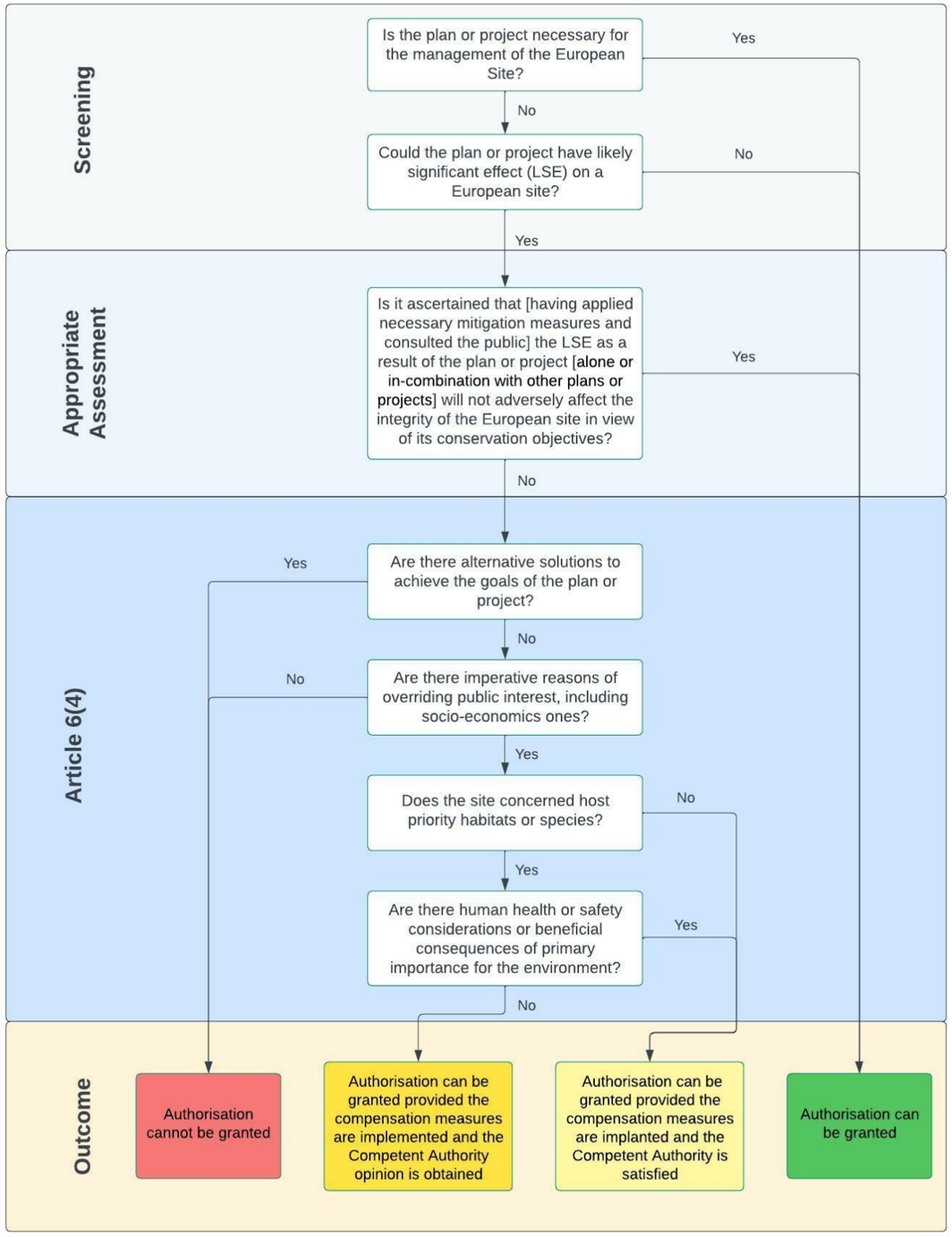


Figure 1.3: Stages in the HRA process (adapted from European Commission, 2021).

1.3.4 The Crown Estate Plan-Level HRA

1.3.4.1 The Crown Estate (TCE), in its role as competent authority, conducted a Plan-Level HRA for the Offshore Wind Leasing Round 4. The Plan-Level HRA assessed the potential impacts of the six potential offshore wind projects identified through the Offshore Wind Leasing Round 4, including the Morgan Offshore Wind Project, on the National Site Network.

1.3.4.2 The Plan-Level HRA process involved engagement and consultation with an Expert Working Group (EWG) consisting of relevant UK statutory marine planning authorities, Statutory Nature Conservation Bodies (SNCBs) and relevant non-governmental organisations.

1.3.4.3 TCE's Plan-Level HRA (TCE, 2022) concluded that the possibility of an adverse effect on site integrity as a result of the Offshore Wind Leasing Round 4could 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 for in-combination effects only. It should be noted, however, that the Morgan Offshore Wind Project was not identified as a preferred project 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 Offshore Wind Project in the Plan-Level HRA.

1.3.4.4 On the basis of these conclusions, TCE considered derogation and concluded that: a) there are no alternative solutions to deliver the Offshore Wind Leasing Round 4objectives; b) there are clear imperative reasons of overriding public interest to proceed under the government's targets for offshore wind and net-zero; and c) the Offshore Wind Leasing Round 4plan provides a robust framework for the delivery of compensatory measures. TCE therefore considered that the three derogation tests have been met and the Secretary of State has since agreed that TCE can proceed with the plan.

1.3.4.5 The Plan-Level HRA notes that TCE expects developers to undertake project-specific environmental assessments - including a detailed project-level HRA - as part of their application for development consent. This document comprises Stage 2 of the HRA, which carries out the Appropriate Assessment of the Morgan Generation Assets with respect to its potential to have an adverse effect on integrity on European sites. This HRA Stage 2 ISAA Report has taken into account the information and approach taken by the Plan Level HRA as set out below in paragraph 1.3.5.1.

1.3.5 Guidance

1.3.5.1 The HRA Stage 2 ISAA 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
- 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 (2021) 6913 final
- Joint Defra, Welsh Government, Natural England and Natural Resources Wales guidance (2021) 'Habitats 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)
- TCE Plan Level HRA (TCE, 2022)
- Feedback received from the Mona Offshore Wind Project and Morgan Generation Assets Evidence Plan Process to date (see section 1.4).

1.3.6 Case law relevant to the HRA Stage 2 ISAA Report

Consideration of mitigation measures

1.3.6.1 In case C-323/17 'People Over Wind and Sweetman v Coillte Teoranta' (April 2018) (Sweetman 2), the CJEU ruled that mitigation measures could not be taken into account at the screening stage. The approach taken in the HRA Stage 1 Screening Report for the Morgan Generation Assets complied with this judgement and no mitigation measures were considered in the HRA Stage 1 Screening Report.

Adverse effects on integrity

1.3.6.2 The European Commission's guidance on managing Natura 2000 sites (EC, 2018) states that the purpose of the Appropriate Assessment is to assess the implications of the plan or project in regards to the conservation objectives of the European site or Ramsar, this may be from the plan/project alone or in-combination with other plans or projects. The conclusions should enable the relevant competent authority to conclude whether the plan or project will adversely affect the integrity of the site concerned. The focus of the Appropriate Assessment is therefore specifically on the designated features (species and/or the habitats) of the European site.

1.3.6.3 The best scientific knowledge should always be used when undertaking an Appropriate Assessment in order to enable the competent authorities to conclude with certainty that there will be no adverse effects on the integrity of the site. The EC (2018) guidance notes that it is at the time of the decision authorising the implementation of

the project that there must be no reasonable scientific doubt remaining as to the potential for of adverse effects on the integrity of the site being assessed.

1.3.6.4 The judgment of the CJEU confirmed in its ruling in Sweetman, Ireland, Attorney General, Minister for the Environment, Heritage and Local Government v An Bord Pleanála) (C-258/11) (Sweetman 1) that 'Article 6(3) of the Habitats Directive must be interpreted as meaning that a plan or project not directly connected with or required for the management of a site will adversely affect the integrity of that site if it is liable to prevent the lasting preservation of the constitutive characteristics of the site that are connected to the presence of a priority natural habitat whose conservation was the objective justifying the designation of the site in the list of SCIs. The precautionary principle should be applied for the purposes of that appraisal'. EC (2018) advises that this interpretation would also be relevant to non-priority habitat types and to habitats of the designated species.

1.3.6.5 EC (2019) defines the 'integrity of the site' as the coherent sum of the site's ecological structure, function and ecological processes, across its whole area, which enables it to sustain the habitats, complex of habitats and/or populations of species for which the site is designated. In Sweetman 1, it was determined that the ecological structure and function of a European site would be adversely affected with regards to the site's overall ecological functions and "the lasting preservation of the constitutive characteristics of the site".

1.3.6.6 EC (2018) also states that if the competent authority considers that the relevant mitigation measures are sufficient to avert the adverse effects on site integrity identified in the Appropriate Assessment, they are then required to become an essential element of the final plan or project design or may be listed as a condition for project consent.

1.3.6.7 EC (2020) states it is the competent authority's responsibility to approve the plan or project, a decision made on the basis of the information provided by the applicant to inform the Appropriate Assessment. The decision can only be made after the competent authority is satisfied beyond reasonable scientific doubt that the plan or project will not adversely affect the integrity of the site.

1.3.6.8 EC (2020) also reaffirms that the authorisation criterion laid down in the second sentence of Article 6(3) of the Habitats Directive integrates the precautionary principle and makes it possible to effectively to prevent the protected sites from suffering adverse effects on their integrity as the result of the plans or projects in question. A less stringent authorisation criterion could not as effectively ensure the fulfilment of the objective of site protection intended under that provision. The onus is therefore on demonstrating the absence of adverse effects rather than their presence, reflecting the precautionary principle. The Appropriate Assessment must therefore be adequately detailed and justified to highlight the absence of adverse effects, using the best scientific knowledge available.

1.3.6.9 In accordance with the decision of the CJEU in Waddenzee (C-127/02), the measure of significance is made against the conservation objectives for which the European sites were designated.

Consideration of *ex situ* effects

1.3.6.10 EC (2018) advises that Article 6(3) safeguards be applied to any development pressures, including those which are outside of the boundaries of European sites, but which are likely to have significant effects on that European site.

1.3.6.11 The CJEU developed this point when it issued a ruling in case C-461/17 ("Brian Holohan and Others v An Bord Pleanála") that determined *inter alia* that Article 6(3) of Directive 92/43/EEC must be interpreted as meaning that an Appropriate Assessment must identify all of the habitat types and species for which a site is protected, and identify and assess both the effects of the proposed plan or project for the species present on that site, and for which that site has not been listed, and the implications for habitat types and species to be found outside the boundaries of that site, provided that the identified effects have the potential to affect the conservation objectives of the site.

1.3.6.12 On this basis, consideration has been given in this HRA Stage 2 ISAA Report to implications for designated habitats and species located both inside and outside of the identified European site boundaries considered in the HRA Stage 1 Screening Report, with reference to those sites' conservation objectives where effects upon those habitats and/or species could potentially undermine the conservation objectives of the sites concerned.

1.4 Consultation

1.4.1 The Evidence Plan process

1.4.1.1 The Applicant is facilitating the 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.

1.4.1.2 An Evidence Plan steering group has been established for the Mona Offshore Wind Project and Morgan Generation Assets. It was determined appropriate to have a joint Evidence Plan process across the Mona Offshore Wind Project and the Morgan Generation Assets so as to ensure common issues and cumulative/in-combination issues are appropriately addressed. The steering group is comprised of the Applicant, the Planning Inspectorate, Natural Resources Wales (NRW), Natural England, the Joint Nature Conservation Committee (JNCC) and the Marine Management Organisation (MMO) as the key regulatory bodies and SNCBs. The steering group has met and will continue to meet at key milestones throughout the Environmental Impact Assessment (EIA) process.

1.4.1.3 In addition, 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.

1.4.2 Consultation to date

1.4.2.1 A summary of the key consultation undertaken to date is presented in Table 1.2.

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

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
Steering Group				
November 2021	NRW, Natural England, MMO, JNCC and Planning Inspectorate.	Steering Group meeting	• Meeting purpose was to set up and establish the Evidence Plan process and to gain feedback on the EWGs.	N/A
December 2021	Natural England, NRW, MMO, JNCC, Planning Inspectorate, Environment Agency	Steering Group meeting	• Meeting to introduce the cable route selection process.	N/A
July 2022	NRW, Natural England, MMO, JNCC and Planning Inspectorate	Steering Group meeting	• LSE methodology circulated to members of the Steering Group to gain feedback and agreement on the methodology to be used.	Feedback has been incorporated into the HRA Stage 1 Screening Report and the HRA Stage 2 ISAA Report.
Expert Working Groups				
Marine mammals				
December 2021	NRW, Natural England, MMO, JNCC, Centre for Environment Fisheries and Aquaculture Science (Cefas) and The Wildlife Trusts (TWT).	EWG meeting	• Meeting to introduce the Morgan Generation Assets and to establish the EWG • Overview of approach to baseline characterisation and study areas and ongoing surveys and preliminary findings • 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.	Feedback has been incorporated into the PEIR. Marine mammal MUs have been used when screening for LSE.
July 2022	NRW, Natural England, MMO, JNCC, Cefas and TWT.	EWG meeting	• Discussion of actions from first EWG meeting, scoping opinion discussion and underwater sound methodology • LSE Methodology presented and discussed to the EWG for agreement on the methodology to be used.	Feedback has been incorporated into the HRA Stage 1 Screening Report and the HRA Stage 2 ISAA Report.
November 2022	NRW, Natural England, MMO, JNCC, Cefas and TWT.	EWG meeting	• Baseline characterisation • Baseline populations • Approach to LSE screening.	Discussion on marine mammals. Due to the timing of the workshop ahead of publishing the PEIR, discussion outputs will be incorporated into the HRA Stage 2 ISAA Report to accompany the application for consent.
Offshore ornithology				
December 2021	NRW, Natural England, MMO, JNCC, TWT, Royal Society for the Protection of Birds (RSPB)	EWG meeting	• Meeting to introduce the Morgan Generation Assets and to establish the EWG • Discussion of ongoing surveys, preliminary findings and the approach to baseline characterisation.	Feedback has been incorporated into the PEIR and this HRA Stage 2 ISAA Report.
July 2022	Natural England, NRW, MMO, JNCC, RSPB and TWT.	EWG meeting	• Meeting to agree the approach to baseline characterisation, collision risk modelling and displacement • Opportunity for discussion of the Scoping Opinion • LSE Methodology presented and discussed to the EWG for agreement on the methodology to be used.	Feedback has been incorporated into the HRA Stage 1 Screening Report and the HRA Stage 2 ISAA Report.

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
November 2022	Natural England, NRW, MMO, JNCC and TWT.	EWG meeting	• Baseline characterisation • Baseline populations • Approach to LSE screening.	Discussion on offshore ornithology. Due to the timing of the workshop ahead of publishing the PEIR, discussion outputs will be incorporated into the HRA Stage 2 ISAA Report to accompany the application for consent.
Benthic, fish and shellfish and physical processes				
February 2022	Natural England, NRW, MMO, JNCC, RSPB and TWT.	EWG meeting	• Meeting to discuss benthic survey feedback, preliminary results and desktop data sources • Physical Processes baseline characterisation: Site specific data and desktop data sources • Fish and Shellfish baseline characterisation: Site specific and desktop data sources.	Feedback has been incorporated into the PEIR and this HRA Stage 2 ISAA Report
April 2022	Natural England, NRW and JNCC	Email	• Benthic subtidal and intertidal survey scope of work was consulted on to gain feedback on the methodology.	Advice has been incorporated into Benthic Ecology Survey Scope of Work.
November 2022	Natural England, NRW, MMO, JNCC and TWT.	EWG meeting	• Baseline characterisation • Baseline populations • Approach to LSE screening.	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 Stage 2 ISAA Report to accompany the application for consent.

1.5 Summary of HRA Stage 1 Screening Report conclusions

1.5.1.0 This section summarises all pathways identified for potential LSE (arising alone and/or in-combination) and defines the scope of the assessments within the HRA Stage 2 ISAA Report.

1.5.1 Screening outcomes for the Morgan Generation Assets alone

1.5.1.1 The potential for LSE as a result of the Morgan Generation Assets alone has been identified following HRA Stage 1 Screening Report with respect to 43 SACs and eight SPAs.

1.5.1.2 The Stage 1 HRA Screening identified that there were no European sites with Annex I habitat features to be taken forward for determination of LSE. This was based on no European sites meeting the criterion (which represents the greatest distance from Morgan Generation Assets) which considered sites with Annex I habitats within the potential ZOI of impacts associated with Morgan Generation Assets. This was based on the potential for indirect effects associated with increased suspended sediment concentrations and associated deposition. A precautionary buffer for this indirect effect of 15 km was applied. There are no European sites within this ZOI for Annex I benthic habitats and so no sites were screened in for further consideration on this basis.

1.5.1.3 The Stage 1 screening also identified that where the Annex II species otter *Lutra lutra* is a qualifying feature of a site screened in for other Annex II species such as diadromous fish or other marine mammals, the feature otter has been screened out from further assessment on the basis of no receptor-impact pathway. This is due to the distance of Morgan Generation Assets from the SACs designated for otter. The closest site to Morgan Generation Assets with otter as a designating feature is the River Derwent and Bassenthwaite Lake SAC at 71.28 km distance.

Annex II diadromous fish species

1.5.1.4 The nine European sites designated for Annex II diadromous fish species listed in Table 1.3 were advanced to the HRA Stage 2 ISAA Report.

Table 1.3: European sites and relevant Annex II diadromous fish features for which the potential for LSE could not be ruled out and therefore considered in the HRA Stage 2 ISAA.

SAC	Annex II diadromous fish features
River Ehen SAC	• Atlantic salmon • Freshwater pearl mussel
Dee Estuary/Aber Dyfrdwy SAC	• Sea lamprey • River lamprey
River Derwent and Bassenthwaite Lake SAC	• Sea lamprey • River lamprey • Atlantic salmon
River Kent SAC	• Freshwater pearl mussel
Solway Firth SAC	• Sea lamprey

SAC	Annex II diadromous fish features
	• River lamprey
River Bladnoch SAC	• Atlantic salmon
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	• Sea lamprey • River lamprey • Atlantic salmon
Afon Gwyrfai a Llyn Cwellyn SAC	• Atlantic salmon
River Eden SAC	• Sea lamprey • River lamprey • Atlantic salmon

Annex II marine mammals

1.5.1.5 A total of 33 European sites were advanced to the HRA Stage 2 ISAA Report for Annex II marine mammals. These sites are listed in Table 1.7, broken down by country.

Table 1.4: European sites and relevant Annex II marine mammal features for which the potential for LSE could not be ruled out and therefore considered in the HRA Stage 2 ISAA.

European site	Annex II marine mammal features
Twelve sites in the United Kingdom	
North Anglesey Marine/Gogledd Môn Forol SAC	• Harbour porpoise
North Channel SAC	• Harbour porpoise
Strangford Lough SAC	• Harbour seal
Murlough SAC	• Harbour seal
Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC	• Bottlenose dolphin • Grey seal
West Wales Marine/Gorllewin Cymru Forol SAC	• Harbour porpoise
The Maidens SAC	• Grey seal
Cardigan Bay/Bae Ceredigion SAC	• Bottlenose dolphin • Grey seal
Pembrokeshire Marine/Sir Benfro Forol SAC	• Grey seal
Bristol Channel Approaches SAC	• Harbour porpoise
Lundy SAC	• Grey seal
Isles of Scilly Complex SAC	• Grey seal
Four sites in Ireland	
Rockabill to Dalkey Island SAC	• Harbour porpoise
Saltee Islands SAC	• Grey seal
Roaringwater Bay and Islands SAC	• Harbour porpoise
Blasket Islands SAC	• Harbour porpoise
17 sites in France	
Mers Celtiques - Talus du golfe de Gascogne SCI	• Harbour porpoise
Abers - Côte des légendes SCI	• Harbour porpoise
Ouessant-Molène SCI	• Harbour porpoise
Côte de Granit rose-Sept-Iles SCI	• Harbour porpoise
Anse de Goulven, dunes de Keremma SCI	• Harbour porpoise
Tregor Goëlo SCI	• Harbour porpoise
Côtes de Crozon SCI	• Harbour porpoise
Chaussée de Sein SCI	• Harbour porpoise
Cap Sizun SCI	• Harbour porpoise
Récifs du talus du golfe de Gascogne SCI	• Harbour porpoise
Anse de Vauville SCI	• Harbour porpoise
Cap d'Erquy-Cap Fréhel SCI	• Harbour porpoise
Baie de Saint-Brieuc – Est SCI	• Harbour porpoise
Banc et récifs de Surtainville SCI	• Harbour porpoise
Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI	• Harbour porpoise
Estuaire de la Rance SCI	• Harbour porpoise
Baie du Mont Saint Michel SCI	• Harbour porpoise

Offshore ornithological features

1.5.1.6 As detailed in the HRA Stage 1 Screening Report, a total of eight European sites designated for ornithological features were advanced to the HRA Stage 2 ISAA Report (Table 1.5). These comprised two marine SPAs and six breeding seabird colony SPAs.

Table 1.5: European sites and relevant offshore ornithological features for which the potential for LSE could not be ruled out and therefore considered in the HRA Stage 2 ISAA.

European site	Offshore ornithological features
Liverpool Bay/Bae Lerpwl SPA	• Non-breeding red-throated diver • Non-breeding common scoter • Non-breeding little gull

European site	Offshore ornithological features
	• Breeding common tern • Breeding little tern • Non-breeding waterbird assemblage
Morecambe Bay and Duddon Estuary SPA	• Non-breeding and breeding lesser black-backed gull • Breeding herring gull
Ribble and Alt Estuaries SPA	• Breeding lesser black-backed gull
Irish Sea Front SPA	• Breeding Manx shearwater
Lambay Island SPA	• Breeding common guillemot.
Grassholm SPA	• Breeding northern gannet
Ailsa Craig SPA	• Breeding northern gannet
Ireland's Eye SPA	• Breeding common guillemot.

1.5.2 LSE in-combination

LSE in-combination for Annex II diadromous fish species

1.5.2.1 A precautionary approach to the selection of relevant sites for Annex II diadromous fish was adopted in the HRA Stage 1 Screening Report 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 *Salmo salar*) to/from natal rivers (river of origin). For the purposes of LSE screening, a precautionary approach was 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 *Margaritifera* where the regional area has been considered. These screening buffers take into account the likely migratory routes and distances for diadromous fish as outlined in ABPmer (2014), and follow the methodology outlined in the Plan Level HRA (TCE, 2022), in line with feedback from stakeholders.

1.5.2.2 No potential impact pathways were identified between the Morgan Generation Assets and any additional sites designated for Annex II diadromous fish, therefore there is no potential for in-combination effects at any sites apart from those which are screened in for the HRA Stage 2 ISAA Report (see paragraph 1.5.1.4).

1.5.2.3 For potential impacts discounted for LSE alone, there is either no pathway to effect, or the Morgan Generation Assets will result in only negligible or inconsequential effects that would not contribute (even collectively with other projects or plans) in a material way to in-combination effects. Therefore, where a potential impact has been screened out for LSE alone, it has also been screened out for in-combination effects.

LSE in-combination for Annex II marine mammals

1.5.2.4 A precautionary approach to selection of relevant sites for Annex II marine mammals was adopted in the HRA Stage 1 Screening Report. As marine mammals are highly mobile animals with the potential to forage over wide areas, all European sites for marine mammal features with a range that overlaps with the Morgan Generation Assets were considered.

1.5.2.5 For Annex II cetaceans (harbour porpoise *Phocoena* and bottlenose dolphin *Tursiops truncatus*), the search area extended to the relevant MU for each species, as defined by the Inter Agency Marine Mammal Working Group (IAMMWG, 2015). For harbour seal *Phoca vitulina* and grey seal *Halichoerus grypus*, SACs located within the same seal MU (SCOS, 2020), as well as recent sources on seal foraging ranges (Carter *et al.*, 2022) and telemetry data presented in appendix 2 of volume 2, chapter 9.1: Marine mammals technical report of the PEIR (Wright and Sinclair, 2022) were considered. These were in line with feedback from stakeholders via the marine mammals EWG (see section1.4.2).

1.5.2.6 Potential for LSE alone has been identified for all UK sites within species' range, therefore in-combination effects for these sites are assessed in this HRA Stage 2 ISAA Report.

1.5.2.7 For potential impacts discounted for LSE alone, there is either no pathway to effect, or the Morgan Generation Assets would result in only negligible or inconsequential effects that would not contribute (even collectively with other projects or plans) in a material way to in-combination effects. Therefore, where a potential impact has been screened out for LSE alone, it has also been screened out for in-combination effects.

LSE in-combination for marine ornithological features

1.5.2.8 The HRA Stage 1 Screening Report used site-specific information, including the baseline characterisation for ornithology set out in volume 2, annex 10.1: Ornithology baseline of the PEIR, and site-specific modelling outputs for displacement, collision and apportioning of impacts (volume 2, annex 10.2: Offshore ornithology displacement assessment of the PEIR, volume 2, annex 10.3: Offshore ornithology non-migratory seabird collision risk assessment of the PEIR, volume 2, annex 10.4: Offshore ornithology migratory seabird collision risk assessment of the PEIR and volume 2, annex 10.5: Offshore ornithology apportioning assessment of the PEIR). These were then used to screen sites/features into the HRA Stage 2 ISAA Report and used to inform the assessment of adverse effects on site integrity presented in section 1.9.

1.5.2.9 The approach taken in TCE Plan level HRA has been broadly followed in the HRA Stage 1 Screening Report, (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, 2022). Although these broad thresholds have been used as a guide for determining whether there is potential for LSE alone and 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.

1.5.2.10 On this basis in-combination are considered for

- Liverpool Bay/Bae Lerpwl SPA (all features)

- Morecambe Bay and Duddon Estuary SPA (lesser black-backed gull and herring gull *Larus argentatus* only)
- Ribble and Alt Estuaries SPA (lesser black-backed gull *Larus fuscus* only)
- Irish Sea Front SPA (Manx shearwater *Puffinus puffinus* only)
- Lambay Island SPA (Common guillemot *Uria aalge* only)
- Ireland's Eye SPA (Common guillemot only)
- Ailsa Craig SPA (Northern gannet *Morus bassanus* only)
- Grassholm SPA (Northern gannet only).

1.5.3 Summary table of HRA Stage 1 Screening Report outcomes

1.5.3.1 Table 1.6 presents a summary of the European sites and relevant qualifying features for which LSE could not be ruled out and therefore an Appropriate Assessment is required to be undertaken.

Table 1.6: A summary of all European sites for which the potential for LSE could not be discounted in the HRA Stage 1 Screening Report, and for which Appropriate Assessment is required.

ID	European Site	Distance to Morgan Array Area (km)	Relevant qualifying features	Project phase	Impact
Annex II diadromous fish species					
1	River Ehen SAC	62.8	Atlantic salmon	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables) • In-combination effects.
			Freshwater pearl mussel	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
2	Dee Estuary/Aber Dyfrdwy SAC	70.1	Sea lamprey *Petromyzon marinus*	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
			River lamprey *Lampetra fluviatilis*	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
3	River Derwent and Bassenthwaite SAC	71.3	Atlantic salmon	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
			Sea lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
			River lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
4	River Kent SAC	82.4	Freshwater pearl mussel	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.

ID	European Site	Distance to Morgan Array Area (km)	Relevant qualifying features	Project phase	Impact
			River lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
5	Solway Firth SAC	84.3	Sea lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
			River lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
6	River Bladnoch SAC	89.6	Atlantic salmon	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
7	River Dee and Bala Lake/Afon Dyfrydwy a Llyn Tegid SAC	91.6	Atlantic salmon	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
			Sea lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
			River lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
8	Afon Gywrfai a Llyn Gwellyn SAC	118.0	Atlantic salmon	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
9	River Eden	125.7	Atlantic salmon	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.

ID	European Site	Distance to Morgan Array Area (km)	Relevant qualifying features	Project phase	Impact
			Sea lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
			River lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.
				Operations and maintenance	• EMF from subsea electric cables • In-combination effects.
Annex II marine mammals					
1	North Anglesey Marine/Gogledd Môn Forol SAC	28.2	Harbour porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of Unexploded Ordnance (UXO) • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • Changes in prey availability (construction only) • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
2	North Channel SAC	63.8	Harbour porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • Changes in prey availability (construction only) • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
3	Strangford Lough SAC	94.6	Harbour seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
4	Murlough SAC	98.4	Harbour seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.

ID	European Site	Distance to Morgan Array Area (km)	Relevant qualifying features	Project phase	Impact
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
5	Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC	119.8	Bottlenose dolphin	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
			Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
6	West Wales Marine/Gorllewin Cymru Forol SAC	121.1	Harbour porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
7	The Maidens SAC	141.8	Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
8	Cardigan Bay/Bae Ceredigion SAC	188.2	Bottlenose dolphin	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.

ID	European Site	Distance to Morgan Array Area (km)	Relevant qualifying features	Project phase	Impact
			Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
9	Pembrokeshire Marine/Sir Benfro Forol SAC	237.6	Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
10	Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	300.1	Harbour porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
11	Lundy SAC	334.9	Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
12	Isles of Scilly Complex SAC	465.0	Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.

ID	European Site	Distance to Morgan Array Area (km)	Relevant qualifying features	Project phase	Impact
13	Rockabill to Dalkey Island SAC	123.4	Harbour porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
14	Saltee Islands SAC	259.8	Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
15	Roaringwater Bay and Islands SAC	472.5	Harbour porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
16	Blasket Islands SAC	588.4	Harbour porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
17-34	17 French Sites (as listed in paragraph 1.5.1.5)	559.4 – 769.2	Harbour porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.
				Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.
Offshore ornithology features					
1	Liverpool Bay/Bae Lerpwl SPA	10.0	Red-throated diver *Gavia stellata*	Construction/decommissioning	• Changes in prey availability (construction only) • In-combination changes in prey availability effects (construction only).

ID	European Site	Distance to Morgan Array Area (km)	Relevant qualifying features	Project phase	Impact
			Little gull *Hydrocoloeus minutus* Common scoter *Melanitta nigra* Little tern *Sternula albifrons* Common tern *Sterna hirundo* Waterbird assemblage	Operations and maintenance	N/A
2	Morecambe Bay and Duddon Estuary SPA	30.1	Lesser black-backed gull Herring gull	Construction/decommissioning	• Changes in prey availability (construction only) • In-combination changes in prey availability effects (construction only).
				Operations and maintenance	N/A
3	Ribble and Alt Estuaries SPA	50.9	Lesser black-backed gull	Construction/decommissioning	• Changes in prey availability (construction only) • In-combination changes in prey availability effects (construction only).
				Operations and maintenance	N/A
4	Irish Sea Front SPA	56.7	Manx shearwater	Construction/decommissioning	• Changes in prey availability (construction only) • In-combination changes in prey availability effects (construction only).
				Operations and maintenance	N/A
5	Lambay Island	130.2	Common guillemot	Construction/decommissioning Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only).
6	Ireland's Eye SPA	138.5	Common guillemot	Construction/decommissioning Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only).
7	Ailsa Craig SPA	141.3	Northern gannet	Construction/decommissioning Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only) • Collison risk (in-combination effect only). These two pathways are presented as a single figure of annual mortality from disturbance, displacement and collision.
8	Grassholm SPA	260.2	Northern gannet	Construction/decommissioning Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only) • Collison risk (in-combination effect only). These two pathways are presented as a single figure of annual mortality from disturbance, displacement and collision.

1.6 Information to support the Appropriate Assessment

1.6.1 Maximum design scenarios

1.6.1.1 For all European sites considered in this HRA Stage 2 ISAA Report, the assessments have been based on a realistic MDS. Each MDS has been derived from the design envelope for the Morgan Generation Assets. Volume 1, chapter 3: Project description of the PEIR describes the Morgan Generation Assets design and identifies the range of potential parameters for all relevant components.

1.6.1.2 The MDS for each of the potential impacts for each receptor group are tabulated separately in each of the receptor sections of this HRA Stage 2 ISAA Report according to the effect-pathway under consideration. The assessment scenarios are consistent with those used for assessment in relevant chapters of the PEIR.

1.6.2 Measures adopted as part of the Morgan Generation Assets

1.6.2.1 An iterative approach to the Morgan Generation Assets EIA and HRA process has been utilised to inform the Morgan Generation Assets design (through the identification of likely significant effects and development of mitigation measures to address these), this is explained in more detail in volume 1, chapter 5: Environmental Impact Assessment methodology of the PEIR. The incorporation of such measures within the design of the Morgan Generation Assets demonstrates commitment to implementing the identified measures.

1.6.2.2 The term 'measures adopted as part of the Morgan Generation Assets' is used in this HRA Stage 2 ISAA Report to include the following measures (adapted from IEMA, 2016):

- Measures included as part of the project design. These include modifications to the location or design envelope of the Morgan Generation Assets which are integrated into the application for consent. These measures are secured through the consent itself through the description of the development and the parameters secured in the DCO and/or marine licences (referred to as primary mitigation in IEMA, 2016)
- Measures required to meet legislative requirements, or actions that are generally standard practice used to manage commonly occurring environmental effects and are secured through the DCO requirements and/or the conditions of the marine licences (referred to as tertiary mitigation in IEMA, 2016).

1.6.3 Baseline information

1.6.3.1 Baseline information on the European sites identified for further assessment within HRA Stage 2 ISAA Report has been gathered through a comprehensive desktop study of existing studies and datasets. The key data sources are summarised in each of the receptor group sections below and presented in detail within topic chapters in the PEIR. Any additional sources of information used in the HRA Stage 2 ISAA Report are also summarised. The key baseline data sources, for each receptor, are outlined below:

- Annex II diadromous fish – informed by volume 2, annex 8.1: Fish and shellfish ecology technical report of the PEIR and volume 2, chapter 8: Fish and shellfish ecology of the PEIR
- Annex II marine mammals – informed by the 12 month site-specific aerial survey data and baseline characterisation presented in volume 6, annex 9.1: Marine mammal technical report of the PEIR and volume 2, chapter 9: Marine mammals of the PEIR
- Offshore ornithology – informed by the 12 month site-specific aerial survey data and baseline characterisation for ornithology (volume 2, annex 10.1: Ornithology baseline of the PEIR) and site-specific modelling outputs for displacement, collision and apportioning of impacts (volume 2, annex 10.2: Offshore ornithology displacement assessment of the PEIR, volume 2, annex 10.3: Offshore ornithology non-migratory seabird collision risk assessment of the PEIR, volume 2, annex 10.4: Offshore ornithology migratory seabird collision risk assessment of the PEIR and volume 2, annex 10.5: Offshore ornithology apportioning assessment of the PEIR).

1.6.3.2 For brevity, information on the European sites is summarised within the main body of this HRA Stage 2 ISAA Report.

1.6.4 Conservation objectives and advice

1.6.4.1 The SNCBs have produced conservation advice for European sites under their statutory remit. This conservation advice provides supplementary information on sites and features, and although the content provided is similar, the format of the advice provided varies between the different SNCBs.

1.6.4.2 Conservation objectives set the framework for establishing appropriate conservation measures for each feature of the site and provide a benchmark against which plans or projects can be assessed. The conservation objectives set out the essential elements needed to ensure that a qualifying habitat or species is maintained or restored at a site. If all the conservation objectives are met, then the integrity of the site will be maintained, and deterioration or significant disturbance of the qualifying features avoided.

1.6.4.3 In this HRA Stage 2 ISAA Report, the Applicant has referenced the most up-to-date conservation objectives and conservation advice available. It is recognised that in the conservation advice documents, if any feature of the SAC is in unfavourable condition, the integrity of the site is deemed to be compromised and the overarching objective is therefore to restore site integrity.

1.6.4.4 Due to the location and scale of the Morgan Generation Assets, European sites with the potential to be impacted fall variously under the remit of NRW, Natural England, NatureScot, National Parks and Wildlife Service (NPWS), the JNCC and Office Français de la Biodiversité.

1.6.4.5 Natural England has published a ‘European Site Conservation Objectives: Supplementary advice on conserving and restoring features’ document. The document presents attributes which are ecological characteristics of the designated species and habitats within a site. Each attribute has a target which is either quantified or qualitative depending on the available evidence. Targets are also listed for the desired state to be achieved for the attribute.

1.6.4.6 For Welsh sites including the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, the Cardigan Bay/Bae Ceredigion SAC and the Pembrokeshire Marine/Sir Benfro forol SAC conservation advice has been developed by NRW in the form of a 'Regulation 37 Document'.

1.6.4.7 For some European sites under the statutory remit of NatureScot, NRW and/or Natural England, a CAP document has been produced. Of the European sites screened into this HRA Stage 2 ISAA Report, a CAP document has only been produced for the River Bladnoch SAC and Liverpool Bay/Bae Lerpwl SPA; CAP documents for other European sites have not yet been produced. This document contains revised and updated conservation objectives for the features of each site, site-specific clarifications and advice in order for the conservation objectives to be achieved, and advice on management required to achieve the conservation objectives. The Solway Firth SAC CAP is currently being jointly developed by Natural England and NatureScot but has not yet been published.

1.6.4.8 For European sites located within the Republic of Ireland, there are currently no CAP documents. However, conservation objectives have been published for all sites and these have been considered within this HRA Stage 2 ISAA Report.

1.6.4.9 For European sites which fall within both Welsh and English or English and Scottish territorial waters the two relevant governing SNCBs can publish separate conservation objectives for the same European site. For example, both Natural England and NRW have published conservation objectives for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC. Where this is the case for European sites assessed within this HRA Stage 2 ISAA Report, the most recently published conservation objectives have been used.

1.6.4.10 Where Ramsar interests coincide with qualifying features within an SPA or an SAC, the advice for overlapping designations is considered to be, in most cases, sufficient to support the management of the Ramsar interests. Therefore, the conservation objectives would be referenced for both designations, however, no Ramsar sites coincide with any of the European sites considered in this HRA Stage 2 ISAA Report.

1.6.5 Approach to the in-combination assessments

1.6.5.1 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.

1.6.5.2 When undertaking an in-combination assessment projects, plans or activities with which the Morgan Generation Assets may interact to produce an in-combination effect must be identified. These interactions may arise within the construction, operations and maintenance, or decommissioning phases. The process of identifying those projects, plans or activities for which there is the potential for an interaction to occur is referred to as 'screening'.

1.6.5.3 A specialised process has been developed in order to methodically and transparently screen the large number of projects, plans and activities that may be considered cumulatively alongside the Morgan Generation Assets. This involves a staged process that considers the level of detail available for projects, plans and activities, as well as the potential for interactions on a conceptual, physical and temporal basis.

1.6.5.4 The projects, plans and activities screened into the in-combination assessment will be consulted upon with the SNCBs through this HRA Stage 2 ISAA Report, in order to seek agreement on the projects, plans and activities to be considered in the cumulative assessment.

1.6.5.5 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.

1.6.5.6 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.

1.6.5.7 An overview of the projects or activities considered for each receptor group are tabulated separately in each of the receptor chapters according to the effect-pathway under consideration.

1.7 Assessment of potential adverse effect on integrity: Annex II diadromous fish species

1.7.1.1 The HRA Stage 1 Screening Report identified the potential for LSEs on the following European sites (Figure 1.4) designated for Annex II fish features and freshwater pearl mussel listed in Table 1.7.

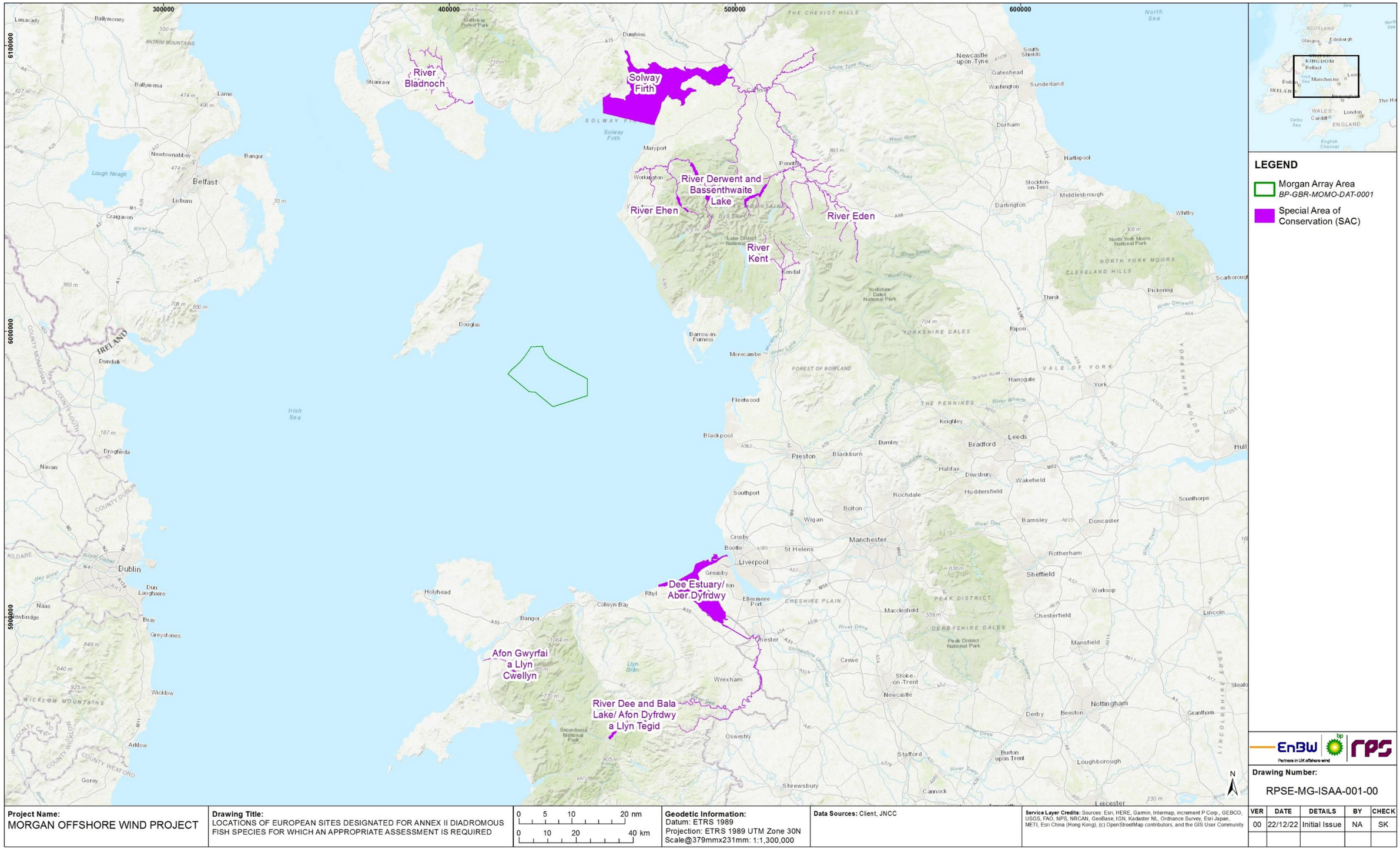
Table 1.7: European sites and relevant Annex II diadromous fish features for which the potential for LSE could not be ruled out and therefore considered in the HRA Stage 2 ISAA.

SAC	Annex II diadromous fish features
River Ehen SAC	• Atlantic salmon • Freshwater pearl mussel
Dee Estuary/Aber Dyfrdwy SAC	• Sea lamprey • River lamprey
River Derwent and Bassenthwaite Lake SAC	• Sea lamprey • River lamprey • Atlantic salmon
River Kent SAC	• Freshwater pearl mussel
Solway Firth SAC	• Sea lamprey • River lamprey
River Bladnoch SAC	• Atlantic salmon
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	• Sea lamprey • River lamprey • Atlantic salmon
Afon Gwyrfai a Llyn Cwellyn SAC	• Atlantic salmon
River Eden SAC	• Sea lamprey • River lamprey • Atlantic salmon

1.7.1.2 LSEs on these European sites were identified from the following impacts:

- During the construction and decommissioning phases
  - Underwater sound.
- During the operations and maintenance phase
  - EMF from subsea electric cables.

1.7.1.3 This section presents the HRA Stage 2 Appropriate Assessments (considering effects both alone and in-combination) for these sites. A summary of all assessments undertaken within this report is provided in the concluding section of this report (section 1.10). Freshwater pearl mussel has been considered within this chapter (specifically as a qualifying feature of the River Ehen SAC and the River Kent SAC) because part of its life stage is reliant on salmonid species such as Atlantic salmon, sea trout and brown trout *Salmo trutta*. The potential for adverse effects to freshwater pearl mussel, if they occur at all would be indirect and would occur as a result of direct effects on Atlantic salmon or brown trout, which are relevant host species for freshwater pearl mussel within the SACs assessed.



LEGEND

- Morgan Array Area *BP-GBR-MOMO-DAT-0001*
- Special Area of Conservation (SAC)

Project Name: MORGAN OFFSHORE WIND PROJECT	**Drawing Title:** LOCATIONS OF EUROPEAN SITES DESIGNATED FOR ANNEX II DIADROMOUS FISH SPECIES FOR WHICH AN APPROPRIATE ASSESSMENT IS REQUIRED	0 5 10 20 nm 0 10 20 40 km	**Geodetic Information:** Datum: ETRS 1989 Projection: ETRS 1989 UTM Zone 30N Scale@379mmx231mm: 1:1,300,000	**Data Sources:** Client, JNCC

Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Drawing Number: RPSE-MG-ISAA-001-00

VER	DATE	DETAILS	BY	CHECK
00	22/12/22	Initial Issue	NA	SK

Figure 1.4: Location of European sites designated for Annex II diadromous fish species for which an Appropriate Assessment is required.

1.7.2 Baseline information

1.7.2.1 Baseline information on the Annex II diadromous fish features of the European sites identified for further assessment within the HRA process has been gathered through a comprehensive desktop study of existing studies and datasets, using the latest available information on diadromous fish. Full details are presented within volume 2 chapter 8: Fish and shellfish ecology of the PEIR and volume 6, annex 8.1: Fish and shellfish technical report of the PEIR.

River Ehen SAC

Site description

1.7.2.2 The River Ehen forms the outfall from Ennerdale Water and flows some 20km to Sellafield where it meets the Irish Sea. The River Ehen SAC, which is 62.8km from the Morgan Array Area, 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 of which is the primary reason for the selection of the site. These populations likely result from high amount of tree shade along the banks, which is thought to be of importance for mussel habitat (Natural England, 2018a). The SAC is also designated for Atlantic salmon which is present as a qualifying feature but not a primary reason for site selection and plays an important role in the lifecycle of the freshwater pearl mussel (Natural England, 2018a).

Feature accounts

Freshwater pearl mussel

1.7.2.3 The freshwater pearl mussel is an endangered species of freshwater mussel. It is widely distributed in Europe but has suffered widespread decline and is highly vulnerable in every part of its former range. A Scottish national survey undertaken in 2015 found that freshwater pearl mussel had been lost from a number of rivers. More widely, since 1999 a total of 11 rivers in Scotland have seen their freshwater pearl mussel populations become extinct (JNCC, 2022a).

1.7.2.4 Freshwater pearl mussel are similar in shape to common marine mussels but grow much larger and live far longer. They can grow as large as 20 cm and live for more than 100 years, making them one of the longest-lived invertebrates (Skinner *et al*., 2003). These mussels live on the beds of clean, fast flowing rivers, where they can be buried partly of wholly in coarse sand or fine gravel. Mussels have a complex life cycle, living on the gills of young Atlantic salmon or sea trout, for their first year, without causing harm to the fish (Skinner *et al.,* 2003). While there is no potential for direct impacts on this species from the Morgan Generation Assets (as this is an entirely freshwater species), indirect impacts may occur due to effects on their host species (i.e. Atlantic salmon and sea trout) during their marine phase.

1.7.2.5 The River Ehen supports the largest freshwater pearl mussel population (>100,000) in England with high densities of greater than 100m^2 found in some locations. The conservation importance of the site is further enhanced by the presence of juvenile pearl mussels, indicating recruitment since 1990 (JNCC, 2022a).

Atlantic salmon

1.7.2.6 The River Ehen holds a significant population of Atlantic salmon. The environment agency has classified the population as “probably at risk” based on the 2017 assessment and was predicted to remain in that status over the following five years. Recent estimates suggest that the salmon migration flow-range in the River Ehen is estimated to be between 90 – 390 Ml/d with peak migration occurring around 240 Ml/d. October through to the end of January is the principal time for salmon migration in to the River Ehen SAC (Natural England, 2022a).

1.7.2.7 Figure 1.5 presents the likely migration routes for anadromous fish reaching UK rivers. These migration routes have been considered when assessing the potential for an adverse effect on integrity on the SACs listed in Table 1.7 in sections 1.7.3 and 1.7.4.

Condition assessment

1.7.2.8 A condition assessment was carried out for units of the River Ehen (Ennerdale Water to Keekle Confluence) SSSI which overlaps with the River Ehen SAC. For both units of the SSSI assessed the freshwater pearl mussel was deemed to be in unfavourable declining condition and the Atlantic salmon feature was deemed to be in unfavourable no change condition (Natural England, 2022b)[2].

Conservation objectives

1.7.2.9 The conservation objectives for the River Ehen SAC (Natural England, 2018a)[3] are outlined below.

1.7.2.10 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the ‘Qualifying Features’ listed below), and subject to natural change:

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its Qualifying Features, by maintaining or restoring:
  - The extent and distribution of the habitats of qualifying species
  - The structure and function of the habitats of qualifying species
  - The supporting processes on which the habitats of qualifying species rely
  - The populations of qualifying species
  - The distribution of qualifying species within the site.

[2] https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK0030057&SiteName=river%20ehen&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=

[3] http://publications.naturalengland.org.uk/publication/4544671464292352

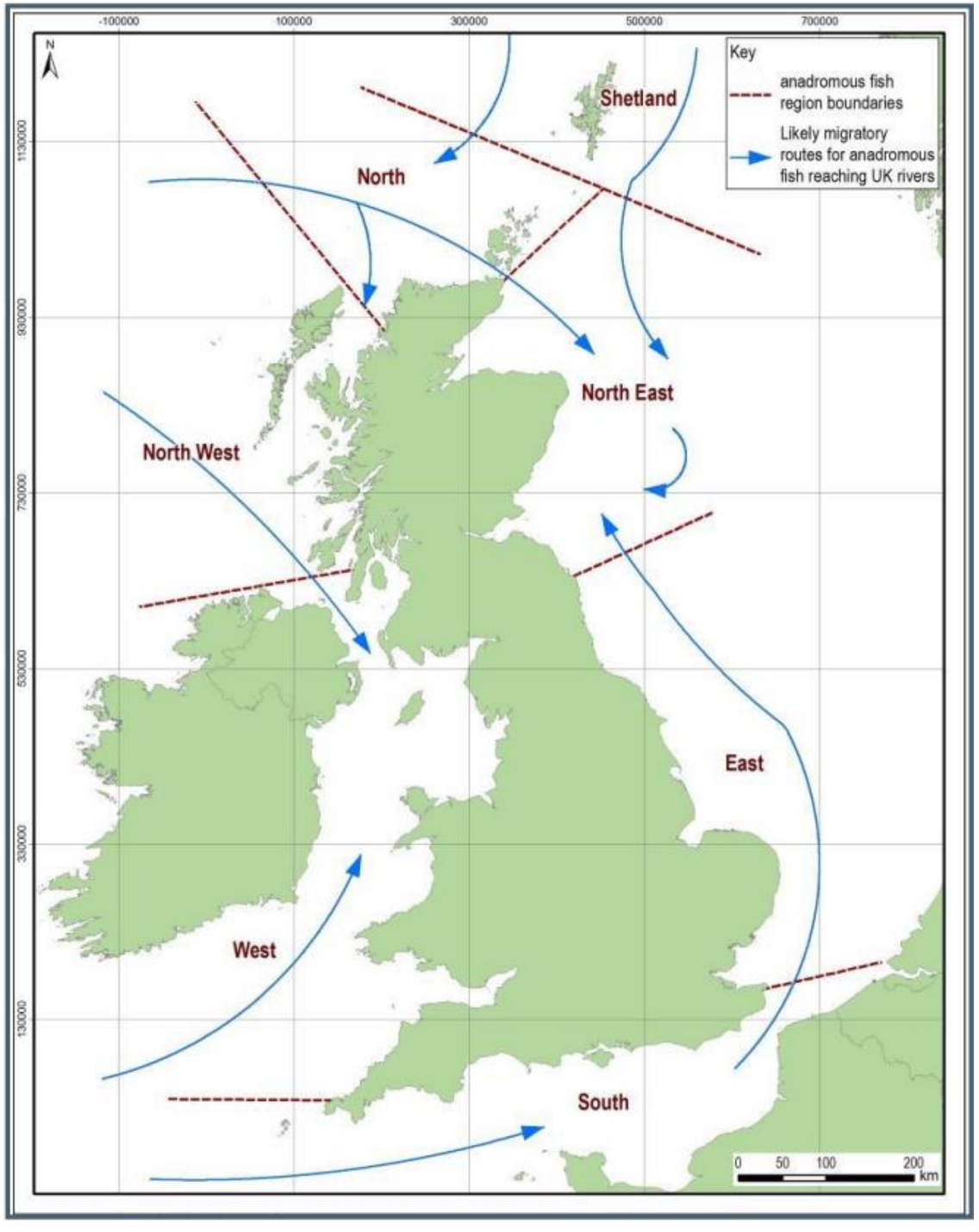


Figure 1.5: Likely migration routes for anadromous fish reaching UK rivers (ABPmer, 2014).

Dee Estuary/Aber Dyfrdwy SAC

Site description

1.7.2.11 The Dee Estuary Aber Dyfrdwy SAC is located 70.1km from the Morgan Array Area. River lamprey and sea lamprey, which migrate through the SAC, are Annex II species present as qualifying features, but are not a primary reason for selection of the SAC.

Feature accounts

Sea lamprey

1.7.2.12 The sea lamprey is a primitive, jawless fish resembling an eel and is the largest of the lamprey species found in the UK. It occurs in estuaries and easily accessible rivers and is an anadromous species (i.e. spawning in freshwater but completing its life cycle in the sea) (JNCC, 2022b).

1.7.2.13 Sea lamprey are present in the River Dee which forms an essential part of their migratory route. Records of sea lamprey caught at the fish trap at Chester Weir indicate that mature adults migrate upstream almost exclusively during the months of May and June (Potter and Hatton-Ellis, 2003).

River lamprey

1.7.2.14 The river lamprey is found in coastal waters, estuaries and accessible rivers. Some populations are permanent freshwater residents; however, the species is normally anadromous (i.e. spawning in freshwater but completing part of its life cycle in the sea) (JNCC, 2022b). They live on hard bottoms or attached to larger fish such as cod and herring due to their parasitic feeding behaviour, with spawning taking place in pre-excavated pits in riverbeds. Due to their preference for estuarine and nearshore coastal waters, it is unlikely that river lamprey will be found within the Morgan Array Area.

1.7.2.15 River lampreys are also present in the River Dee and must therefore use the Dee Estuary as part of their migratory route. As mentioned above lampreys are known to congregate in large estuaries of major rivers, although this feeding behaviour has not yet been documented for the Dee Estuary. However, it is known that several potential river lamprey prey species are found within the Dee Estuary including herring *Clupea harengus*, sprat *Sprattus*, flounder *Platichthys flesus* and small gadoids (Henderson, 2003). Records of river lamprey caught at the fish trap at Chester weir indicate that mature adults undertake their upstream migration at two different periods of the year, either early spring (March-April) or late summer/autumn (August-November).

Condition assessment

1.7.2.16 Table 1.8 outlines the indicative condition assessments of the relevant qualifying features of the Dee Estuary/Aber Dyfrdwy SAC, overall the condition assessment deemed that both river and sea lamprey are in unfavourable condition (NRW, 2022a).

Water quality issues are likely to be contributing to the condition of the lamprey features at this SAC (NRW, 2022a)[4].

Table 1.8: Condition assessment of relevant Annex II diadromous fish species of the Dee Estuary/Aber Dyfrdwy SAC.

Component of species feature assessed	Indicative assessment (favourable, unfavourable, unknown)	Level of agreement	Confidence in evidence	Component confidence level
River lamprey				
Freshwater population variables	Favourable	High	Medium	Medium
Marine habitat	Unfavourable	High	High	High
Sea lamprey				
Freshwater population variables	Unfavourable	High	High	High
Marine habitat	Unfavourable	High	High	High

Conservation objectives

1.7.2.17 The conservation objectives for the Dee Estuary/Aber Dyfrdwy SAC (Natural England, 2018b)[5] are outlined below.

1.7.2.18 With regard to the SAC and the natural habitats and/or species for which the site has been designated, and subject to natural change;

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its Qualifying Features, by maintaining or restoring:
  - The extent and distribution of qualifying natural habitats and habitats of qualifying species
  - The structure and function (including typical species) of qualifying natural habitats
  - The structure and function of the habitats of qualifying species
  - The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
  - The populations of qualifying species
  - The distribution of qualifying species within the site.

1.7.2.19 Only conservation objectives relevant to the qualifying species (Annex II diadromous fish qualifying features) of the SAC will be assessed in section 1.7.3; conservation objectives relating to the qualifying habitats of the SAC will not be considered on the basis of the findings of the HRA Stage 1 Screening Report (i.e. there is no impact pathway and therefore no LSE).

River Derwent and Bassenthwaite Lake SAC

Site description

1.7.2.20 The River Derwent and Bassenthwaite SAC, which is located 71.3km from the Morgan Array Area, consists of the River Derwent, a large oligotrophic river system with high water quality and a natural channel (Natural England, 2018c). The Derwent flows through two lakes Derwentwater and Bassenthwaite, with presence of aquatic flora is typical of oligotrophic/mesotrophic lake. Designated fish species as primary reason for the selection of the SAC include Atlantic salmon, sea lamprey, river lamprey and brook lamprey *Lampetra planeri*. The site encompasses various important salmon spawning areas as well as extensive sea and river lamprey nursery grounds (Natural England, 2018c).

Feature accounts

Atlantic salmon

1.7.2.21 The Derwent represents Atlantic salmon populations in north-west England and is a particularly good example of a large oligotrophic river flowing over base-poor geology, providing a contrast to the more mesotrophic River Eden (Natural England, 2018c). Low intensity land-use in the catchment means there is good water quality throughout much of the system. This water quality, coupled with the presence of extensive gravel shoals, makes it a particularly suitable river for breeding and enables it to support a large population (JNCC, 2022c).

Sea lamprey

1.7.2.22 The Derwent represents sea lamprey in a high-quality oligotrophic river in north England. The presence of gravels and silts in the middle to lower reaches of this river means that it supports a large population of sea lamprey (Natural England, 2018c; JNCC, 2022c).

River lamprey

1.7.2.23 The Derwent represents river lamprey in an oligotrophic river in north England. High numbers of this species are known to occur and this river has features that provide the necessary habitats for both spawning and nursery areas (gravel shoals, good water quality and areas of marginal silt) (Natural England, 2018c; JNCC, 2022c).

Condition assessment

1.7.2.24 Condition assessments are not available for the River Derwent and Bassenthwaite SAC.

[4] https://cdn.cyfoethnaturiol.cymru/media/684383/dee-estuary-sac-ica-2018.pdf

[5] http://publications.naturalengland.org.uk/publication/6124489284780032

Conservation objectives

1.7.2.25 The conservation objectives for the River Derwent and Bassenthwaite Lake SAC (Natural England, 2018c)[6] are outlined below.

1.7.2.26 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its Qualifying Features, by maintaining or restoring:
  - The extent and distribution of qualifying natural habitats and the habitats of qualifying species
  - The structure and function (including typical species) of qualifying natural habitats
  - The structure and function of the habitats of qualifying species
  - The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
  - The populations of qualifying species
  - The distribution of qualifying species within the site.

1.7.2.27 Only conservation objectives relevant to the qualifying species (Annex II diadromous fish qualifying features) of the SAC will be assessed in section 1.7.3;conservation objectives relating to the qualifying habitats of the SAC will not be considered on the basis of the findings of the HRA Stage 1 Screening Report (i.e. there is no impact pathway and therefore no LSE).

River Kent SAC

Site description

1.7.2.28 The River Kent SAC is located 82.4km from the Morgan Array Area. Freshwater pearl mussel are Annex II species present as qualifying features but are not a primary reason for selection of the SAC. 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 (Natural England, 2005a). 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. The high water quality, fast flow regime, cool temperatures and suitable areas of stable river channel, also provide sufficient habitat for freshwater pearl mussels found primarily in one of the upper tributaries (Natural England, 2005a).

Feature accounts

Freshwater pearl mussel

1.7.2.29 The freshwater pearl mussel requires clean, fast flowing, highly oxygenated rivers and burrows into sand/gravel substrates, often between boulders and pebbles (Geist and Auerswald, 2007). The freshwater pearl mussel is currently found in only one tributary of the Kent, Dubbs Beck (unit 102) which is situated between two reservoirs (Natural England, 2005a). The mussel requires a salmonid fish host for its larval (glochidial) stage; it is thought that the host species within the River Kent SAC is brown trout, although in line with a precautionary approach for the basis of this assessment Atlantic salmon is also considered to be a host species. A pollution incident and consequent recruitment failure (lack of juvenile mussels) have resulted in declines in the population within the river in the last decade (Natural England, 2005a).

Condition assessment

1.7.2.30 A condition assessment was carried out for a unit of the River Kent and Tributaries SSSI which overlaps with the River Kent SAC. Within this unit the freshwater pearl mussel feature was deemed to be in unfavourable condition (Natural England, 2022c)[7].

Conservation objectives

1.7.2.31 The conservation objectives for the River Kent SAC (Natural England, 2018d)[8] are outlined below.

1.7.2.32 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change;

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its Qualifying Features, by maintaining or restoring:
  - The extent and distribution of qualifying natural habitats and the habitats of qualifying species
  - The structure and function (including typical species) of qualifying natural habitats
  - The structure and function of the habitats of qualifying species
  - The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
  - The populations of qualifying species
  - The distribution of qualifying species within the site.

1.7.2.33 Only conservation objectives relevant to the qualifying species (Annex II diadromous fish qualifying features and freshwater pearl mussel) of the SAC will be assessed in section 1.7.3, conservation objectives relating to the qualifying habitats of the SAC will

[6] http://publications.naturalengland.org.uk/publication/6086221126172672

[7] https://designatedsites.naturalengland.org.uk/SiteSACFeaturesMatrix.aspx?SiteCode=UK0030256&SiteName=River%20Kent%20SAC

[8] http://publications.naturalengland.org.uk/publication/5256393649029120

not be considered on the basis of the findings of the HRA Stage 1 Screening Report (i.e. there is no impact pathway and therefore no LSE).

Solway Firth SAC

Site description

1.7.2.34 The Solway Firth SAC is located 84.3km from the Morgan Array Area. River lamprey and sea lamprey are Annex II species present as qualifying features and primary reason for selection of the SAC. The Solway is a large, complex estuary with moderately strong tidal streams and wave action (Natural England, 2005b). 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 and river lamprey to and from their spawning and nursery grounds (Natural England, 2005b).

Feature accounts

Sea lamprey

1.7.2.35 The Solway Firth provides migratory passage for sea lamprey to and from spawning and nursery grounds in a number of rivers, including the Eden which is also designated as a SAC for the species (JNCC, 2022d).

River lamprey

1.7.2.36 The Solway Firth provides migratory passage for river lamprey to and from spawning and nursery grounds in a number of rivers, including the Eden which is also designated as a SAC for the species (JNCC, 2022d).

Condition assessment

1.7.2.37 The condition of the sea lamprey and river lamprey features of the Solway Firth SAC have not been assessed (NatureScot, 2022)[9].

Conservation objectives

1.7.2.38 The conservation objectives for the Solway Firth SAC (Natural England, 2018e)[10] are outlined below.

1.7.2.39 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change:

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its Qualifying Features, by maintaining or restoring:
  - The extent and distribution of qualifying natural habitats and habitats of qualifying species
  - The structure and function (including typical species) of qualifying natural habitats
  - The structure and function of the habitats of qualifying species
  - The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
  - The populations of qualifying species
  - The distribution of qualifying species within the site.

1.7.2.40 Only conservation objectives relevant to the qualifying species (Annex II diadromous fish qualifying features) of the SAC will be assessed in section 1.7.3, conservation objectives relating to the qualifying habitats of the SAC will not be considered on the basis of the findings of the HRA Stage 1 Screening Report (i.e. there is no impact pathway and therefore no LSE).

River Bladnoch SAC

Site description

1.7.2.41 The River Bladnoch SAC is located 89.6km from the Morgan Array Area. The River Bladnoch flows from Mayberry Loch in South Ayrshire for seven miles to Wigtown Bay. The River Bladnoch is designated for Atlantic salmon as a primary reason and the site supports a high-quality salmon population and a spring run of salmon (JNCC, 2022e). The river's ecological and water quality characteristics are influenced by a moderate-sized catchment with diverse upland and lowland areas (JNCC, 2022e).

Feature accounts

Atlantic salmon

1.7.2.42 The River Bladnoch is located in southwest Scotland and a supports a high-quality salmon population and a spring run of salmon which is considered unusual for rivers in this region. There are issues associated with acidification upstream however these are subject to national and local initiatives which are both reducing and ameliorating the worst effects of this pollution source (JNCC, 2022e).

Condition assessment

1.7.2.43 The condition of the Atlantic salmon feature was assessed as part of the Nature Scot's site condition monitoring programme. The feature was assessed as unfavourable recovering in September 2011 (NatureScot, 2020)[11].

[9] https://sitelink.nature.scot/site/8377

[10] http://publications.naturalengland.org.uk/publication/6556237919420416

[11] https://sitelink.nature.scot/site/8355

Conservation objectives

1.7.2.44 The conservation objectives for the River Bladnoch SAC (NatureScot, 2020)[12] are outlined below.

- To ensure that the qualifying feature of the River Bladnoch SAC is in favourable condition and makes an appropriate contribution to achieving favourable conservation status
- To ensure that the integrity of the River Bladnoch SAC is restored by meeting objectives 2a, 2b and 2c for the qualifying feature
  - 2a. Restore the population of the species, including range of genetic types, as a viable component of the site
  - 2b. Restore the distribution of the species throughout the site
  - 2c. Restore the habitats supporting the species within the site and availability of food.

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

Site description

1.7.2.45 The River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC, which is 91.6km from the Morgan Array Area, 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 Site of Special Scientific Interest (SSSI). Several Dee tributaries are also included within the site, specifically the Ceiriog, Meloch, Tryweryn, and Mynach. Atlantic salmon are a primary reason for the selection of the River Dee and Bala Lake SAC, 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 but not a primary reason for site section of the site are river lamprey and sea lamprey.

Feature accounts

Atlantic salmon

1.7.2.46 Atlantic salmon are anadromous (i.e. spawns in freshwater but completes its life cycle in the sea). They spend two to three years in freshwater, with downstream migration (to open sea) occurring between April and May. Atlantic salmon remain at sea for one to three years. Upstream migration into freshwater occurs year-round, with a peak in late summer/early autumn (NRW, 2022b).

1.7.2.47 No site specific information is available for this feature.

Sea lamprey

1.7.2.48 No site specific information is available for this feature. An overview of the ecology of the species is provided in paragraph 1.7.2.12.

River lamprey

1.7.2.49 No site specific information is available for this feature. An overview of the ecology of the species is provided in paragraph 1.7.2.14 and 1.7.2.15.

Condition assessment

1.7.2.50 Table 1.9 outlines the indicative condition assessment for the Atlantic salmon qualifying feature of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC. There isn't sufficient information to assess the population size and dynamics of the sea lamprey and river lamprey feature. However overall, the condition assessment deemed that Atlantic salmon, river and sea lamprey features are all in unfavourable condition (NRW, 2022b).

Table 1.9: Condition assessment of relevant Annex II diadromous fish species of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC.

Attribute	Pass	Fail
Atlantic salmon		
Juvenile population densities	✓	
Adult run		×
Overall assessment		×

Conservation objectives

1.7.2.51 The conservation objectives for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (NRW, 2022b)[13] are outlined below.

Atlantic salmon

- The vision for this feature is for it to be in a FCS, where all of the following conditions are satisfied:
  - The parameters defined in the vision for the watercourse as outlined in NRW (2022b) must be met
  - The SAC feature populations will be stable or increasing over the long term
  - The natural range of the features in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future
  - There will be no reduction in the area or quality of habitat for the feature populations in the SAC on a long-term basis

[12] https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwid37n-qqv8AhU7_bsIHcEgDcQQFnoECAwQAw&url=https%3A%2F%2Fapps.snh.gov.uk%2Fsitelink-api%2Fv1%2Fsites%2F8355%2Fdocuments%2F66%23%3A~%3Atext%3DThe%2520aim%2520at%2520this%2520SAC%2Cto%2520its%2520wider%2520conservation%2520status.&usg=AOvVaw20NFyWFxG9_8pC4bhyzJCM&cshid=1672746684001234

[13] https://afonyddcymru.org/wp-content/uploads/2022/11/river_dee___bala_lake_32_plan.pdf

- All known, controllable factors, affecting the achievement of these conditions are under control (many factors may be unknown or beyond human control).

Sea lamprey and river lamprey

- The vision for this feature is for it to be in a favourable conservation status, where all of the following conditions are satisfied:
  - The parameters defined in the vision for the watercourse as outlined in NRW (2022b) must be met
  - The SAC feature populations will be stable or increasing over the long term
  - The natural range of the features in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future
  - There will be no reduction in the area or quality of habitat for the feature populations in the SAC on a long-term basis
  - All factors affecting the achievement of these conditions are under control.

1.7.2.52 Only conservation objectives relevant to the qualifying species (Annex II diadromous fish qualifying features) of the SAC will be assessed in section 1.7.3;conservation objectives relating to the qualifying habitats of the SAC will not be considered on the basis of the findings of the HRA Stage 1 Screening Report (i.e. there is no impact pathway and therefore no LSE).

Afon Gwyrfai a Llyn Cwellyn SAC

Site description

1.7.2.53 The Afon Gwyrfai a Llyn Cwellyn SAC which is located 118km from the Morgan Array Area, encompasses the Afon Gwyrfai and Llyn Cwellyn and is designated for Atlantic salmon as a primary reason. The Gwyrfai flows out of Llyn y Gader near Rhyd Ddu and passes through Llyn Cwellyn before reaching the sea at, Caernarfon Bay. The lake 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 Atlantic salmon population (the primary reason for selection of the site), one of the best supporting rivers in the UK (NRW, 2022c).

Feature accounts

Atlantic salmon

1.7.2.54 The Afon Gwyrfai in north-west Wales is representative of the small montane rivers in the region. The river contains a largely unexploited salmon population with a characteristically late run (JNCC, 2022f). Electrofishing data from the Environment Agency indicates the presence of healthy juvenile populations downstream of Llyn Cwellyn within the SAC (JNCC, 2022f).

Condition assessment

1.7.2.55 The condition assessment for the Atlantic salmon feature of the Afon Gwyrfai a Llyn Cwellyn SAC deemed the feature to be unfavourable: unclassified (NRW, 2022c). The current unfavourable status results from an assessment of feature distribution and abundance within the SAC, specifically salmon catch and juvenile surveys (NRW, 2022c)[14].

Conservation objectives

1.7.2.56 The conservation objectives for the Afon Gwyrfai a Llyn Cwellyn SAC (NRW, 2022d)[15] are outlined below:

- The conservation objective for the water as outlined in NRW (2022c) must be met
- The population of the feature in the SAC is stable or increasing over the long term
- The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future
- The Gwyrfai will continue to be a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis.

River Eden SAC

Site description

1.7.2.57 The River Eden SAC is located 125.7km from the Morgan Array Area. Designated fish species as primary reason for the selection of the River Eden SAC includes Atlantic salmon, bullhead, and sea, river and brook lampreys. 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 (Natural England, 2018g). 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 provides habitat for bullheads and the tributaries, specifically those flowing over limestone, also hold high numbers of b bullhead (Natural England, 2018g).

Feature accounts

Atlantic salmon

1.7.2.58 The Eden represents one of the largest populations of Atlantic salmon in north England. The varied, base-rich geology and large range in altitude results in the development of distinct habitat types, supporting diverse plant and invertebrate communities. The high ecological value of the river system and the fact that the salmon are able to use the majority of the catchment mean that the Eden supports a large population of salmon (JNCC, 2022g).

Sea lamprey

[14] https://naturalresources.wales/media/670697/Afon%20Gwyrfai%20a%20Llyn%20Cwellyn%20Management%20%20Plan%20_English_.pd

[15] https://afonyddcymru.org/wp-content/uploads/2022/11/afon-gwyrfai-a-llyn-cwellyn-management-plan-_english_.pdf

1.7.2.59 The highly erodible nature of the rock within the Eden results in extensive areas of gravel and finer silts being deposited throughout the system, which provide suitable habitats for spawning and nursery areas. A large and healthy population of sea lamprey is therefore supported in the middle to lower regions of the river (JNCC, 2022g).

River lamprey

1.7.2.60 The highly erodible nature of the rock within the Eden results in extensive areas of gravel and finer silts being deposited throughout the system, which provide suitable habitats for spawning and nursery areas. The high quality of these habitats and their accessibility results in the river hosting a large, healthy population of river lamprey (JNCC, 2022g).

Condition assessment

1.7.2.61 A condition assessment was carried out for units of the River Eden and Tributaries SSSI which overlaps with the River Eden SAC. For the assessment an average of the condition across all units has been taken for each qualifying species, therefore on this basis sea lamprey and river lamprey are deemed to be unfavourable recovering and Atlantic salmon is deemed to be in favourable condition (Natural England, 2022d)[16].

Conservation objectives

1.7.2.62 The conservation objectives for the River Eden SAC (Natural England, 2018d)[17] are outlined below.

1.7.2.63 With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change:

- Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its Qualifying Features, by maintaining or restoring:
  - The extent and distribution of qualifying natural habitats and the habitats of qualifying species
  - The structure and function (including typical species) of qualifying natural habitats
  - The structure and function of the habitats of qualifying species
  - The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
  - The populations of qualifying species
  - The distribution of qualifying species within the site.

1.7.2.64 Only conservation objectives relevant to the qualifying species (Annex II diadromous fish qualifying features) of the SAC will be assessed in section 1.7.3; conservation objectives relating to the qualifying habitats of the SAC will not be considered on the basis of the findings of the HRA Stage 1 Screening Report (i.e. there is no impact pathway and therefore no LSE).

[16] https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK0012643&SiteName=river%20eden&countyCode=&responsiblePerson=&SeaArea=&IFCAArea=

[17] http://publications.naturalengland.org.uk/publication/5935614042046464

1.7.3 Assessment of adverse effects alone

Underwater sound

1.7.3.1 Some activities associated with the construction of the Morgan Generation Assets will generate underwater sound which has the potential to result in mortality, injury and/or disturbance to diadromous fish. The greatest potential impacts from underwater sound emissions are predicted to result from piling activities (for the installation of monopile or jacket foundations) and UXO clearance including detonation within the Morgan Array Area. No piling or UXO activities will be carried out during the decommissioning phase and therefore potential impacts during this phase are predicted to be lower than for the construction phase.

1.7.3.2 All other sound sources including cable installation, foundation drilling and geophysical site investigation activities are non-percussive and will result in much lower sound levels and therefore much smaller injury ranges (in most cases no injury is predicted) than those predicted for piling operations.

1.7.3.3 The assessment of LSE in the HRA Stage 1 Screening Report identified that during construction and decommissioning, LSE could not be ruled out for the potential impact of underwater sound. This relates to the designated site and relevant Annex II diadromous fish features listed in Table 1.10.

Table 1.10: European sites and relevant Annex II diadromous fish features from which the potential for an LSE could not be ruled out in relation to underwater sound.

SAC	Annex II diadromous fish features
River Ehen SAC	• Atlantic salmon • Freshwater pearl mussel
Dee Estuary/Aber Dyfrdwy SAC	• Sea lamprey • River lamprey
River Derwent and Bassenthwaite Lake SAC	• Sea lamprey • River lamprey • Atlantic salmon
River Kent SAC	• Freshwater pearl mussel
Solway Firth SAC	• Sea lamprey • River lamprey
River Bladnoch SAC	• Atlantic salmon
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	• Sea lamprey • River lamprey • Atlantic salmon
Afon Gwyrfai a Llyn Cwellyn SAC	• Atlantic salmon
River Eden SAC	• Sea lamprey • River lamprey • Atlantic salmon

1.7.3.4 The following sections explain how this potential impact on Annex II diadromous fish features of the European sites listed above have been quantified and assessed.

1.7.3.5 For the purposes of the assessment, sea lamprey and river lamprey have been assessed together due to their similar sensitivity to underwater sound and the fact that their conservation objectives are the same for both species at all European sites assessed and therefore effects and associated conclusions are considered to be alike.

1.7.3.6 The MDS considered for the assessment of potential impacts on Annex II diadromous fish features is presented in Table 1.11.

Table 1.11: Maximum design scenario considered for the assessment of potential impacts on diadromous fish from underwater sound.

Phase	MDS	Justification
Construction phase	Monopiles: • Wind turbines: installation of up to 68 wind turbines with a 16m diameter monopile foundations installed by impact piling • OSPs: installation of one OSP with foundations consisting of two 16m diameter piled monopile foundations installed by impact piling • Maximum hammer energy of up to 5,500kJ • Up to two vessels piling concurrently (minimum distance 875m, maximum distance 28.5km, between piling vessels) • Maximum of up to 9.5 hours of piling for a monopile with a cumulative total of up to 665 hours • Consecutive piling over a maximum of 24 hours. • One monopile installed per 24 hours per vessel = 70 days for a single vessel (maximum temporal) or 35 days for two vessels (maximum spatial). Pin piles • Wind turbines: installation up to 68 3-legged jacket foundations with up to one pile per leg (a total of up to 204 piles) or up to 2 piles per leg (a total of 408 piles) and each pile with a diameter of 5.5m installed by impact piling. • OSP: installation of one OSP with 6-legged jacket foundations, with up to three piles per leg (a total of 18 piles) and each pile with a diameter of 5.5m installed by impact piling • Maximum hammer energy of up to 3,700kJ • Up to two vessels piling concurrently (minimum distance 875m, maximum distance 28.5km, between piling vessels) • Wind turbines: maximum duration of up to 8.02 hours per pile (where only a single pin-pile is used per leg) or up to 4.01 hours per pile (where two pin-piles are used per leg) with a cumulative total of up to 1,638 hours; installation of wind turbines over 103 days (=16.04 hours of piling per day; two piles per day)	For both monopiles and pin piles the largest hammer energy and maximum spacing between concurrent piling events would lead to the largest spatial extent of ensonification at any one time. Minimum spacing between concurrent piling represents the highest risk of injury to fish and shellfish as sound from adjacent foundations could combine to produce a greater radius of effect compared to a single piling event. For both monopiles and pin piles the maximum temporal scenario was assessed on the greatest number of days on which piling could occur based on the number of piles that could be installed within a 24-hour period. Consecutive piling is assumed over a maximum period of 24 hours.

Phase	MDS	Justification
	• OSP: maximum duration of up to 8.02 hours per pile with a cumulative total of up to 145 hours; installation of OSP over 9 days (=16.04 hours piling per day) • Consecutive piling over a maximum of 24 hours • Single piling of 103 days for wind turbines plus approx. 9 days for OSPs = 112 days (maximum temporal) or 56 days for two vessels (maximum spatial). Total piling phase (foundation installation) of up to two years within a four-year construction programme.	
	Geophysical site investigation • Geophysical site investigation activities will include the following activities: – Multi-beam echo-sounder (MBES) – Sidescan Sonar (SSS) – Single Beam Echosounder (SBES) – Sub-Bottom Profilers (SBP) – Ultra High Resolution Seismic (UHRS). For further detail regarding geophysical sound sources and levels, see volume 3, annex 3.1: Underwater noise technical report of the PEIR.	Range of geophysical and geotechnical activities likely to be undertaken using equipment typically employed for these types of surveys.
	UXO • For the purposes of this assessment, it has been assumed that the MDS will be clearance of UXO with a Net Explosive Quantity (NEQ) of 907kg cleared by either low order or high order techniques • Clearance of up to 13 UXOs within the Morgan Array Area • Most likely (common) of 130kg UXO. • Up to 0.5kg NEQ clearance shot for neutralisation of residual explosive material at each location. • Clearance during daylight hours only.	Maximum number and maximum size of UXOs encountered in the Morgan Array Area. Donor charge is maximum required to initiate low order/low yield detonation. Assumption of a clearance shot of up to 0.5kg at all locations although noting that this may not always be required.

Measures adopted as part of Morgan Generation Assets

Measures adopted as part of the Morgan Generation Assets which are of relevance to the assessment of potential impacts on Annex II diadromous fish features from underwater sound during construction and decommissioning are presented in Table 1.12.

Table 1.12: Measures adopted as part of the project which are relevant to the assessment of adverse effect on European sites designated for Annex II diadromous fish features from underwater sound.

Measure	Justification	How the measure will be secured
Primary measures: Measures included as part of the project design		
Implementation of piling soft-start and ramp-up measures	This measure will be included in the draft Marine Mammal Mitigation Protocol (MMMP) and will minimise the risk of injury to fish species in the immediate vicinity of piling activities, allowing individuals to move away from the area before sound levels reach a level at which injury may occur.	Proposed to be secured through a condition in the marine licence(s).

Construction and decommissioning phases

Information to support assessment

Hearing sensitivity of Annex II diadromous fish features

1.7.3.7 The Sound Exposure Guidelines for Fishes and Sea Turtles (Popper *et al*., 2014) are considered to be the most relevant and best available guidelines for impacts of underwater sound on fish species (see volume 3, annex 3.1: Underwater sound technical report of the PEIR). The Popper *et al*. (2014) guidelines broadly group fish into the following categories according to their hearing sensitivity and in particular, the presence or absence of a swim bladder and on the potential for that swim bladder to improve the hearing sensitivity and range of hearing:

- Group 1: Fishes lacking swim bladders (e.g. elasmobranchs and flatfish, lamprey). These species are only sensitive to particle motion, not sound pressure and show sensitivity to only a narrow band of frequencies
- Group 2: Fishes with a swim bladder but the swim bladder does not play a role in hearing (e.g. salmonids and some Scombridae). These species are considered to be more sensitive to particle motion than sound pressure and show sensitivity to only a narrow band of frequencies
- Group 3: Fishes with swim bladders that are close, but not connected, to the ear (e.g. gadoids and eels). These fishes are sensitive to both particle motion and sound pressure and show a more extended frequency range than Groups 1 and 2, extending to about 500Hz
- Group 4: Fishes that have special structures mechanically linking the swim bladder to the ear (e.g. clupeids such as herring, sprat and shad). These fishes are sensitive primarily to sound pressure, although they also detect particle motion. These species have a wider frequency range, extending to several kHz and generally show higher sensitivity to sound pressure than fishes in Groups 1, 2 and 3.

1.7.3.8 Sea lamprey are considered to be a Group 1 fish in terms of hearing sensitivity (Popper *et al.,* 2014) and therefore have relatively low sensitivity to underwater sound.

River lamprey is, like sea lamprey, classified as a Group 1 fish for the purposes of hearing sensitivity and as such the assessment for sea lamprey presented above also applies to river lamprey. Atlantic salmon are a Group 2 fish in terms of hearing sensitivity (Popper *et al.,* 2014) and therefore also have relatively low sensitivity to underwater sound.

Underwater sound modelling for the Morgan Generation Assets

1.7.3.9 To understand the magnitude of sound emissions from piling and UXO clearance during construction activity, underwater sound modelling has been undertaken. Full details of the modelling undertaken are presented in volume 3, annex 3.1: Underwater sound technical report of the PEIR. A summary of the underwater sound modelling has been provided below in paragraphs 1.7.3.10 to 1.7.3.12 and additional detail is also included in volume 2, chapter 8: Fish and shellfish ecology of the PEIR including full details of sound exposure criteria used to inform the assessment, in line with Popper *et al.* (2014). Of the different types of piling impacts investigated (including pin piles), the single monopile scenario resulted in the greatest realistic predicted injury ranges and therefore formed the focus of the assessment for injury.

1.7.3.10 For peak pressure sound levels when piling energy is at its maximum (i.e. 5,500kJ), mortality and recoverable injury to fish may occur within a maximum of 634m of the piling activity for Group 2 Fish (e.g. Atlantic salmon) and within 386m for Group 1 fish (e.g. sea lamprey and river lamprey; see volume 2, chapter 8: Fish and shellfish ecology of the PEIR). It should be noted that these ranges are the maximum ranges for the maximum hammer energy, and it is unlikely that injury will occur in this range due to the implementation of soft starts during piling operations, which will allow fish to move away from the areas of highest sound levels, before they reach a level that would cause an injury. The initial injury ranges for soft start initiation will be smaller than those maximum ranges presented (i.e. with a maximum of 297m, for Group 2 fish).

1.7.3.11 For cumulative Sound Exposure Level (SEL_{cum}), injury ranges were calculated for piling activities wherein fish are treated as fleeing and static receptors. These ranges indicate that with the implementation of soft start initiation, when fish are modelled as fleeing receptors, the mortality injury ranges are considerably smaller than those predicted for peak Sound Pressure Levels (SPL_{pk}), and the mortality thresholds were not exceeded for group 1 and 2 fish. Similarly, the recoverability ranges were much lower, with thresholds not exceeded for group 1 fish, and group 2 fish had a maximum range of 79m. However, when fish were modelled as static receptors (see volume 2, chapter 8: Fish and shellfish ecology of the PEIR), mortality and recoverable injury ranges were significantly higher than for both SPL_{pk} and SEL_{cum} when fish were modelled as static receptors, with a maximum mortality range of up to 745m and 2,120m in group 1 and group 2 fish, respectively and a recoverable injury range of up to 1,060m and 4,760m in group 1 and group 2 fish, respectively.

1.7.3.12 The injury ranges presented indicate that injury may occur out to ranges of hundreds of metres for SPL_{pk}. However, in reality, the risk of fish injury overall will be considerably lower due to the hammer energies being lower than the absolute maximum modelled, as demonstrated by the lower injury ranges associated with first strikes as part of the soft start procedure (see volume 2, chapter 8: Fish and shellfish ecology of the PEIR for more information). The expected fleeing behaviour of fish from the area affected when exposed to high levels of sound and the soft start procedure, mean that it is likely that fish will have sufficient time to vacate the areas where injury may occur prior to sound levels reaching a level causing mortality, with only recoverable injury predicted for group 2 fish out to 79m. If the fish were to remain in the area and not have any behavioural response to the piling sound, the potential range for both mortality and recoverable injury would be much greater, out to the range of hundreds of metres to a few kilometres (see volume 2, chapter 8: Fish and shellfish ecology of the PEIR for more information).

1.7.3.13 Temporary Threshold Shift (TTS) is a temporary reduction in hearing sensitivity caused by intense sound. Normal hearing ability returns following cessation of the sound causing TTS, though the recovery period is variable, during which fish may have decreased fitness due to a reduced ability to communicate, detect predators or prey, and/or assess their environment. Volume 2, chapter 8: Fish and shellfish ecology of the PEIR outlines the predicted ranges of effect for TTS for all fish groups modelled as fleeing receptors which may occur as a result of piling for one 16m diameter pile, with TTS predicted to occur to a maximum range of 21,980m from piling operations when fish are modelled as fleeing receptors. For fish species modelled as static receptors, TTS is predicted to occur out to a maximum ranges of 30,180m from piling operations.

1.7.3.14 When concurrent piling is considered and modelled, the TTS ranges for fish modelled as fleeing receptors have a maximum range of 23,880m, and fish modelled as stationary receptors have a maximum range of 32,340m. These ranges are not significantly further than the impacts of the single piling and are thus unlikely to significantly increase the level of impact.

1.7.3.15 With respect to behaviour, fish species responses to construction-related underwater sound include a wide variety of behaviours, including startle (C-turn) responses; strong avoidance behaviour; changes in swimming or schooling behaviour, or changes of position in the water column. The Popper *et al.* (2014) guidelines provide qualitative behavioural criteria for fish from a range of sound sources, with the risk of behavioural effects on group 1 and group 2 fish from piling operations considered to be moderate to high in the near to intermediate field (i.e. <1km from piling operations) and low in the far field (i.e. in the range of kilometres form piling operations).

1.7.3.16 While behavioural effect thresholds proposed by Popper *et al*. (2014) are qualitative, a more quantitative assessment is presented in volume 2, chapter 8: Fish and shellfish ecology of the PEIR, using sound modelling outputs for SPL_{pk} from three locations around the Morgan Array Area. The contours showed SPL_{pk} associated with the greatest hammer energy for monopiles and based on the studies summarised within volume 2, chapter 8: Fish and shellfish ecology of the PEIR above, it can be expected that behavioural effects on fish species could be expected within the 160dB re 1µPa peak contours (see Figure 1.6); noting that this contour is likely to be highly conservative for group 1 and group 2 fish species as these are known to be less sensitive to underwater sound. Sound contours in volume 2, chapter 8: Fish and shellfish ecology of the PEIR indicated that while these contours extended over 10km from the piling operations, these did not extend to the coast of Wales, England or the Isle of Man except for piling at the north-west corner of the Morgan Array Area where the contour extends to the Isle of Man using the maximum hammer energy for monopiles. Due to the large distance between the array and the surrounding coastlines, underwater sound would not represent a barrier to migration for those fish moving though the Irish Sea to/from the relevant SACs discussed below. Further, the sound contours are for the greatest hammer energy for monopiles and therefore in

most scenarios this hammer energy will not be used, and therefore smaller contours (and more limited behavioural effects) would be expected, with lower risk of barrier effects. In addition, as noted in Table 1.11, the potential sound impacts will be short-term and intermittent in nature during the construction phase (i.e. piling occurring over approximately 112 days over a two year piling phase). As such, there is minimal risk of disruption to migration of lamprey species or Atlantic salmon.

1.7.3.17 Underwater sound modelling has also been completed for underwater sound associated with UXO clearance and detonation. Modelling was undertaken for a range of orders of detonation from a realistic worse case high order detonation to low order detonations (e.g. deflagration and clearance shots) to be used as mitigation to minimise sound levels. For the purposes of this assessment, it has been assumed that the MDS will be clearance of UXO with a NEQ of 907kg cleared by either low order or high order techniques, see volume 2, chapter 8: Fish and shellfish Ecology of the PEIR. The outputs of sound modelling for UXO clearance concluded that injury impacts may occur at range of tens to hundreds of metres, depending on the size of the UXO cleared and the method of detonation (i.e. smaller ranges for low order detonation, larger ranges for high order detonation) with a maximum range of up to approximately 900m.

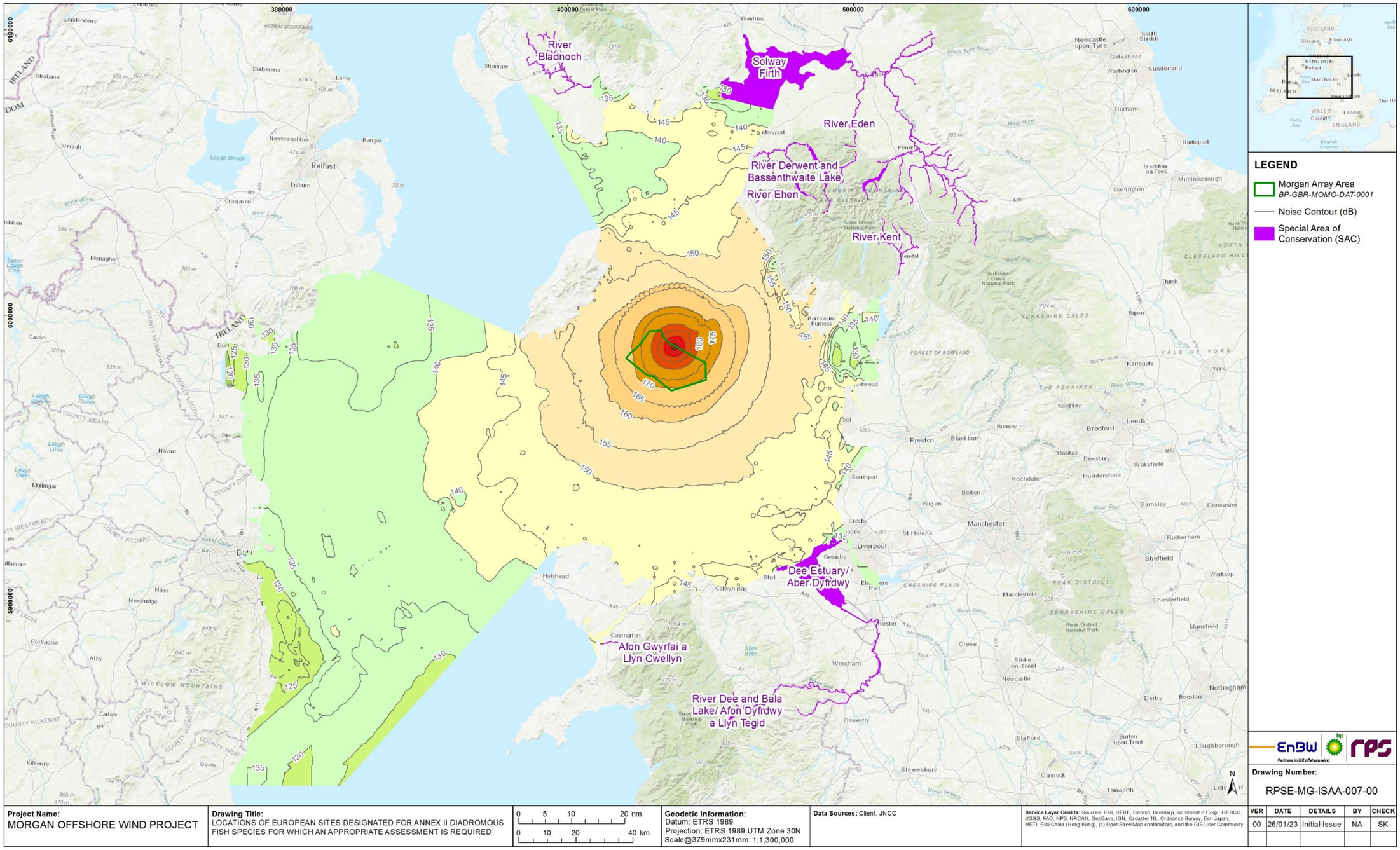


Figure 1.6: SACs with Annex II diadromous fish features with underwater sound SPL_{pk} 160dB re 1µPA contours for the northeast piling (monopile) location.

River Ehen SAC

Atlantic salmon

1.7.3.18 As outlined in paragraphs 1.7.3.9 to 1.7.3.13, Atlantic salmon within close proximity to piling operations may experience injury or mortality. However, considering the highly mobile nature of Atlantic salmon and that they only tend to utilise the environment within the Morgan Fish and Shellfish Ecology study area to pass through during migration, it is unlikely to result in significant mortality of Atlantic salmon. The measures adopted as part of Morgan Generation Assets (see Table 1.12 outlining the use of soft start piling procedures) will also allow individuals in close proximity to piling to flee the ensonified area, which further reduces the likelihood of injury and mortality on Atlantic salmon features.

1.7.3.19 Research from Harding *et al.* (2016) failed to produce physiological or behavioural responses in Atlantic salmon when subjected to sound similar to piling. However, the sound levels tested were estimated at <160dB re 1µPa Root Mean Square (rms), below the level at which injury or behavioural disturbance would be expected for Atlantic salmon. Nedwell *et al*. (2006) used the slightly less sensitive sea trout as a model for comparison to Atlantic salmon, and found no significant behavioural response from piling activities, with modelling suggesting a similar response in Atlantic salmon and sea trout. Physical impacts on migrating salmonids have been noted from piling producing sounds of 218dB re 1µPa (Bagocius, 2015), although at these sound levels, it would be expected that avoidance reactions would occur, thus avoiding injury impacts.

1.7.3.20 The sound modelling outputs discussed in paragraph 1.7.3.9 to 1.7.3.17 indicated that piling related underwater sound would result in behavioural responses in the vicinity of the Morgan Array Area although these would not extend close to the coasts of north Wales and therefore would not represent a barrier to migration. Further, the potential sound impacts will be short-term and intermittent in nature during the construction phase (i.e. piling occurring over approximately 70 days over a two year piling phase). As such, there is negligible risk of disruption to migration of these species.

Freshwater pearl mussel

1.7.3.21 Adult freshwater pearl mussel are confined to freshwater habitats therefore there is no pathway for direct effects to this species during construction and decommissioning of the Morgan Generation Assets as a result of underwater sound.

1.7.3.22 There is potential however for indirect adverse effects on the larval stage of freshwater pearl mussel if there are adverse effects on the individual salmon (their host species for the first year of their life) to which they are attached. The assessment for Atlantic salmon above (paragraphs 1.7.3.18 to 1.7.3.20) concluded that underwater sound emissions will not lead to adverse effects on the population, distribution and supporting habitats of Atlantic salmon, therefore it can also be concluded that there will be no significant indirect effects to freshwater pearl mussel.

Conclusions

1.7.3.23 Adverse effects on Atlantic salmon and freshwater pearl mussel which undermine the conservation objectives of the River Ehen SAC will not occur as a result of potential underwater sound impacts during the construction and decommissioning activities. An assessment of the impact 'underwater sound' against each relevant conservation objective (as presented in paragraphs 1.7.2.9 to 1.7.2.10) is presented in Table 1.13. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.13: Conclusions against the conservation objectives of the Riven Ehen SAC from underwater sound during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound to result in adverse effects on the habitats of Atlantic salmon and freshwater pearl mussel. Therefore underwater sound associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon and freshwater pearl mussel or the supporting processes on which the habitats of Atlantic salmon and freshwater pearl mussel rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Atlantic salmon within close proximity to piling operations may experience injury or mortality. However, given they are highly mobile, will only travel through the potential Zone of Influence (ZOI) during migration and the use of soft start piling procedures will allow individuals in close proximity of piling to flee the ensonified area, significant mortality or injury is not predicted. Atlantic salmon may experience behavioural effects in response to piling in the vicinity of the Morgan Array Area however, modelling indicates these effects would not result in barriers to migration to and from this SAC and potential sound impacts will be short-term and intermittent during the construction phase. As such there is negligible risk of disruption to migration of Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the populations or the distributions of Atlantic salmon or freshwater pearl mussel from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.3.24 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Ehen SAC as a result of underwater sound emissions with respect to construction and decommissioning of the Morgan Generation Assets alone.

Dee Estuary/Aber Dyfrdwy SAC

Sea lamprey and river lamprey

1.7.3.25 As outlined in paragraphs 1.7.3.9 to 1.7.3.13, sea lamprey features within close proximity to piling operations may experience injury or mortality. However, given the highly mobile nature of sea lamprey and their tendency to only utilise the environment within the Morgan fish and shellfish ecology study area to pass through during migration, the impact is unlikely to result in significant mortality of lamprey species. The measures adopted as part of the Morgan Generation Assets (see Table 1.12 which outlines the use of soft start piling procedures) will also allow individuals in close proximity to piling to flee the ensonified area, further reducing the likelihood of injury and mortality on sea lamprey features.

1.7.3.26 Lamprey species associated with the Dee Estuary/Aber Dyfrdwy SAC may experience behavioural effects in response to piling sound, including a startle response, disruption

of feeding, or avoidance of an area. For lamprey species (considered the least sensitive to underwater sound compared with other diadromous fish species) behavioural responses may occur within a range of hundreds of metres to a few kilometres from piling operations.

1.7.3.27 Lamprey species are known to have relatively simple ear structures (Popper and Hoxter, 1987), with very few responses to auditory stimuli noted overall (Popper, 2005), except a slight swimming speed increase and decrease in resting behaviour when exposed to continuous low frequency sound of 50-200Hz (Mickle *et al*., 2019), suggesting a low vulnerability to sound impacts overall.

1.7.3.28 The sound modelling outputs (including sound contours presented in volume 2, chapter 8: Fish and shellfish ecology of the PEIR) discussed in the previous sections indicated that piling related underwater sound would result in behavioural responses in the vicinity of the Morgan Array Area although these would not extend close to the coasts of north Wales (i.e. Dee Estuary/Aber Dyfrdwy SAC) and therefore would not represent a barrier to migration. Further, the potential sound impacts will be short-term and intermittent in nature during the construction phase (i.e. piling occurring over approximately 112 days over a two year piling phase). As such, there is negligible risk of disruption to migration of the lamprey qualifying species of the Dee Estuary/Aber Dyfrdwy SAC.

Conclusions

1.7.3.29 Adverse effects on the lamprey species which undermine the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC will not occur as a result of potential underwater sound impacts during the construction and decommissioning activities. An assessment of the impact 'underwater sound' against each relevant conservation objective (as presented in paragraph 1.7.2.17 to 1.7.2.19) is presented in Table 1.14. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.14: Conclusions against the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC from underwater sound during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound to result in adverse effects on the habitats of river and sea lampreys. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of river and sea lampreys or the supporting processes on which the habitats of river and sea lampreys rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Sea lamprey and river lamprey within close proximity to piling operations may experience injury or mortality. However, given they are highly mobile, will only travel through the potential ZOI during migration and the use of soft start piling procedures will allow individuals in close proximity of piling to flee the ensonified area, significant mortality or injury is not predicted. Sea lamprey and river lamprey may experience behavioural effects in response to piling in the vicinity of the Morgan Array Area however, modelling indicates these effects would not result in barriers to migration to and from this SAC and potential sound impacts will be short-term and intermittent during the construction phase. As such there is negligible risk of disruption to migration of sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the populations or the distributions of sea lamprey and river lamprey from being maintained or restored.

1.7.3.30 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Dee Estuary/Aber Dyfrdwy SAC as a result of underwater sound emissions with respect to construction and decommissioning of the Morgan Generation Assets alone.

River Derwent and Bassenthwaite Lake SAC

Sea lamprey and river lamprey

1.7.3.31 Potential impacts of underwater sound on sea lamprey and river lamprey features of the River Derwent and Bassenthwaite Lake SAC are predicted to be similar to those associated with the Dee Estuary/Aber Dyfrdwy SAC (70.1km from the Morgan Array Area) outlined in paragraphs 1.7.3.25 to 1.7.3.30. As the River Derwent and Bassenthwaite Lake SAC (71.3km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Dee Estuary/Aber Dyfrdwy SAC, it is considered that effects on the lamprey features of this site would be of similar if not of a lower magnitude. In addition, the conservation objectives for the two SACs are the same and therefore considered comparable. No adverse effect on integrity was concluded for the Dee Estuary/Aber Dyfrdwy SAC (see paragraph 1.7.3.30) therefore no adverse effect on the sea lamprey and river lamprey features of the Derwent and Bassenthwaite Lake SAC can also be concluded.

Atlantic salmon

1.7.3.32 Potential impacts of underwater sound on Atlantic salmon features of the River Derwent and Bassenthwaite Lake SAC are predicted to be similar to those associated with the River Ehen SAC (62.8km from the Morgan Array Area) outlined in paragraphs 1.7.3.18 to 1.7.3.20. As the River Derwent and Bassenthwaite Lake SAC (71.3km from the Morgan Array Area) is located at an increased distance from the Morgan Generations Assets than the River Ehen SAC, it is considered that effects would be of similar if not of a lower magnitude. In addition, the conservation objectives for the two SACs are the same and therefore considered comparable. No adverse effect on integrity was concluded for the River Ehen SAC (see paragraph 1.7.3.24) therefore no adverse effect on the sea lamprey and river lamprey features of the Derwent and Bassenthwaite Lake SAC can also be concluded.

Conclusions

1.7.3.33 Adverse effects on river and sea lampreys and Atlantic salmon which undermine the conservation objectives of the River Derwent and Bassenthwaite Lake SAC will not occur as a result of potential underwater sound impacts during the construction and decommissioning activities. An assessment of the impact 'underwater sound' against

each relevant conservation objective (as presented in paragraph 1.7.2.25 to 1.7.2.26) is presented in Table 1.15. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.15: Conclusions against the conservation objectives of the River Derwent and Bassenthwaite Lake SAC from underwater sound during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of Atlantic salmon, sea lamprey and river sea lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Atlantic salmon, sea lamprey and river lamprey within close proximity to piling operations may experience injury or mortality. However, given they are highly mobile, will only travel through the potential ZOI during migration and the use of soft start piling procedures will allow individuals in close proximity of piling to flee the ensonified area, significant mortality or injury is not predicted. Atlantic salmon, sea lamprey and river lamprey may experience behavioural effects in response to piling in the vicinity of the Morgan Array Area however, modelling indicates these effects would not result in barriers to migration to and from this SAC and potential sound impacts will be short-term and intermittent during the construction phase. As such there is negligible risk of disruption to migration of Atlantic salmon, sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the populations or the distributions of Atlantic salmon, sea lamprey and river lamprey from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.3.34 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Derwent and Bassenthwaite Lake SAC as a result of underwater sound emissions with respect to construction and decommissioning of the Morgan Generation Assets alone.

River Kent SAC

Freshwater pearl mussel

1.7.3.35 Adult freshwater pearl mussel are confined to freshwater habitats therefore there is no pathway for direct effects to this species during construction and decommissioning of the Morgan Generation Assets as a result of underwater sound.

1.7.3.36 There is potential however for indirect adverse effects on the larval stage of freshwater pearl mussel if there are adverse effects on the individual salmon (their host species for the first year of their life) to which they are attached. The assessment for Atlantic salmon above for the River Derwent and Bassenthwaite SAC (paragraphs 1.7.3.31 to 1.7.3.34) concluded that underwater sound emissions will not lead to adverse effects on the population, distribution and supporting habitats of Atlantic salmon, therefore it can also be concluded that there will be no significant indirect effects to freshwater pearl mussel.

Conclusions

1.7.3.37 Adverse effects on freshwater pearl mussel which undermine the conservation objectives of the River Kent SAC will not occur as a result of potential underwater sound impacts during the construction and decommissioning activities. An assessment of the impact 'underwater sound' against each relevant conservation objective (as presented in paragraph 1.7.2.31 to 1.7.2.33) is presented in Table 1.16. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.16: Conclusions against the conservation objectives of the River Kent SAC from underwater sound during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound to result in adverse effects on the habitats of freshwater pearl mussel. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of freshwater pearl mussel or the supporting processes on which the habitats of freshwater pearl mussel rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that no direct effects are anticipated for freshwater pear mussel features of the River Kent SAC and adverse effects are not anticipated for Atlantic salmon populations within the SAC, underwater sound associated with Morgan Generation Assets will not prevent the population and distribution of freshwater pearl mussel from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.3.38 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Kent SAC as a result of underwater sound emissions with respect to construction and decommissioning of the Morgan Generation Assets alone.

Solway Firth SAC

Sea lamprey and river lamprey

1.7.3.39 Underwater sound effects on sea lamprey and river lamprey features of the Solway Firth SAC are predicted to be similar to those associated with the Dee Estuary/Aber Dyfrdwy SAC (70.1km from the Morgan Array Area) outlined in paragraph 1.7.3.25 to 1.7.3.30. As the the Solway Firth SAC (84.3km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Dee Estuary/Aber Dyfrdwy SAC it is considered that effects would be of similar if not of a

lower magnitude. As no adverse effect on the integrity of the Dee Estuary/Aber Dyfrdwy SAC was concluded in paragraph 1.7.3.30, by proxy no adverse effect can also be concluded for the Solway Firth SAC.

Conclusions

1.7.3.40 Adverse effects on sea lamprey and river lamprey which undermine the conservation objectives of the Solway Firth SAC will not occur as a result of potential underwater sound impacts during the construction and decommissioning phase. An assessment of the impact 'underwater sound' against each relevant conservation objective (as presented in paragraph 1.7.2.38 to 1.7.2.39) is presented in Table 1.17. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.17: Conclusions against the conservation objectives of the Solway Firth SAC from underwater sound during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound to result in adverse effects on the habitats of sea lamprey and river lamprey. Therefore underwater sound associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or the supporting processes on which the habitats of sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Sea lamprey and river lamprey within close proximity to piling operations may experience injury or mortality. However, given they are highly mobile, will only travel through the potential ZOI during migration and the use of soft start piling procedures will allow individuals in close proximity of piling to flee the ensonified area, significant mortality or injury is not predicted. Sea lamprey and river lamprey may experience behavioural effects in response to piling in the vicinity of the Morgan Array Area however, modelling indicates these effects would not result in barriers to migration to and from this SAC and potential sound impacts will be short-term and intermittent during the construction phase. As such there is negligible risk of disruption to migration of sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the populations or the distributions of sea lamprey and river lamprey from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.3.41 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Solway Firth SAC as a result of underwater sound emissions with respect to construction and decommissioning of the Morgan Generation Assets alone.

River Bladnoch SAC

Atlantic salmon

1.7.3.42 Underwater sound effects on Atlantic salmon features of the River Bladnoch SAC are predicted to be similar to those associated with the River Ehen SAC (62.8km from the Morgan Array Area) outlined in paragraphs 1.7.3.18 to 1.7.3.20. As the River Bladnoch SAC (89.6km from the Morgan Array Area) is located at an increased distance from the Morgan Generations Assets than the River Ehen SAC it is considered that effects would be of similar if not of a lower magnitude. No adverse effect on integrity was concluded for the River Ehen SAC (see paragraph 1.7.3.24) therefore no adverse effect on the Atlantic salmon feature of the River Bladboch SAC can also be concluded.

Conclusions

1.7.3.43 Adverse effects on Atlantic salmon which undermine the conservation objectives of the River Bladnoch SAC will not occur as a result of potential underwater sound impacts during the construction and decommissioning activities. An assessment of the impact 'underwater sound' against each relevant conservation objective (as presented in paragraph 1.7.2.44) is presented in Table 1.18. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.18: Conclusions against the conservation objectives of the River Bladnoch SAC from underwater sound during the construction phase.

Conservation Objective	Conclusion
Restore the population of the species, including range of genetic types, as a viable component of the site	Atlantic salmon within close proximity to piling operations may experience injury or mortality. However, given they are highly mobile, will only travel through the potential ZOI during migration and the use of soft start piling procedures will allow individuals in close proximity of piling to flee the ensonified area, significant mortality or injury is not predicted. Atlantic salmon may experience behavioural effects in response to piling in the vicinity of the Morgan Array Area however, modelling indicates these effects would not result in barriers to migration to and from this SAC, and potential sound impacts will be short-term and intermittent during the construction phase. As such there is negligible risk of disruption to migration of Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the restoration of the population of Atlantic salmon as a viable component of the site and its distribution throughout the site.
Restore the distribution of the species throughout the site	
Restore the habitats supporting the species within the site and availability of food	There is no pathway for underwater sound to result in adverse effects on the habitats supporting Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the habitats supporting Atlantic salmon within the site and availability of food from being restored.

1.7.3.44 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Bladnoch SAC as a result of underwater sound emissions with respect to construction and decommissioning of the Morgan Generation Assets alone.

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

Sea lamprey and river lamprey

1.7.3.45 Underwater sound effects on the sea lamprey and river lamprey qualifying species of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC are predicted to be similar to those associated with the Dee Estuary/Aber Dyfrdwy SAC (70.1km from the Morgan Array Area) outlined in paragraph 1.7.3.25 to 1.7.3.30. As the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (91.6km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Dee Estuary/Aber Dyfrdwy SAC, it is considered that effects would be of similar if not of a lower magnitude. No adverse effect on integrity was concluded for the Dee Estuary/Aber Dyfrdwy SAC (see paragraph 1.7.3.30) therefore no adverse effect on the sea lamprey and river lamprey features of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC can also be concluded.

Atlantic salmon

1.7.3.46 Underwater sound effects on Atlantic salmon features of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC are predicted to be similar to those associated with the River Ehen SAC (62.8km from the Morgan Array Area) outlined in paragraph 1.7.3.18 to 1.7.3.20. As the the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (91.6km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the River Ehen SAC it is considered that effects would be of similar if not of a lower magnitude. No adverse effect on integrity was concluded for the River Ehen SAC (see paragraph 1.7.3.24) therefore no adverse effect on the sea lamprey and river lamprey features of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC can also be concluded.

Conclusions

1.7.3.47 Adverse effects on sea lamprey and river lamprey which undermine the conservation objectives of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC will not occur as a result of potential underwater sound impacts during the construction and decommissioning activities. An assessment of the impact 'underwater sound' against each relevant conservation objective (as presented in paragraph 1.7.2.51) is presented in Table 1.19. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.19: Conclusions against the conservation objectives of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC from underwater sound during the construction phase.

Conservation Objective	Conclusion
The parameters defined in the vision for the watercourse as outlined in NRW (2022b) must be met	Due to the nature of the impact, and the distance of the Morgan Array Area from the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC, there is no route to impact and underwater sound associated with the Morgan Generation Assets will not prevent the defined vision for the watercourse from being met. There will be no reduction in the area or quality of habitat for the populations Atlantic salmon, sea lamprey and river lamprey of in the SAC on a long-term basis.
There will be no reduction in the area or quality of habitat for the feature populations in the SAC on a long-term basis.	
The SAC feature populations will be stable or increasing over the long term	Atlantic salmon, sea lamprey and river lamprey within close proximity to piling operations may experience injury or mortality. However, given they are highly mobile, will only travel through the potential ZOI during migration and the use of soft start piling procedures will allow individuals in close proximity of piling to flee the ensonified area, significant mortality or injury is not predicted. Atlantic salmon, sea lamprey and river lamprey may experience behavioural effects in response to piling in the vicinity of the Morgan Array Area however, modelling indicates these effects would not result in barriers to migration to and from this SAC and potential sound impacts will be short-term and intermittent during the construction phase. As such there is negligible risk of disruption to migration of Atlantic salmon, sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the populations of Atlantic salmon, sea lamprey and river lamprey from remaining stable or increasing in the long term. Similarly, underwater sound associated with the Morgan Generation Assets will not reduce or likely reduce, in the foreseeable future, the natural range of Atlantic salmon, sea lamprey and river lamprey within the site.
The natural range of the features in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future.	
All factors affecting the achievement of these conditions are under control.	Given the conclusions made for the other conservation objectives above, it is considered that all factors affecting the achievement of these conditions will remain under control.

1.7.3.48 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC as a result of underwater sound emissions with respect to construction and decommissioning of the Morgan Generation Assets alone.

Afon Gwyrfai a Llyn Cwellyn SAC

Atlantic salmon

1.7.3.49 Underwater sound effects on Atlantic salmon features of the Afon Gwyrfai a Llyn Cwellyn SAC are predicted to be similar to those associated with the River Ehen SAC (62.8km from the Morgan Array Area) outlined in paragraphs 1.7.3.18 to 1.7.3.20. As the Afon Gwyrfai a Llyn Cwellyn SAC (118km from the Morgan Array Area) is located at an increased distance from the Morgan Generations Assets than the River Ehen SAC, it is considered that effects would be of similar if not of a lower magnitude. No adverse effect on integrity was concluded for the River Ehen SAC (see paragraph 1.7.3.24), therefore no adverse effect on the Atlantic salmon feature of the Afon Gwyrfai a Llyn Cwellyn SAC also be concluded.

Conclusions

1.7.3.50 Adverse effects on Atlantic salmon which undermine the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC will not occur as a result of potential underwater sound impacts during the construction and decommissioning activities. An

assessment of the impact 'underwater sound' against each relevant conservation objective (as presented in paragraphs 1.7.2.56) is presented in Table 1.20. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.20: Conclusions against the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC from underwater sound during the construction phase.

Conservation Objective	Conclusion
The conservation objective for the water course as outlined in NRW (2022c) must be met	Considering the distance from the Morgan Generation Assets to the Afon Gwyrfai a Llyn Cwellyn SAC (118.km) and the nature of the impact, there is no pathway for effects to the watercourse to occur. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the conservation objectives for the water course from being met.
The population of the feature in the SAC is stable or increasing over the long term	Atlantic salmon within close proximity to piling operations may experience injury or mortality. However, given they are highly mobile, will only travel through the potential ZOI during migration and the use of soft start piling procedures will allow individuals in close proximity of piling to flee the ensonified area, significant mortality or injury is not predicted. Atlantic salmon may experience behavioural effects in response to piling in the vicinity of the Morgan Array Area however, modelling indicates these effects would not result in barriers to migration to and from this SAC, and potential sound impacts will be short-term and intermittent during the construction phase. As such there is negligible risk of disruption to migration of Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the population of Atlantic salmon from remaining stable or increasing in the long term. Similarly, underwater sound associated with the Morgan Generation Assets will not reduce or likely reduce, in the foreseeable future, the natural range of Atlantic salmon within the site.
The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future	
The Gwyrfai will continue to be a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis	Considering the distance from the Morgan Generation Assets to the Afon Gwyrfai a Llyn Cwellyn SAC (118km) and the nature of the impact, there is no pathway for underwater sound to result in adverse effects on the habitats supporting Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets will not reduce the area of the habitats of Atlantic salmon and the Gwyrfai will continue to be a sufficiently large habitat to maintain the population of Atlantic salmon in the Afon Gwyrfai a Llyn Cwellyn SAC on a long-term basis.

1.7.3.51 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Afon Gwyrfai a Llyn Cwellyn SAC as a result of underwater sound emissions with respect to construction and decommissioning of the Morgan Generation Assets alone.

River Eden SAC

Sea lamprey and river lamprey

1.7.3.52 Underwater sound effects on sea lamprey and river lamprey features of the River Eden SAC are predicted to be similar to those associated with the Dee Estuary/Aber Dyfrdwy SAC (70.1km from the Morgan Array Area) outlined in paragraph 1.7.3.25 to 1.7.3.30. As the River Eden SAC (125.7km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Dee Estuary/Aber Dyfrdwy SAC it is considered that effects would be of similar if not of a lower magnitude. No adverse effect on integrity was concluded for the Dee Estuary/Aber Dyfrdwy SAC (see paragraph 1.7.3.30), therefore no adverse effect on the sea lamprey and river lamprey features of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC can also be concluded.

Atlantic salmon

1.7.3.53 Underwater sound effects on Atlantic salmon features of the River Eden SAC are predicted to be similar to those associated with the River Ehen SAC (62.8km from the Morgan Array Area) outlined in paragraphs 1.7.3.18 to 1.7.3.20. As the River Eden SAC (125.7km from the Morgan Array Area) is located at an increased distance from the Morgan Generations Assets than the River Ehen SAC it is considered that effects would be of similar if not of a lower magnitude. No adverse effect on integrity was concluded for the River Ehen SAC (see paragraph 1.7.3.24), therefore no adverse effect on the Atlantic salmon feature of the Afon Gwyrfai a Llyn Cwellyn SAC also be concluded.

Conclusions

1.7.3.54 Adverse effects on sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Eden SAC will not occur as a result of potential underwater sound impacts during the construction and decommissioning activities. An assessment of the impact 'underwater sound' against each relevant conservation objective (as presented in paragraphs 1.7.2.62 to 1.7.2.64) is presented in Table 1.21. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.21: Conclusions against the conservation objectives of the River Eden SAC from underwater sound during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore underwater sound associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of Atlantic salmon, sea lamprey and river sea lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	

Conservation Objective	Conclusion
The populations of qualifying species [are maintained or restored]	Atlantic salmon, sea lamprey and river lamprey within close proximity to piling operations may experience injury or mortality. However, given they are highly mobile, will only travel through the potential ZOI during migration and the use of soft start piling procedures will allow individuals in close proximity of piling to flee the ensonified area, significant mortality or injury is not predicted. Atlantic salmon, sea lamprey and river lamprey may experience behavioural effects in response to piling in the vicinity of the Morgan Array Area however, modelling indicates these effects would not result in barriers to migration to and from this SAC and potential sound impacts will be short-term and intermittent during the construction phase. As such there is negligible risk of disruption to migration of Atlantic salmon, sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets will not prevent the populations or the distributions of Atlantic salmon, sea lamprey and river lamprey from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.3.55 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Eden SAC as a result of underwater sound emissions with respect to construction and decommissioning of the Morgan Generation Assets alone.

EMF from subsea electric cables

1.7.3.56 The presence and operation of inter-array and interconnector cables within the Morgan Array Area will lead to localised potential EMF impacts, which may affect Annex II diadromous fish features and freshwater pearl mussel.

1.7.3.57 The assessment of LSE in the HRA Stage 1 Screening Report identified that during the operations and maintenance phase, LSE could not be ruled out for the potential impacts of EMF from subsea electric cables. This relates to the European sites and relevant Annex II features listed in Table 1.22.

Table 1.22: European sites and relevant Annex II diadromous fish features from which potential for an LSE could not be ruled out in relation to EMF impacts.

SAC	Annex II diadromous fish features
River Ehen SAC	• Atlantic salmon • Freshwater pearl mussel.
Dee Estuary/Aber Dyfrdwy SAC	• Sea lamprey • River lamprey.
River Derwent and Bassenthwaite Lake SAC	• Sea lamprey • River lamprey • Atlantic salmon.
River Kent SAC	• Freshwater pearl mussel
Solway Firth SAC	• Sea lamprey • River lamprey.
River Bladnoch SAC	• Atlantic salmon
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	• Sea lamprey • River lamprey • Atlantic salmon.
Afon Gwyrfai a Llyn Cwellyn SAC	• Atlantic salmon
River Eden SAC	• Sea lamprey • River lamprey • Atlantic salmon.

1.7.3.58 The following sections explain how this potential impact on Annex II diadromous fish features of the identified SACs has been quantified and assessed.

1.7.3.59 The MDS considered for the assessment of potential impacts on Annex II diadromous fish features from EMF from subsea electric cables effects is presented in Table 1.23.

1.7.3.60 For the purposes of the assessment sea lamprey and river lamprey have been assessed together due to their similar sensitivity to EMF from subsea electric cables and the fact that their conservation objectives are the same for both species at all European sites assessed and therefore effects and associated conclusions are considered to be alike.

Table 1.23: Maximum design scenario considered for the assessment of potential impacts on diadromous fish from EMF from subsea electric cables.

Phase	MDS	Justification
Operations and maintenance phase	Presence of inter-array and interconnector cables: • Inter-array cables: up to 500km of inter-array cables of 66kV to 132kV • Interconnector cables: up to 60km of 275kV HVAC cables • Minimum burial depth 0.5m • Assumes up to 10% of inter-array cables and 20% of interconnector cables may require cable protection • Cable protection: cables will also require cable protection at asset crossings (up to 67 crossings for inter-array cables and 10 crossings for interconnector cables) • Operations and maintenance phase of up to 35 years.	Maximum length of cables across the Morgan Array Area and minimum burial depth (the greater the burial depth, the more the EMF from subsea electric cables is attenuated).

Measures adopted as part of Morgan Generation Assets

1.7.3.61 Table 1.24 outlines the measures adopted as part of Morgan Generation Assets which are relevant to EMF from subsea electric cables effects on Annex II diadromous fish features during the operations and maintenance phase.

Table 1.24: Measures adopted as part of the Morgan Generation Assets which are relevant to EMF from subsea electric cables effects.

Measure	Justification	How the measure will be secured
Development and adherence to a Cable Specification and Installation Plan (CSIP)	All electrical cables will be buried to depths of at least 0.5m as informed by a Cable Burial Risk Assessment (CBRA, within the CSIP). While burial of cables will not reduce the strength of EMF from subsea electric cables, it does increase the distance between cables and fish and shellfish receptors, thereby potentially reducing the effect on those receptors.	Proposed to be secured through a condition in the marine licence(s)

Operations and maintenance phase

Information to support assessment

1.7.3.62 EMF comprise both the electrical fields, measured in volts per metre (V/m), and the magnetic fields, measured in microtesla (µT) or milligauss (mG). Background measurements of the magnetic field are approximately 50µT (i.e. 500mG) for example in the North Sea (Tasker *et al.*, 2010). It is common practice to block the direct electrical field using conductive sheathing, meaning that the only EMFs that are emitted into the marine environment are the magnetic field and the resultant induced electrical field. It is generally considered impractical to assume that cables can be buried at depths that will reduce the magnitude of the magnetic field, and hence the sediment-sea water interface induced electrical field, to below that at which these fields could be detected by certain marine organisms on or close to the seabed (Gill *et al*., 2005; Gill *et al*., 2009). By burying a cable, the magnetic field at the seabed is reduced due to the distance between the cable and the seabed surface as a result of field decay with distance from the cable (CSA, 2019).

1.7.3.63 A variety of design and installation factors affect EMF levels in the vicinity of the cables. These include current flow, distance between cables, cable insulation, number of conductors, configuration of cable and burial depth. The flow of electricity associated with an Alternating Current (AC) cable changes direction (as per the frequency of the AC transmission) and creates a constantly varying electric field in the surrounding marine environment (Huang, 2005).

1.7.3.64 The strength of the magnetic field (and consequently, induced electrical fields) decreases rapidly horizontally and vertically with distance from source. A recent study conducted by CSA (2019) found that inter-array and offshore export cables buried between depths of 1m to 2m reduces the magnetic field at the seabed surface four-fold. For cables that are unburied and instead protected by thick concrete mattresses or rock berms, the field levels were found to be similar to buried cables.

1.7.3.65 Further information on the EMF from subsea electric cables levels associated with offshore wind farm power cables is included within volume 2, chapter 8: Fish and shellfish ecology of the PEIR.

River Ehen SAC

Atlantic salmon

1.7.3.66 Atlantic salmon and European eel have both been found to possess magnetic material of a size suitable for magnetoreception, and these species can use the earth's magnetic field for orientation and direction-finding during migration (Gill and Bartlett, 2010; CSA, 2019). Mark and recapture experiments undertaken at the Nysted operational offshore wind farm showed that eel did cross the offshore export cable (Hvidt *et al*., 2003).

1.7.3.67 Studies on European eel in the Baltic Sea have highlighted some limited effects of subsea cables (Westerberg and Lagenfelt, 2008), with evidence of direct detection of EMF through the lateral line of this species (Moore and Riley, 2009). The swimming speed during migration was shown to change in the short term (tens of minutes) with exposure to AC electric subsea cables, even though the overall direction remained unaffected (Westerberg and Langenfelt, 2008). The authors concluded that any delaying effect (i.e. on average 40 minutes) would not be likely to influence fitness in a 7,000km migration, with little to no impact on migratory behaviour noted beyond 500m from wind farm development infrastructure (Ohman *et al*., 2007). While this study was undertaken on European eel, this indicates that fish behavioural effects in response to EMF from subsea electric cables are limited both temporally and spatially and these do not cause barriers to migration.

1.7.3.68 Research in Sweden on the effects of a High Voltage Direct Current (HVDC) cable on the migration patterns of a range of fish species, including salmonids, failed to find any effect (Westerberg *et al*., 2007; Wilhelmsson *et al*., 2010). Research conducted at the Trans Bay cable, a direct current (DC) undersea cable near San Francisco, California, found that migration success and survival of chinook salmon *Oncorhynchus tshawytscha* was not impacted by the cable. However, behavioural changes were noted when these fish were near the cable with salmon appearing to remain around the cable for longer periods (Kavet *et al*., 2016). These studies demonstrate that while DC subsea power cables can result in altered patterns of fish behaviour, these changes are temporary and do not interfere with migration success or population health.

1.7.3.69 As outlined in paragraphs 1.7.3.67 and 1.7.3.68, the Morgan Generation Assets could potentially cause Atlantic salmon features to alter their migration route, however as discussed above, it is considered more likely that migratory behaviour will not be altered in terms of direction and rather that swimming speed may be reduced when in proximity to EMF from subsea electric cables.

1.7.3.70 Any EMF from subsea electric cables impacts will be localised in context with the wider Irish Sea region and will not present a barrier to migration to and from the SAC. Any behavioural effects will be further minimised by the burial of cables (see Table 1.24).

Freshwater pearl mussel

1.7.3.71 The freshwater pearl mussel has been considered within this HRA Stage 2 ISAA Report as Atlantic salmon are host species during a critical parasitic phase of the mussel's lifecycle. There could therefore be an indirect potential impact upon the freshwater pearl mussel feature of the site if the salmon population is adversely affected. However, as outlined in paragraphs 1.7.3.66 to 1.7.3.70. it is not anticipated that Atlantic salmon will be adversely affected. Therefore, no adverse effects on the freshwater pearl mussel can also be concluded.

Conclusions

1.7.3.72 Adverse effects on Atlantic salmon and freshwater pearl mussel which undermine the conservation objectives of the River Ehen SAC will not occur as a result of EMF from subsea electric cables during the operations and maintenance phase. An assessment of the potential impact 'EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraphs 1.7.2.9 to 1.7.2.10) is presented in Table 1.25. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.25: Conclusions against the conservation objectives of the River Ehen SAC from EMF from subsea electric cables during the operations and maintenance phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for effect between EMF from subsea electric cables and the habitats of Atlantic salmon and freshwater pearl mussel. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon and freshwater pearl mussel or the supporting processes on which the habitats of Atlantic salmon and freshwater pearl mussel rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that Atlantic salmon are considered to have low sensitivity to EMF from subsea electric cables and that the assessment concluded that EMF from subsea electric cables associated with Morgan Generation Assets would not result in a barrier to migration of Atlantic salmon, the populations and distributions of Atlantic salmon and freshwater pearl mussel will not be prevented from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.3.73 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Ehen SAC as a result of EMF from subsea electric cables with respect to the operations and maintenance phase of the Morgan Generation Assets alone.

Dee Estuary/Aber Dyfrdwy SAC

Sea lamprey and river lamprey

1.7.3.74 EMF from subsea electric cables may interfere with the navigation of sensitive diadromous species. Lamprey possess specialised ampullary electroreceptors that are sensitive to weak, low frequency electric fields (Bodznick and Northcutt, 1981; Bodznick and Preston, 1983), which are hypothesised to be used for prey-detection, although further research is required in this area (Tricas and Carlston, 2012). Chung-Davidson *et al*. (2008) found that weak electric fields may play a role in the reproduction of sea lamprey and it was suggested that electrical stimuli mediate different behaviours in the feeding-stage and spawning-stage of individuals. This study showed that migration behaviour of sea lamprey was affected (i.e. adults did not move) when stimulated with electrical fields of intensities of between 2.5 and 100mV/m, with normal behaviour observed at electrical field intensities higher and lower than this range (Chung-Davidson *et al*., 2008). It should be noted, however, that these levels are considerably higher than modelled induced electrical fields expected from AC subsea cables (see volume 2, chapter 8: Fish and shellfish ecology of the PEIR). There is currently no evidence of lamprey responses to magnetic B fields (Gill and Bartlett, 2010).

1.7.3.75 As outlined in paragraph 1.7.3.74, EMF from subsea electric cables may influence the behaviour of lamprey species. These effects may be detrimental if they result in the creation of a barrier to migration routes to and from natal rivers. However, diadromous species such as lamprey are highly mobile and are considered to be capable of changing course during migration between natal rivers and the open sea.

1.7.3.76 Lamprey species are considered to have significantly reduced sensitivity to EMF from subsea electric cables in comparison with fish species, such as elasmobranchs, and should effects occur, these would be limited to within a few metres of the buried cable and migration will not be significantly affected. In addition, considering the mitigation measure outlined in Table 1.24 which will ensure that inter-array and interconnector cables will be buried to depths of at least 0.5m as informed by a CBRA, no adverse effects to lamprey are predicted. While burial of cables will not reduce the strength of EMF from subsea electric cables, it does increase the distance between cables and Annex II diadromous fish features, thereby reducing the effect on those receptors.

1.7.3.77 Any impact of EMF from subsea electric cables will be localised in context with the wider Irish Sea region and will not result in any barriers to migration to and from the SAC. Any behavioural effects will be further minimised by the burial of cables (see Table 1.24).

Conclusions

1.7.3.78 Adverse effects on sea lamprey and river lamprey which undermine the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC will not occur as a result of EMF from subsea electric cables during the operations and maintenance phase. An assessment of the potential impact 'EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraphs 1.7.2.17 to 1.7.2.19) is presented in Table 1.26. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.26: Conclusions against the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC from EMF from subsea electric cables during the operations and maintenance phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for effect between EMF from subsea electric cables and the habitats of sea lamprey and river lamprey. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or the supporting processes on which the habitats of sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that lamprey species are considered to have low sensitivity to EMF from subsea electric cables and that the assessment concluded that EMF from subsea electric

Conservation Objective	Conclusion
The distributions of qualifying species within the site [are maintained or restored]	cables associated with Morgan Generation Assets would not result in a barrier to migration of sea lamprey and river lamprey, the populations and distributions of sea lamprey and river lamprey will not be prevented from being maintained or restored.

1.7.3.79 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Dee Estuary/Aber Dyfrdwy SAC as a result of EMF from subsea electric cables with respect to the operations and maintenance phase of the Morgan Generation Assets alone.

River Derwent and Bassenthwaite Lake SAC

Sea lamprey and river lamprey

1.7.3.80 Potential EMF from subsea electric cables impacts on sea lamprey and river lamprey features of the River Derwent and Bassenthwaite Lake SAC are predicted to be similar to those associated with the Dee Estuary/Aber Dyfrdwy SAC (70.1km from the Morgan Array Area) outlined in paragraph 1.7.3.74 to 1.7.3.77. As the River Derwent and Bassenthwaite Lake SAC (71.3km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Dee Estuary/Aber Dyfrdwy SAC, it is considered that impacts on the lamprey features of this site would be of similar if not of a lower magnitude. Due to the location of the Derwent and Bassenthwaite Lake SAC in respect to the Morgan Generation Assets, it is unlikely to present a barrier to migration. In addition, the conservation objectives for the two SACs are the same and therefore considered comparable. No adverse effect on integrity was concluded for the Dee Estuary/Aber Dyfrdwy SAC (see paragraph 1.7.3.79) therefore no adverse effect on the sea lamprey and river lamprey features of the Derwent and Bassenthwaite Lake SAC can also be concluded.

Atlantic salmon

1.7.3.81 Potential impacts from EMF from subsea electric cables on Atlantic salmon features of the River Derwent and Bassenthwaite Lake SAC are predicted to be similar to those associated with the River Ehen SAC (62.78km from the Morgan Array Area) outlined in paragraphs 1.7.3.66 to 1.7.3.70. As the River Derwent and Bassenthwaite Lake SAC (71.3km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the River Ehen SAC, it is considered that impacts on the Atlantic salmon feature of this site would be of similar if not of a lower magnitude. Due to the location of the Derwent and Bassenthwaite Lake SAC in respect to the Morgan Generation Assets, it is unlikely to present a barrier to migration. In addition, the conservation objectives for the two SACs are the same and therefore considered comparable. No adverse effect on integrity was concluded for the River Ehen SAC (see paragraph 1.7.3.73) therefore no adverse effect on the Atlantic salmon feature of the River Derwent and Bassenthwaite Lake SAC can also be concluded.

Conclusions

1.7.3.82 Adverse effects on sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Derwent and Bassenthwaite Lake SAC will not occur as a result of EMF from subsea electric cables during the operations and maintenance phase. An assessment of the potential impact 'EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraphs 1.7.2.25 to 1.7.2.26) is presented in Table 1.27. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.27: Conclusions against the conservation objectives of the River Derwent and Bassenthwaite Lake SAC from EMF from subsea electric cables during the operations and maintenance phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for effect between EMF from subsea electric cables and the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of Atlantic salmon, sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that Atlantic salmon and lamprey species are considered to have low sensitivity to EMF from subsea electric cables and that the assessment concluded that EMF from subsea electric cables associated with Morgan Generation Assets would not result in a barrier to migration of Atlantic salmon, sea lamprey and river lamprey, the populations and distributions of Atlantic salmon, sea lamprey and river lamprey will not be prevented from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.3.83 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Derwent and Bassenthwaite Lake SAC as a result of EMF from subsea electric cables with respect to the operations and maintenance phase of the Morgan Generation Assets alone.

River Kent SAC

Freshwater pearl mussel

1.7.3.84 This site is only designated for freshwater pearl mussel with brown trout thought to be the host species within the River Kent SAC, however Atlantic salmon are also present within the river (Natural England, 2018d), and the site was therefore screened in on a precautionary basis.

1.7.3.85 For the SACs outlined above, where Atlantic salmon is a qualifying feature, no adverse effects have been concluded in relation to EMF from subsea electric cables. Potential impacts from EMF from subsea electric cables on brown trout and Atlantic salmon features of the River Kent SAC are predicted to be similar to those associated with the River Ehen SAC (62.8km from the Morgan Array Area) outlined in paragraphs 1.7.3.66 to 1.7.3.70. As the River Kent SAC (82.4km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the River Ehen SAC, it is considered that impacts would be of similar if not of a lower magnitude. Due to the location of the River Kent in respect to the Morgan Generation Assets, it is unlikely to present a barrier to migration. In addition, the conservation objectives for the two SACs are the same and therefore considered comparable. No adverse effect

on integrity was concluded for the River Ehen SAC (see paragraph 1.7.3.73) therefore no adverse effect on the Atlantic salmon feature of the River Kent can also be concluded. Therefore, it can also be concluded that there will be no indirect adverse effects to freshwater pearl mussel.

Conclusions

1.7.3.86 Adverse effects on freshwater pearl mussel which undermine the conservation objectives of the River Kent SAC will not occur as a result of EMF from subsea electric cables during the operations and maintenance phase. An assessment of the potential impact 'EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraphs 1.7.2.31 to 1.7.2.33) is presented in Table 1.28. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.28: Conclusions against the conservation objectives of the River Kent SAC from EMF from subsea electric cables during the operations and maintenance phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for effect between EMF from subsea electric cables and the habitats of freshwater pearl mussel. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of freshwater pearl mussel or the supporting processes on which the habitats of freshwater pearl mussel rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Atlantic salmon and brown trout are thought to be the host species for freshwater pearl mussel within the SAC. EMF from subsea electric cables will not impact brown trout as the species is purely freshwater and does not migrate into the marine environment. Given that Atlantic salmon are considered to have low sensitivity to EMF from subsea electric cables and that the assessment concluded that EMF from subsea electric cables associated with Morgan Generation Assets would not result in a barrier to migration of Atlantic salmon, the population and distribution of freshwater pearl mussel within the site will not be prevented from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.3.87 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Kent SAC as a result of EMF from subsea electric cables with respect to the operations and maintenance phase of the Morgan Generation Assets alone.

Solway Firth SAC

Sea lamprey and river lamprey

1.7.3.88 Potential EMF from subsea electric cables impacts on sea lamprey and river lamprey features of the Solway Firth SAC are predicted to be similar to those associated with the Dee Estuary/Aber Dyfrdwy SAC (70.1km from the Morgan Array Area) outlined in paragraph 1.7.3.74 to 1.7.3.77 due to the proximity of the locations. As the Solway Firth SAC (84.3km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Dee Estuary/Aber Dyfrdwy SAC, it is considered that impacts on the lamprey features of this site would be of similar if not of a lower magnitude. Due to the location of the Solway Firth SAC in respect to the Morgan Generation Assets, it is unlikely to present a barrier to migration. In addition, the conservation objectives for the two SACs are the same and therefore considered comparable. No adverse effect on integrity was concluded for the Dee Estuary/Aber Dyfrdwy SAC (see paragraph 1.7.3.79) therefore no adverse effect on the sea lamprey and river lamprey features of the Solway Firth SAC can also be concluded.

Conclusions

1.7.3.89 Adverse effects on sea lamprey and river lamprey which undermine the conservation objectives of the Solway Firth SAC will not occur as a result of EMF from subsea electric cables during the operations and maintenance phase. An assessment of the potential impact 'EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraphs 1.7.2.38 to 1.7.2.39) is presented in Table 1.29. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.29: Conclusions against the conservation objectives of the Solway Firth SAC from EMF from subsea electric cables during the operations and maintenance phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for effect between EMF from subsea electric cables and the habitats of sea lamprey and river lamprey. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or the supporting processes on which the habitats of sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that lamprey species are considered to have low sensitivity to EMF from subsea electric cables and that the assessment concluded that EMF from subsea electric cables associated with Morgan Generation Assets would not result in a barrier to migration of sea lamprey and river lamprey, the populations and distributions of sea lamprey and river lamprey will not be prevented from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.3.90 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Solway Firth SAC as a result of EMF from subsea electric cables with respect to the operations and maintenance phase of the Morgan Generation Assets alone.

River Bladnoch SAC

Atlantic salmon

1.7.3.91 Potential impacts from EMF from subsea electric cables on Atlantic salmon features of the River Bladnoch SAC are predicted to be similar to those associated with the River Ehen SAC (62.8km from the Morgan Array Area) outlined in paragraphs 1.7.3.66

to 1.7.3.70. As the River Bladnoch SAC (89.6km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the River Ehen SAC, it is considered that impacts on the Atlantic salmon feature of this site would be of similar if not of a lower magnitude. Due to the location of the River Bladnoch SAC in respect to the Morgan Generation Assets, it is unlikely to present a barrier to migration. No adverse effect on integrity was concluded for the River Ehen SAC (see paragraph 1.7.3.73) therefore no adverse effect on the Atlantic salmon feature of the River Bladnoch SAC can also be concluded.

Conclusions

1.7.3.92 Adverse effects on Atlantic salmon which undermine the conservation objectives of the River Bladnoch SAC will not occur as a result of EMF from subsea electric cables during the operations and maintenance phase. An assessment of the potential impact 'EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraph 1.7.2.44) is presented in Table 1.30. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.30: Conclusions against the conservation objectives of the River Bladnoch SAC from EMF from subsea electric cables during the operations and maintenance phase.

Conservation Objective	Conclusion
Restore the population of the species, including range of genetic types, as a viable component of the site	Given that Atlantic salmon are considered to have low sensitivity to EMF from subsea electric cables and that the assessment concluded that EMF from subsea electric cables associated with Morgan Generation Assets would not result in a barrier to migration of Atlantic salmon, the population of Atlantic salmon (including range of genetic types) within the site will not be prevented from being restored as a viable component within the site. Similarly, EMF from subsea electric cables associated with Morgan Generation Assets will not prevent the distribution of Atlantic salmon within the site from being restored.
Restore the distribution of the species throughout the site	
Restore the habitats supporting the species within the site and availability of food	There is no pathway between EMF from subsea electric cables and the habitats of Atlantic salmon. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets will not prevent the habitats supporting Atlantic salmon within the site and availability of food from being restored.

1.7.3.93 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Bladnoch SAC as a result of EMF from subsea electric cables with respect to construction and decommissioning of the Morgan Generation Assets alone.

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

Sea lamprey and river lamprey

1.7.3.94 Potential EMF from subsea electric cables impacts on sea lamprey and river lamprey features of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC are predicted to be similar to those associated with the Dee Estuary/Aber Dyfrdwy SAC (70.1km from the Morgan Array Area) as outlined in paragraphs 1.7.3.74 to 1.7.3.76. As the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (91.6km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Dee Estuary/Aber Dyfrdwy SAC, it is considered that impacts on the lamprey features of this site would be of similar if not of a lower magnitude. No adverse effect on integrity was concluded for the Dee Estuary/Aber Dyfrdwy SAC (see paragraph 1.7.3.79) therefore no adverse effect on the Atlantic salmon feature of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC can also be concluded.

Atlantic salmon

1.7.3.95 Potential impacts from EMF from subsea electric cables on Atlantic salmon features of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC are predicted to be similar to those associated with the River Ehen SAC (62.8km from the Morgan Array Area) outlined in paragraphs 1.7.3.66 to 1.7.3.70, due to the proximity of the locations. As the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (91.6km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the River Ehen SAC it is considered that impacts on the Atlantic salmon feature of this site would be of similar if not of a lower magnitude. Due to the location of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC in respect to the Morgan Generation Assets, it is unlikely to present a barrier to migration. No adverse effect on integrity was concluded for the River Ehen SAC (see paragraph 1.7.3.73) therefore no adverse effect on the Atlantic salmon feature of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC can also be concluded.

Conclusions

1.7.3.96 Adverse effects on sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC will not occur as a result of EMF from subsea electric cables during the operations and maintenance phase. An assessment of the potential impact 'EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraph 1.7.2.51) is presented in Table 1.31. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.31: Conclusions against the conservation objectives of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC from EMF from subsea electric cables during the operations and maintenance phase.

Conservation Objective	Conclusion
The parameters defined in the vision for the watercourse as outlined in NRW (2022b) must be met	Due to the nature of the potential impact, and the distance of the Morgan Array Area from the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC, there is no route to potential impact and EMF from subsea electric cables associated with the Morgan Generation Assets will not prevent the defined vision for the watercourse from being met. There will be no reduction in the area or quality of habitat for the populations Atlantic salmon, sea lamprey and river lamprey of in the SAC on a long-term basis.
There will be no reduction in the area or quality of habitat for the feature populations in the SAC on a long-term basis	
The SAC feature populations will be stable or increasing over the long term	Given that Atlantic salmon and lamprey species are considered to have low sensitivity to EMF from subsea electric cables and that the assessment concluded that

Conservation Objective	Conclusion
The natural range of the features in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future	EMF from subsea electric cables associated with Morgan Generation Assets would not result in a barrier to migration of Atlantic salmon, sea lamprey and river lamprey, the populations of Atlantic salmon, sea lamprey and river lamprey will not be prevented from remaining stable or increasing in the long term and the natural ranges of Atlantic salmon, sea lamprey and river lamprey will neither be reduced or likely be reduced in the foreseeable future.
All factors affecting the achievement of these conditions are under control.	Given the conclusions made for the other conservation objectives above, it is considered that all factors affecting the achievement of these conditions will remain.

1.7.3.97 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC as a result of EMF from subsea electric cables with respect to the operations and maintenance phase of the Morgan Generation Assets alone.

Afon Gwyrfai a Llyn Cwellyn SAC

Atlantic salmon

1.7.3.98 Potential impacts from EMF from subsea electric cables on Atlantic salmon features of the River Bladnoch SAC are predicted to be similar to those associated with the River Ehen SAC (62.8km from the Morgan Array Area) outlined in paragraphs 1.7.3.66 to 1.7.3.70. As the Afon Gwyrfai a Llyn Cwellyn SAC (118km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the River Ehen SAC, it is considered that impacts on the Atlantic salmon feature of this site would be of similar if not of a lower magnitude. Due to the location of the Afon Gwyrfai a Llyn Cwellyn SAC in respect to the Morgan Generation Assets, it is unlikely to present a barrier to migration. No adverse effect on integrity was concluded for the River Ehen SAC (see paragraph 1.7.3.73) therefore no adverse effect on the Atlantic salmon feature of the Afon Gwyrfai a Llyn Cwellyn SAC can also be concluded.

Conclusions

1.7.3.99 Adverse effects on Atlantic salmon which undermine the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC will not occur as a result of EMF from subsea electric cables during the operations and maintenance phase. An assessment of the potential impact 'EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraph 1.7.2.56) is presented in Table 1.32. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.32: Conclusions against the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC from EMF from subsea electric cables during the operations and maintenance phase.

Conservation Objective	Conclusion
The conservation objective for the water course as outlined in NRW (2022c) must be met	Considering the distance from the Morgan Generation Assets to the Afon Gwyrfai a Llyn Cwellyn SAC (118km) and the nature of the potential impact, there is no pathway for effect between EMF from subsea electric cables and the watercourse. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets will not prevent the conservation objectives for the water course from being met.
The population of the feature in the SAC is stable or increasing over the long term	Given that Atlantic salmon are considered to have low sensitivity to EMF from subsea electric cables and that the assessment concluded that EMF from subsea electric cables associated with Morgan Generation Assets would not result in a barrier to migration of Atlantic salmon, the population of Atlantic salmon will not be prevented from remaining stable or increasing in the long term and the natural range of Atlantic salmon will neither be reduced or likely be reduced in the foreseeable future.
The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future	
The Gwyrfai will continue to be a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis	There is no pathway for effect between EMF from subsea electric cables and the habitats of the qualifying species. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets will not reduce the area of the habitats of Atlantic salmon and the Gwyrfai will continue to be a sufficiently large habitat to maintain the population of Atlantic salmon in the SAC on a long-term basis.

1.7.3.100 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Afon Gwyrfai a Llyn Cwellyn SAC as a result of EMF from subsea electric cables with respect to construction and decommissioning of the Morgan Generation Assets alone.

River Eden SAC

Sea lamprey and river lamprey

1.7.3.101 Potential EMF from subsea electric cables impacts on sea lamprey and river lamprey features of the River Eden SAC are predicted to be similar to those associated with the Dee Estuary/Aber Dyfrdwy SAC (70.1km from the Morgan Array Area) outlined in paragraph 1.7.3.74 to 1.7.3.77. As the River Eden SAC (125.7km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Dee Estuary/Aber Dyfrdwy SAC, it is considered that impacts on lamprey features of this site would be of similar if not of a lower magnitude. In addition, the conservation objectives for the two SACs are the same and therefore considered comparable. No adverse effect on integrity was concluded for the Dee Estuary/Aber Dyfrdwy SAC (see paragraph 1.7.3.79) therefore no adverse effect on the Atlantic salmon feature of the River Eden SAC can also be concluded.

Atlantic salmon

1.7.3.102 Potential impacts from EMF from subsea electric cables on Atlantic salmon features of the River Eden SAC are predicted to be similar to those associated with the River

Ehen SAC (62.8km from the Morgan Array Area) outlined in paragraphs 1.7.3.66 to 1.7.3.70. As the River Eden SAC (125.7km from the Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the River Ehen SAC it is considered that impacts would be of similar if not of a lower magnitude. In addition, the conservation objectives for the two SACs are the same and therefore considered comparable. No adverse effect on integrity was concluded for the River Ehen SAC (see paragraph 1.7.3.73) therefore no adverse effect on the Atlantic salmon feature of the River Eden SAC can also be concluded.

Conclusions

1.7.3.103 Adverse effects on sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Eden SAC will not occur as a result of EMF from subsea electric cables during the operations and maintenance phase. An assessment of the potential impact 'EMF from subsea electric cables ' against each relevant conservation objective (as presented in paragraph 1.7.2.56) is presented in Table 1.33. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.33: Conclusions against the conservation objectives of the River Eden SAC from EMF from subsea electric cables during the operations and maintenance phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for effect between EMF from subsea electric cables and the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of Atlantic salmon, sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that Atlantic salmon and lamprey species are considered to have low sensitivity to EMF from subsea electric cables and that the assessment concluded that EMF from subsea electric cables associated with Morgan Generation Assets would not result in a barrier to migration of Atlantic salmon, sea lamprey and river lamprey, the populations and distributions of Atlantic salmon, sea lamprey and river lamprey will not be prevented from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.3.104 Therefore, it can be concluded that there **is no risk of an adverse effect** on the integrity of the River Eden SAC as a result of EMF from subsea electric cables with respect to the operations and maintenance phase of the Morgan Generation Assets alone.

1.7.4 Assessment of adverse effects in-combination with other plans and projects

1.7.4.1 The other developments (projects/plans) that could result in in-combination effects associated with the Morgan Generations Assets on Annex II diadromous fish features of the designated sites identified have been summarised in Table 1.34 and are shown in Figure 1.7.

1.7.4.2 As outlined in the HRA Stage 1 Screening Report, where the potential for LSE has been concluded with respect to the Morgan Generation Assets alone, the potential for LSE also has been concluded in-combination. For potential impacts where LSE has been ruled out with respect to the Morgan Generation Assets alone, there is either no pathway to effect, or the Morgan Generation Assets would result in only negligible or inconsequential effects that would not contribute (even collectively) or materially to in-combination effects and therefore, no additional potential impacts are taken forward to the in-combination assessment.

1.7.4.3 On this basis, the potential impacts identified for assessment as part of volume 2, chapter 8: Fish and Shellfish Ecology of the PEIR, and which have been brought forward for consideration in the in-combination assessment of the HRA Stage 2 ISAA Report are:

- In-combination underwater sound
- In-combination EMF from subsea electric cables.

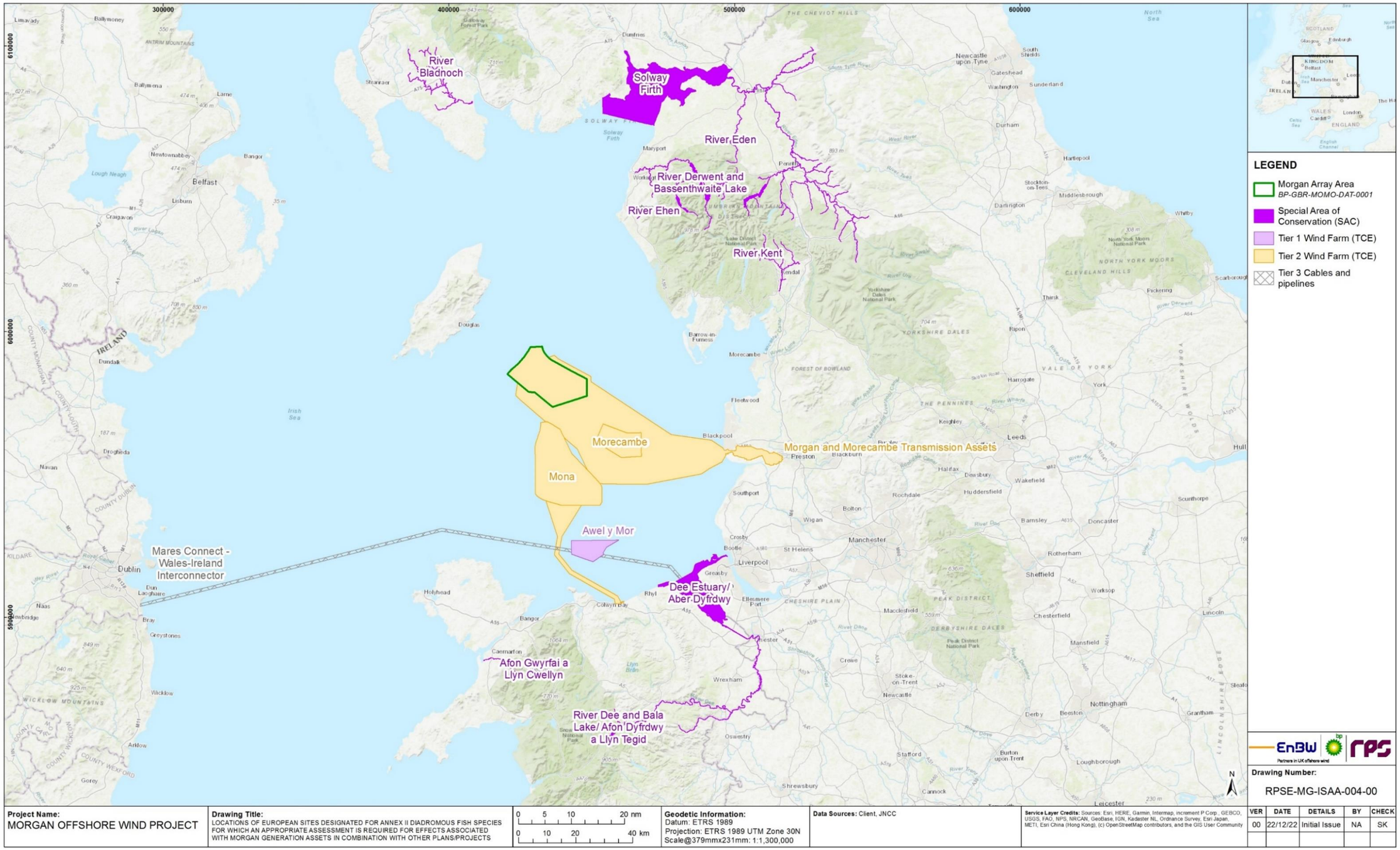


Figure 1.7: Locations of other projects and plans considered for in-combination effects on SACs with Annex II diadromous fish features[18].

[18] The Awel y Môr agreement for lease area extends further to the west than the application boundary presented, however Awel y Môr Offshore Wind Farm Ltd. have decided to develop in the area presented.

Table 1.34: List of other projects and plans with potential for in-combination effects on Annex II diadromous fish features.

Plan/project	Status	Details	Tier	Distance from the Morgan Array Area	Date of construction (C)/operation (O)	Spatial overlap	Temporal overlap	Further assessment required? (Yes/No)
Awel y Môr Offshore Wind Farm	Application Submitted	Up to 100MW (48 to 91 wind turbines)	Tier 1	47.24	C: 2026 to 2030 O: 2030 to 2055	No	Yes	Yes
Morgan and Morecambe Transmission Assets	Pre-application	Morgan and Morecambe Transmission Assets	Tier 2	0	C: 2028 to 2029 O: 2030 to 2065	Yes	Yes	Yes
Mona Offshore Wind Project	Pre-application	Up to 107 wind turbines	Tier 2	5.52	C: 2028 to 2029 O: 2030 to 2065	No	Yes	Yes
Morecombe Offshore Wind Farm Generation Assets	Pre-application	12 -24MW (Up to 40 wind turbines)	Tier 2	11.24	C: 2026 to 2028 O: 2029 to 2089	No	Yes	Yes
MaresConnect – Wales-Ireland Interconnector Cable	Pre-application	A proposed 750MW subsea and underground electricity interconnector system linking the existing electricity grids in Ireland and Great Britain.	Tier 3	48.2	C: 2025 O: 2027 to 2037	No	Yes	Yes

In-combination underwater sound

1.7.4.4 There is potential for underwater sound impacts as a result of activities associated with the Morgan Generation Assets during construction, in-combination with activities associated with the following projects/plans: tier 1 projects, the construction of the Awel y Môr Offshore Wind Farm and tier 2 projects, Morecambe Offshore Wind Farm, Mona Offshore Wind Project, and the Morgan and Morecambe Transmission Assets.

Construction Phase

Tier 1

1.7.4.5 The construction phases of the Awel y Môr Offshore Wind Farm will temporally overlap with the Morgan Generation Assets in terms of construction sound (specifically piling and UXO clearance), potentially resulting in in-combination effects. The assessment of potential sound impacts associated with the Morgan Generation Assets alone has been presented in section 1.7.3.

1.7.4.6 For Awel y Môr, based on the MDS presented in the Awel y Môr Fish and Shellfish Chapter, maximum hammer piling energy of up to 5,000kJ is planned for monopiles, with up to 50 of these monopiles being installed over up to a maximum 74 day period (single vessel), with a maximum duration of 896 hours of piling expected. When considered in-combination with the Morgan Generation Assets, this would equate to up to 144 days and 1,561 hours of piling over construction phases of several years (i.e. four and three years for Morgan and Awel y Môr, respectively).

1.7.4.7 Sound modelling undertaken for the Awel y Môr project indicated similar patterns as those for the Morgan Generation Assets, with injury and mortality from sound produced within the Awel y Môr Array Area to ranges of up to 1,200m for group 1 fish, <100m for group 2 fish, if modelled as static receptors (RWE, 2022). In all cases, modelling the fish as fleeing receptors highly significantly reduced mortality distances, down to <100m even for group 3 fish. TTS ranges distances were calculated to reach out to up to 11,800m for group 3 static receptors, with this again reducing to 100m when fish were modelled as fleeing receptors, with similar patterns for all other groups of fish (i.e. groups 1 and 2).

1.7.4.8 As with the Morgan Generation Assets, measures including soft starts will reduce the risk of injury and mortality to fish receptors. With respect to behavioural effects the Awel y Môr project indicated behavioural effects to similar ranges as those predicted for the Morgan Generation Assets, with behavioural effects expected to a range of approximately up to tens of kilometres from the piling location at the maximum hammer energies. Diadromous fish species were not examined separately for the Awel y Môr Offshore Wind Farm, but evidence did indicate for fish motivated by strong biological drivers, as would be the case for diadromous fish on their spawning migrations, the effect was not significant.

Tier 2

1.7.4.9 The construction phases of the Mona Offshore Wind Project, the Morecambe Offshore Wind Farm, and the Morgan and Morecambe Transmission Assets may have temporal overlap with the Morgan Generation Assets in terms of construction sound, with potential to result in in-combination effects.

1.7.4.10 For the Mona Offshore Wind Project, sound modelling indicated similar patterns as those for the Morgan Generation Assets, with distances to threshold values for mortality effects up to 1,085m for group 1 fish and 2,090m for group 2 fish, if modelled as static receptors (Mona Offshore Wind Ltd, 2023). In all cases, modelling the fish as fleeing receptors significantly reduced distances to threshold values for mortality. Injury distances were calculated to reach out to up to 4,400m for group 3 and 4 static receptors, with this again reducing to <100m in all cases when fish were modelled as fleeing receptors, with similar patterns for all other groups of fish. As with the Morgan Generation Assets, measures including soft starts will reduce the risk of injury and mortality to fish receptors.

1.7.4.11 With respect to behaviour, sound contours indicated that while these contours extended over 10km from the piling operations, these did not extend to the coast of Wales, England or the Isle of Man and as such would not represent a barrier to migration for those fish moving though the Irish Sea to/from the relevant SACs (Morgan Offshore Wind Ltd, 2023). In addition, the potential sound impacts will be short-term and intermittent in nature during the construction phase (i.e. piling occurring at the Mona Offshore Wind Project over approximately 73 days over a two year piling phase)(Mona Offshore Wind Ltd, 2023). As such, there is minimal risk of disruption to migration of lamprey species or Atlantic salmon.

1.7.4.12 Currently, no information is publicly available for the sound modelling and construction parameters of the Morecambe Offshore Wind Farm, although it is expected this will be a similar scale as the Morgan Generation Assets and Mona Offshore Wind Project.

River Ehen SAC

Atlantic salmon and freshwater pearl mussel

1.7.4.13 Any potential in-combination impacts are predicted to be of short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to the effect. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also have mitigation measures including soft starts which will further reduce the potential for in-combination underwater sound effects.

Conclusions

1.7.4.14 Adverse effects on Atlantic salmon and freshwater pearl mussel which undermine the conservation objectives of the River Ehen SAC will not occur as a result of underwater sound associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact ‘in-combination underwater sound’ against each relevant conservation objective (as presented in paragraphs 1.7.2.9 to 1.7.2.10) is discussed in Table 1.35. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.35: Conclusions against the conservation objectives of the River Ehen SAC for in-combination underwater sound.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for in-combination underwater sound to result in adverse effects on the habitats of the Atlantic salmon and freshwater pearl mussel. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon and freshwater pearl mussel or the supporting processes on which the habitats of Atlantic salmon and freshwater pearl mussel rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will be intermittent, all projects will implement mitigation measures such as soft starts and diadromous fish features are expected to have low sensitivity to the effect. As such there is negligible risk of disruption to migration of Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the populations and distributions of Atlantic salmon and freshwater pearl mussel within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.15 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Ehen SAC as a result of underwater sound impacts with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Dee Estuary/Aber Dyfrdwy SAC

Sea lamprey and river lamprey

1.7.4.16 Any potential in-combination impacts are predicted to be of short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to the effect. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also have mitigation measures including soft starts which will reduce the potential for in-combination underwater sound effects.

Conclusions

1.7.4.17 Adverse effects on sea lamprey and river lamprey which undermine the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC will not occur as a result of underwater sound associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination underwater sound' against each relevant conservation objective (as presented in paragraphs 1.7.2.17 to 1.7.2.19) is discussed in Table 1.36. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.36: Conclusions against the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC for in-combination underwater sound.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound to result in adverse effects on the habitats of sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or the supporting processes on which the habitats of sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will be intermittent, all projects will implement mitigation measures such as soft starts and diadromous fish features are expected to have low sensitivity to the effect. As such there is negligible risk of disruption to migration of sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the populations and distributions of sea lamprey and river lamprey within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.18 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Dee Estuary/Aber Dyfrdwy SAC as a result of underwater sound impacts with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

River Derwent and Bassenthwaite Lake SAC

Sea lamprey, river lamprey and Atlantic salmon

1.7.4.19 Any potential in-combination impacts are predicted to be of short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to the effect. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also have mitigation measures including soft starts which will reduce the potential for in-combination underwater sound effects.

Conclusions

1.7.4.20 Adverse effects on sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Derwent and Bassenthwaite Lake SAC will not occur as a result of underwater sound associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination underwater sound' against each relevant conservation objective (as presented in paragraphs 1.7.2.25 to 1.7.2.26) is discussed in

Table 1.37. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.37: Conclusions against the conservation objectives of the River Derwent and Bassenthwaite Lake SAC for in-combination underwater sound.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of Atlantic salmon, sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will be intermittent, all projects will implement mitigation measures such as soft starts and diadromous fish features are expected to have low sensitivity to the effect. As such there is negligible risk of disruption to migration of Atlantic salmon, sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.21 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Derwent and Bassenthwaite Lake SAC as a result of underwater sound impacts with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

River Kent SAC

Freshwater pearl mussel

1.7.4.22 Any potential in-combination impacts are predicted to be of short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to the effect. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also have mitigation measures including soft starts which will reduce the potential for in-combination underwater sound effects.

Conclusions

1.7.4.23 Adverse effects on freshwater pearl mussel which undermine the conservation objectives of the River Kent SAC will not occur as a result of underwater sound associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination underwater sound' against each relevant conservation objective (as presented in paragraphs 1.7.2.31 to 1.7.2.33) is discussed Table 1.38. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.38: Conclusions against the conservation objectives of the River Kent SAC for in-combination underwater sound.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for in-combination underwater sound to result in adverse effects on the habitats of the freshwater pearl mussel. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of freshwater pearl mussel or the supporting processes on which the habitats of freshwater pearl mussel rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will be intermittent, all projects will implement mitigation measures such as soft starts and diadromous fish features are expected to have low sensitivity to the effect. As such there is negligible risk of disruption to migration of diadromous fish species. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the population and distribution of freshwater pearl mussel within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.24 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Kent SAC as a result of underwater sound impacts with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Solway Firth SAC

Sea lamprey and river lamprey

1.7.4.25 Any potential in-combination impacts are predicted to be of short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to the effect. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also have mitigation measures including soft starts which will reduce the potential for in-combination underwater sound effects.

Conclusions

1.7.4.26 Adverse effects on sea lamprey and river lamprey which undermine the conservation objectives of the Solway Firth SAC will not occur as a result of underwater sound associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination underwater sound' against each relevant conservation objective (as presented in paragraphs 1.7.2.38 to 1.7.2.39) is discussed in Table 1.39. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.39: Conclusions against the conservation objectives of the Solway Firth SAC for in-combination underwater sound.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound to result in adverse effects on the habitats of sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or the supporting processes on which the habitats of sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will be intermittent, all projects will implement mitigation measures such as soft starts and diadromous fish features are expected to have low sensitivity to the effect. As such there is negligible risk of disruption to migration of sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the populations and distributions of sea lamprey and river lamprey within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.27 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Solway Firth as a result of underwater sound impacts with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

River Bladnoch SAC

Atlantic salmon

1.7.4.28 Any potential in-combination impacts are predicted to be of short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to the effect. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also have mitigation measures including soft starts which will reduce the potential for in-combination underwater sound effects.

Conclusions

1.7.4.29 Adverse effects on Atlantic salmon which undermine the conservation objectives of the River Bladnoch SAC will not occur as a result of underwater sound associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination underwater sound' against each relevant conservation objective (as presented in paragraph 1.7.2.44) is discussed in Table 1.40. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.40: Conclusions against the conservation objectives of the River Bladnoch SAC for in-combination underwater sound.

Conservation Objective	Conclusion
Restore the population of the species, including range of genetic types, as a viable component of the site	Underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will be intermittent, all projects will implement mitigation measures such as soft starts and diadromous fish features are expected to have low sensitivity to the effect. As such there is negligible risk of disruption to migration of Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the restoration of the population of Atlantic salmon as a viable component of the site. Similarly, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the distribution of Atlantic salmon within the site from being restored.
Restore the distribution of the species throughout the site	
Restore the habitats supporting the species within the site and availability of food	There is no pathway for underwater sound to result in adverse effects on the habitats of Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the habitats supporting Atlantic salmon within the site and availability of food from being restored.

1.7.4.30 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Bladnoch SAC as a result of underwater sound impacts with respect to construction and decommissioning of the Morgan Generation Assets in-combination with other plans/projects.

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

Sea lamprey, river lamprey and Atlantic salmon

1.7.4.31 Any potential in-combination impacts are predicted to be of short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to the effect. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also have mitigation measures including soft starts which will reduce the potential for in-combination underwater sound effects.

Conclusions

1.7.4.32 Adverse effects on sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC will not occur as a result of underwater sound associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination underwater sound' against each relevant conservation objective (as presented in paragraph 1.7.2.51) is discussed in Table 1.41. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.41: Conclusions against the conservation objectives of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC for in-combination underwater sound.

Conservation Objective	Conclusion
The parameters defined in the vision for the watercourse as outlined in NRW (2022b) must be met	Considering the nature of the potential impact, there is no pathway for effects to the watercourse to occur. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the conservation objectives for the water course from being met.
The SAC feature populations will be stable or increasing over the long term	Underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will be intermittent, all projects will implement mitigation measures such as soft starts and diadromous fish features are expected to have low sensitivity to the effect. As such there is negligible risk of disruption to migration of sea lamprey, river lamprey and Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the populations of sea lamprey, river lamprey and Atlantic salmon from remaining stable or increasing in the long term. Similarly, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not reduce or likely reduce in the foreseeable future the natural ranges of sea lamprey, river lamprey and Atlantic salmon within the site.
The natural range of the features in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future	
There will be no reduction in the area or quality of habitat for the feature populations in the SAC on a long-term basis.	There is no pathway for underwater sound to result in adverse effects on the habitats of sea lamprey, river lamprey and Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not lead to reduction in the area or quality of habitat for the populations of sea lamprey, river lamprey and Atlantic salmon in the SAC on a long-term basis.
All factors affecting the achievement of these conditions are under control.	Given the conclusions made for the other conservation objectives above, it is considered that all factors affecting the achievement of these conditions will remain under control.

1.7.4.33 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC as a result of underwater sound impacts with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Afon Gwyrfai a Llyn Cwellyn SAC

Atlantic salmon

1.7.4.34 Any potential in-combination impacts are predicted to be of short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to the effect. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also have mitigation measures including soft starts which will reduce the potential for in-combination underwater sound effects.

Conclusions

1.7.4.35 Adverse effects on Atlantic salmon which undermine the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC will not occur as a result of underwater sound associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination underwater sound' against each relevant conservation objective (as presented in paragraph 1.7.2.56) is discussed in Table 1.42. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.42: Conclusions against the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC for in-combination underwater sound.

Conservation Objective	Conclusion
The conservation objective for the water course as outlined in NRW (2022c) must be met	Considering the nature of the potential impact, there is no pathway for effects to the watercourse to occur. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the conservation objectives for the water course from being met.
The population of the feature in the SAC is stable or increasing over the long term	Underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will be intermittent, all projects will implement mitigation measures such as soft starts and diadromous fish features are expected to have low sensitivity to the effect. As such there is negligible risk of disruption to migration of Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the population of Atlantic salmon from remaining stable or increasing in the long term. Similarly, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not reduce or likely reduce in the foreseeable future the natural range of Atlantic salmon within the site.
The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future	
The Gwyrfai will continue to be a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis	There is no pathway for underwater sound to result in adverse effects on the habitats of Atlantic salmon. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not reduce the area of the habitats of Atlantic salmon and the Gwyrfai will continue to be a sufficiently large habitat to maintain the population of Atlantic salmon in the SAC on a long-term basis.

1.7.4.36 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Afon Gwyrfai a Llyn Cwellyn SAC as a result of underwater sound impacts with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

River Eden SAC

Sea lamprey, river lamprey and Atlantic salmon

1.7.4.37 Any potential in-combination impacts are predicted to be of short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to the

effect. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also have mitigation measures including soft starts which will reduce the potential for in-combination underwater sound effects.

Conclusions

1.7.4.38 Adverse effects on sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Eden SAC will not occur as a result of underwater sound in-combination associated with Morgan Generation Assets with other plans/projects. An assessment of the potential impact 'in-combination underwater sound' against each relevant conservation objective (as presented in paragraphs 1.7.2.62 to 1.7.2.64) is discussed in Table 1.43. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.43: Conclusions against the conservation objectives of the River Eden SAC for in-combination underwater sound.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of Atlantic salmon, sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will be intermittent, all projects will implement mitigation measures such as soft starts and diadromous fish features are expected to have low sensitivity to the effect. As such there is negligible risk of disruption to migration of Atlantic salmon, sea lamprey and river lamprey. Therefore, underwater sound associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.39 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Eden SAC as a result of underwater sound impacts with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

In-combination EMF from subsea electric cables

1.7.4.40 There is potential for EMF from subsea electric cables impacts as a result of activities associated with the Morgan Generation Assets during the operations and maintenance phase, in-combination with activities associated with the following projects/plans: tier 1 Awel y Môr Offshore Wind Farm; the tier 2 Mona Offshore Wind Project, Morecambe Offshore Wind Farm, and Morgan and Morecambe Transmission Assets, and the tier 3 MaresConnect Wales-Ireland Interconnector Cable.

Operations and maintenance phase

Tier 1

1.7.4.41 The maximum potential EMF from subsea electric cables impacts associated with the tier 1 Awel y Môr Offshore Wind Farm will originate from the project's inter-array, interconnector, and offshore export cables, which have the potential for creating an in-combination effect with the inter-array and interconnector cables of the Morgan Generation Assets. For the Awel y Môr Offshore Wind Farm, this is likely to result from the operation of the 145km of inter-array cables, and 81.3km of export cables (RWE, 2021a). The minimum burial depth for cables for Awel y Môr is planned to be 1m, likely limiting EMF from subsea electric cables to the range of up to 10m from the cable, in line with the predictions for the Morgan Generation Assets.

Tier 2

1.7.4.42 The maximum potential EMF from subsea electric cables impacts associated with the tier 2 projects will originate from the inter-array, interconnector cables and offshore export cables of the Mona Offshore Wind Project, the Morecambe Offshore Wind Farm, and the Morgan and Morecambe Transmission Assets. For the Mona Offshore Wind Project, this is likely to result from the operation of up to 500km of 66kV to 132kV inter-array cables, 50km of 275kV HVAC interconnector cable, and up to 360km of 275kV HVAC offshore export cables. The minimum burial depth for cables will be 0.5m, likely limiting EMF from subsea electric cables to the range of metres from the cable, with potential impacts expected to be similar to the Morgan Generation Assets, due to the similar sizes and extents of the projects (Mona Offshore Wind Ltd, 2023).

1.7.4.43 The extent of EMF from subsea electric cables associated with the Morecambe Offshore Wind Farm are not fully quantified due to the early stage of development of this project. However, the scoping report indicates the use of 66kV to 132kV HVAC inter-array cables, with all cables buried to an expected depth of 1m, and a minimum distance of the entire offshore wind farm to shore of 30km, with more cable required overall.

Tier 3

1.7.4.44 The proposed operation of the MaresConnect Interconnector Cable will temporally overlap with the operations and maintenance phase of the Morgan Generation Assets, resulting in an in-combination effect. Specifically, the MaresConnect Wales-Ireland Interconnector Cable is expected to continuously produce EMFs during operation, although exact specifications are not currently publicly available. However, the overall potential in-combination effect is expected to be small and limited to directly around the cable, with very little overlap between it and the Morgan Generation Assets.

River Ehen SAC

Atlantic salmon and freshwater pearl mussel

1.7.4.45 Whilst any potential in-combination impacts are predicted to be of long term duration, and continuous during the operation of the relevant projects, they are also predicted

to be of local spatial extent. Diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electric cables. EMF from subsea electric cables effects will be confined to the close vicinity of cables for all relevant projects and diadromous fish species are considered to be less likely to interact with emitted EMF from subsea electric cables as they are pelagic and swim in the water column rather than along the seabed. All projects which may contribute to an in-combination effect will implent mitigation inllcuding cable burial. The burial of cables will increase the distance between cables and diadromous fish, the increased distance will attenuate EMF from subsea electric cables, thereby reducing the effect of EMF from subsea electric cables on diadromous fish.

Conclusions

1.7.4.46 Adverse effects on Atlantic salmon and freshwater pearl mussel which undermine the conservation objectives of the River Ehen SAC will not occur as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraphs 1.7.2.9 to 1.7.2.10) is discussed in Table 1.44. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.44: Conclusions against the conservation objectives of River Ehen SAC for in-combination EMF from subsea electric cables.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for in-combination EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects to affect the habitats of Atlantic salmon and freshwater pearl mussel. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon and freshwater pearl mussel or the supporting processes on which the habitats of Atlantic salmon and freshwater pearl mussel rely from being maintained or restored
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other projects will be localised in spatial extent, all projects will implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electric cables, the populations and distributions of Atlantic salmon and freshwater pearl mussel within the site will not be prevented from being maintained or restored as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.47 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Ehen SAC as a result of EMF from subsea electric cables with respect to the Morgan Generation Assets in-combination with other plans/projects.

Dee Estuary/Aber Dyfrdwy SAC

Sea lamprey and river lamprey

1.7.4.48 Whilst any potential in-combination impacts are predicted to be of long term duration, and continuous during the operation of the relevant projects, they are also predicted to be of local spatial extent. Diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electric cables. EMF from subsea electric cables effects will be confined to the close vicinity of cables for all relevant projects and diadromous fish species are considered to be less likely to interact with emitted EMF from subsea electric cables as they are pelagic and swim in the water column rather than along the seabed. All projects which may contribute to an in-combination effect will implent mitigation including cable burial. The burial of cables will increase the distance between cables and diadromous fish, the increased distance will attenuate EMF from subsea electric cables, thereby reducing the effect of EMF from subsea electric cables on diadromous fish.

Conclusions

1.7.4.49 Adverse effects on sea lamprey and river lamprey which undermine the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC will not occur as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination EMF from subsea electric cables against each relevant conservation objective (as presented in paragraphs 1.7.2.17 to 1.7.2.19) is discussed in Table 1.45. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.45: Conclusions against the conservation objectives of Dee Estuary/Aber Dyfrdwy SAC for in-combination EMF from subsea electric cables.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for in-combination EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects to affect the habitats of sea lamprey and river lamprey. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or the supporting processes on which the habitats of sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other projects will be localised in spatial extent, all projects will implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electric cables, the populations and distributions of sea lamprey and river lamprey within the site will not be prevented from being maintained or restored as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.50 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Dee Estuary/Aber Dyfrdwy SAC as a result of EMF from subsea electric cables with respect to the Morgan Generation Assets in-combination with other plans/projects.

River Derwent and Bassenthwaite Lake SAC

Sea lamprey, river lamprey and Atlantic salmon

1.7.4.51 Whilst any potential in-combination impacts are predicted to be of long term duration, and continuous during the operation of the relevant projects, they are also predicted to be of local spatial extent. Diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electric cables. EMF from subsea electric cables effects will be confined to the close vicinity of cables for all relevant projects and diadromous fish species are considered to be less likely to interact with emitted EMF from subsea electric cables as they are pelagic and swim in the water column rather than along the seabed. All projects which may contribute to an in-combination effect will implent mitigation inllcuding cable burial. The burial of cables will increase the distance between cables and diadromous fish, the increased distance will attenuate EMF from subsea electric cables, thereby reducing the effect of EMF from subsea electric cables on diadromous fish.

Conclusions

1.7.4.52 Adverse effects on sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Derwent and Bassenthwaite Lake SAC will not occur as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraphs 1.7.2.25 to 1.7.2.26) is discussed in Table 1.46. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.46: Conclusions against the conservation objectives of River Derwent and Bassenthwaite Lake SAC for in-combination EMF from subsea electric cables.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for in-combination EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects to affect the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of Atlantic salmon, sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other projects will be localised in spatial extent, all projects will implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electric cables, the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site will not be prevented from being maintained or restored as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.53 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Derwent and Bassenthwaite Lake SAC as a result of EMF from subsea electric cables with respect to the Morgan Generation Assets in-combination with other plans/projects.

River Kent SAC

Freshwater pearl mussel

1.7.4.54 Whilst any potential in-combination impacts are predicted to be of long term duration, and continuous during the operation of the relevant projects, they are also predicted to be of local spatial extent. Diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electric cables. EMF from subsea electric cables effects will be confined to the close vicinity of cables for all relevant projects and diadromous fish species are considered to be less likely to interact with emitted EMF from subsea electric cables as they are pelagic and swim in the water column rather than along the seabed. All projects which may contribute to an in-combination effect will implent mitigation inllcuding cable burial. The burial of cables will increase the distance between cables and diadromous fish, the increased distance will attenuate EMF from subsea electric cables, thereby reducing the effect of EMF from subsea electric cables on diadromous fish.

Conclusions

1.7.4.55 Adverse effects on freshwater pearl mussel which undermine the conservation objectives of the River Derwent and Bassenthwaite Lake SAC will not occur as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraphs 1.7.2.31 to 1.7.2.33) is discussed in Table 1.47. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.47: Conclusions against the conservation objectives of River Kent SAC for in-combination EMF from subsea electric cables.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for in-combination EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects to affect

Conservation Objective	Conclusion
The structure and function of the habitats of qualifying species [are maintained or restored]	the habitats of freshwater pearl mussel. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of freshwater pearl mussel or the supporting processes on which the habitats of freshwater pearl mussel rely from being maintained or restored.
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other projects will be localised in spatial extent, all projects will implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electric cables, the populations and distributions of freshwater pearl mussel within the site will not be prevented from being maintained or restored as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.56 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Kent SAC as a result of EMF from subsea electric cables with respect to the Morgan Generation Assets in-combination with other plans/projects.

Solway Firth SAC

Sea lamprey and river lamprey

1.7.4.57 Whilst any potential in-combination impacts are predicted to be of long term duration, and continuous during the operation of the relevant projects, they are also predicted to be of local spatial extent. Diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electric cables. EMF from subsea electric cables effects will be confined to the close vicinity of cables for all relevant projects and diadromous fish species are considered to be less likely to interact with emitted EMF from subsea electric cables as they are pelagic and swim in the water column rather than along the seabed. All projects which may contribute to an in-combination effect will implent mitigation inllcuding cable burial. The burial of cables will increase the distance between cables and diadromous fish, the increased distance will attenuate EMF from subsea electric cables, thereby reducing the effect of EMF from subsea electric cables on diadromous fish.

Conclusions

1.7.4.58 Adverse effects on sea lamprey and river lamprey which undermine the conservation objectives of the Solway Firth SAC will not occur as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact ‘in-combination EMF from subsea electric cables’ against each relevant conservation objective (as presented in paragraphs 1.7.2.38 to 1.7.2.39) is discussed in Table 1.48. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.48: Conclusions against the conservation objectives of Solway Firth SAC for in-combination EMF from subsea electric cables.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for in-combination EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects to affect the habitats of sea lamprey and river lamprey. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or the supporting processes on which the habitats of sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other projects will be localised in spatial extent, all projects will implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electric cables, the populations and distributions of sea lamprey and river lamprey within the site will not be prevented from being maintained or restored as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.59 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Solway Firth SAC as a result of EMF from subsea electric cables with respect to the Morgan Generation Assets in-combination with other plans/projects.

River Bladnoch SAC

Atlantic salmon

1.7.4.60 Whilst any potential in-combination impacts are predicted to be of long term duration, and continuous during the operation of the relevant projects, they are also predicted to be of local spatial extent. Diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electric cables. EMF from subsea electric cables effects will be confined to the close vicinity of cables for all relevant projects and diadromous fish species are considered to be less likely to interact with emitted EMF from subsea electric cables as they are pelagic and swim in the water column rather than along the seabed. All projects which may contribute to an in-combination effect will implent mitigation inllcuding cable burial. The burial of cables will increase the distance between cables and diadromous fish, the increased distance will attenuate EMF from subsea electric cables, thereby reducing the effect of EMF from subsea electric cables on diadromous fish.

Conclusions

1.7.4.61 Adverse effects on Atlantic salmon which undermine the conservation objectives of the River Bladnoch SAC will not occur as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact ‘in-combination EMF from subsea electric

cables‘ against each relevant conservation objective (as presented in paragraph 1.7.2.44) is discussed in Table 1.49. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.49: Conclusions against the conservation objectives of River Bladnoch SAC for in-combination EMF from subsea electric cables.

Conservation Objective	Conclusion
Restore the population of the species, including range of genetic types, as a viable component of the site	Given that EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other projects will be localised in spatial extent, all projects will implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF, the population of Atlantic salmon will not be prevented from being restored as a viable component of the site as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects. Similarly, EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects will not prevent the distribution of Atlantic salmon from being restored throughout the site.
Restore the distribution of the species throughout the site	
Restore the habitats supporting the species within the site and availability of food	There is no pathway for in-combination EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects to affect the habitats of Atlantic salmon, therefore the habitats supporting Atlantic salmon within the sites and availability of food will not be prevented from being restored.

1.7.4.62 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Bladnoch SAC as a result of EMF from subsea electric cables with respect to the Morgan Generation Assets in-combination with other plans/projects.

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

Sea lamprey, river lamprey and Atlantic salmon

1.7.4.63 Whilst any potential in-combination impacts are predicted to be of long term duration, and continuous during the operation of the relevant projects, they are also predicted to be of local spatial extent. Diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electric cables. EMF from subsea electric cables effects will be confined to the close vicinity of cables for all relevant projects and diadromous fish species are considered to be less likely to interact with emitted EMF from subsea electric cables as they are pelagic and swim in the water column rather than along the seabed. All projects which may contribute to an in-combination effect will implent mitigation inllcuding cable burial. The burial of cables will increase the distance between cables and diadromous fish, the increased distance will attenuate EMF from subsea electric cables, thereby reducing the effect of EMF from subsea electric cables on diadromous fish.

Conclusions

1.7.4.64 Adverse effects on sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC will not occur as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact ‘in-combination EMF from subsea electric cables’ against each relevant conservation objective (as presented in paragraph 1.7.2.51) is discussed in Table 1.50. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.50: Conclusions against the conservation objectives of River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC for in-combination EMF from subsea electric cables.

Conservation Objective	Conclusion
The parameters defined in the vision for the watercourse as defined in NRW (2022b) must be met	There is no pathway between in-combination EMF from subsea electric cables with Morgan Generation Assets in-combination with other plans/projects and the watercourse to occur. Therefore EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other projects will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met.
The SAC feature populations will be stable or increasing over the long term	Given that EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other projects will be localised in spatial extent, all projects will implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF, the populations of sea lamprey, river lamprey and Atlantic salmon within the site will not be prevented from remaining stable or increasing in the long term. Similarly, the natural ranges of sea lamprey, river lamprey and Atlantic salmon will neither be reduced or likely be reduced in the foreseeable future as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects.
The natural range of the features in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future	
There will be no reduction in the area or quality of habitat for the feature populations in the SAC on a long-term basis	There is no pathway for EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects to affect the habitats of sea lamprey, river lamprey and Atlantic salmon. Therefore, there will be no reduction in the area or quality of habitat for the populations of sea lamprey, river lamprey and Atlantic salmon in the SAC on a long-term basis.
All factors affecting the achievement of these conditions are under control	Given that the in-combination assessment has concluded that potential impacts associated with Morgan Generation Assets in-combination with other plans/projects will not undermine any of the above conservation objectives, it follows that all factors affecting the achievement of these conditions will remain under control.

1.7.4.65 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC as a result

of EMF from subsea electric cables with respect to the Morgan Generation Assets in-combination with other plans/projects.

Afon Gwyrfai a Llyn Cwellyn SAC

Atlantic salmon

1.7.4.66 Whilst any potential in-combination impacts are predicted to be of long term duration, and continuous during the operation of the relevant projects, they are also predicted to be of local spatial extent. Diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electric cables. EMF from subsea electric cables effects will be confined to the close vicinity of cables for all relevant projects and diadromous fish species are considered to be less likely to interact with emitted EMF from subsea electric cables as they are pelagic and swim in the water column rather than along the seabed. All projects which may contribute to an in-combination effect will implent mitigation inllcuding cable burial. The burial of cables will increase the distance between cables and diadromous fish, the increased distance will attenuate EMF from subsea electric cables, thereby reducing the effect of EMF from subsea electric cables on diadromous fish.

Conclusions

1.7.4.67 Adverse effects on Atlantic salmon which undermine the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC will not occur as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraph 1.7.2.56) is discussed in Table 1.51. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.51: Conclusions against the conservation objectives of Afon Gwyrfai a Llyn Cwellyn SAC for in-combination EMF from subsea electric cables.

Conservation Objective	Conclusion
The conservation objective for the water course must be met	There is no pathway between in-combination EMF from subsea electric cables with Morgan Generation Assets in-combination with other plans/projects and the watercourse to occur. Therefore EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other projects will not prevent the parameters defined in the vision for the watercourse from being met.
The population of the feature in the SAC is stable or increasing over the long term	Given that EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other projects will be localised in spatial extent, all projects will implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF, the population of Atlantic salmon will not be prevented from remaining
The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future	stable or increasing in the long term as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects. Similarly, the natural range of Atlantic salmon in the SAC will neither be reduced nor is likely to be reduced for the foreseeable future as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects.
The Gwyrfai will continue to be a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis	There is no pathway for in-combination EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects to affect the habitats of Atlantic salmon within the SAC. The Gwyrfai will continue to be a sufficiently large habitat to maintain the population of Atlantic salmon in the Afon Gwyrfai a Llyn Cwellyn SAC on a long-term basis.

1.7.4.68 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Afon Gwyrfai a Llyn Cwellyn SAC as a result of EMF from subsea electric cables with respect to the Morgan Generation Assets in-combination with other plans/projects.

River Eden SAC

Sea lamprey, river lamprey and Atlantic salmon

1.7.4.69 Whilst any potential in-combination impacts are predicted to be of long term duration, and continuous during the operation of the relevant projects, they are also predicted to be of local spatial extent. Diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electric cables. EMF from subsea electric cables effects will be confined to the close vicinity of cables for all relevant projects and diadromous fish species are considered to be less likely to interact with emitted EMF from subsea electric cables as they are pelagic and swim in the water column rather than along the seabed. All projects which may contribute to an in-combination effect will implent mitigation inllcuding cable burial. The burial of cables will increase the distance between cables and diadromous fish, the increased distance will attenuate EMF from subsea electric cables, thereby reducing the effect of EMF from subsea electric cables on diadromous fish.

Conclusions

1.7.4.70 Adverse effects on sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Eden SAC will not occur as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects. An assessment of the potential impact 'in-combination EMF from subsea electric cables' against each relevant conservation objective (as presented in paragraphs 1.7.2.62 to 1.7.2.63) is discussed in Table 1.52. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.52: Conclusions against the conservation objectives of River Eden SAC for in-combination EMF from subsea electric cables.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for in-combination EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects to affect the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of Atlantic salmon, sea lamprey and river lamprey rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that EMF from subsea electric cables associated with the Morgan Generation Assets in-combination with other projects will be localised in spatial extent, all projects will implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electric cables, the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site will not be prevented from being maintained or restored as a result of EMF from subsea electric cables associated with Morgan Generation Assets in-combination with other plans/projects.
The distributions of qualifying species within the site [are maintained or restored]	

1.7.4.71 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the River Eden SAC as a result of EMF from subsea electric cables with respect to the Morgan Generation Assets in-combination with other plans/projects.

1.8 Assessment of potential adverse effect on integrity: Annex II marine mammals

1.8.1.1 The HRA Stage 1 Screening Report, together with consultation feedback from NRW (see section 1.4), identified potential for LSEs on the qualifying Annex II marine mammal features of all European sites within the same MU as the Morgan Generation Assets for each Annex II marine mammal species.

1.8.1.2 The screening exercise (HRA Stage 1 Screening Report) therefore identified the potential for LSEs on the European sites (Figure 1.8) designated for Annex II marine mammal features which are listed in Table 1.53.

Table 1.53: European sites and relevant Annex II marine mammal features for which the potential for LSE could not be ruled out and therefore considered in the HRA Stage 2 ISAA.

European site	Annex II marine mammal features
Twelve sites in the United Kingdom	
North Anglesey Marine/Gogledd Môn Forol SAC	• Harbour porpoise
North Channel SAC	• Harbour porpoise
Strangford Lough SAC	• Harbour seal
Murlough SAC	• Harbour seal
Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC	• Bottlenose dolphin • Grey seal
West Wales Marine/Gorllewin Cymru Forol SAC	• Harbour porpoise
The Maidens SAC	• Grey seal
Cardigan Bay/Bae Ceredigion SAC	• Bottlenose dolphin • Grey seal.
Pembrokeshire Marine/Sir Benfro Forol SAC	• Grey seal
Bristol Channel Approaches SAC	• Harbour porpoise
Lundy SAC	• Grey seal
Isles of Scilly Complex SAC	• Grey seal
Four sites in Ireland	
Rockabill to Dalkey Island SAC	• Harbour porpoise
Saltee Islands SAC	• Grey seal
Roaringwater Bay and Islands SAC	• Harbour porpoise
Blasket Islands SAC	• Harbour porpoise
17 sites in France	
Mers Celtiques - Talus du golfe de Gascogne SCI	• Harbour porpoise
Abers - Côte des légendes SCI	• Harbour porpoise
Ouessant-Molène SCI	• Harbour porpoise
Côte de Granit rose-Sept-Iles SCI	• Harbour porpoise
Anse de Goulven, dunes de Keremma SCI	• Harbour porpoise
Tregor Goëlo SCI	• Harbour porpoise
Côtes de Crozon SCI	• Harbour porpoise
Chaussée de Sein SCI	• Harbour porpoise
Cap Sizun SCI	• Harbour porpoise
Récifs du talus du golfe de Gascogne SCI	• Harbour porpoise
Anse de Vauville SCI	• Harbour porpoise
Cap d'Erquy-Cap Fréhel SCI	• Harbour porpoise
Baie de Saint-Brieuc – Est SCI	• Harbour porpoise
Banc et récifs de Surtainville SCI	• Harbour porpoise
Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI	• Harbour porpoise
Estuaire de la Rance SCI	• Harbour porpoise
Baie du Mont Saint Michel SCI	• Harbour porpoise

1.8.1.3 Following feedback from Natural England in the Marine Mammmal EWG for the Morgan Generation Assets, the potential for an adverse effect is considered for all Annex II marine mammal SACs located within English waters including transboundary European SACs located both in English and Welsh waters (sections 1.8.3 and 1.8.4). The approach outlined above has also been used for European sites located in Northern Ireland waters in absence of specific advice from Department for Environment, Food and Rural Affairs (DAERA). However, for European sites located exclusively in Welsh, Irish or French waters, a different approach, recommended by NRW, has been adopted. The recommended approach by NRW follows an iterative process that assesses, in the first instance, the impacts on the European site within the relevant MU for each qualifying species which is closest to the Morgan Generation Assets. The conclusion from the site closest to the Morgan Generation Assets is then applied to assess the remaining sites. In the event that the assessment concluded an adverse effect on integrity for the closest site, the next closest site should then be considered in full, and so on (NRW, 2022d).

1.8.1.4 As detailed in paragraph 1.8.1.3, the approach recommended by NRW advisory services for harbour porpoise was, in the first instance, to assess the impacts on the European site within the Celtic and Irish Seas MU which is closest to the Morgan Generation Assets (i.e. North Anglesey Marine/Gogledd Môn Forol SAC) and use those conclusions to assess the remaining sites. In the event that the assessment concluded an adverse effect on integrity for the closest site, the next closest site should then be considered, and so on. Therefore, the North Anglesey Marine/Gogledd Môn Forol SAC is assessed for relevant impacts on harbour porpoise in section 1.8.3.

1.8.1.5 The same approach has also been recommended for bottlenose dolphin within the Irish Sea MU, therefore Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC has been assessed. The NRW position paper on the uses of marine mammal MUs for screening and assessment in HRA for SACs with marine mammal features (NRW, 2022d) also suggests that Cardigan Bay/Bae Ceredigion SAC should be assessed based on photo-ID evidence which shows that most individual dolphins move between the two SACs, suggesting that the populations of the two SACs are highly connected, and that there is likely a single generic population across the MU. The Cardigan Bay/Bae Ceredigion SAC has therefore also been considered in section 1.8.3.

1.8.1.6 For grey seal and harbour seal, as per the HRA Stage 1 Screening Report and consultation with NRW, all sites within the relevant MUs for each species were brought forward to the HRA Stage 2 ISAA Report (i.e. the Wales MU, Northwest England MU, SW Scotland and Northern Ireland MU for grey seal and the Wales and Northwest England MU for harbour seal). Additional sites were also identified following feedback from NRW to consider foraging ranges from Carter *et al.* (2022) and telemetry data from (Wright and Sinclair, 2022). On this basis, for grey seal, the Isles of Scilly Complex SAC, Lundy SAC, The Maidens SAC and Saltee Islands SAC were carried forward to the HRA Stage 2 ISAA Report. For harbour seal, Strangford Lough SAC and Murlough SAC were also brought forward to the HRA Stage 2 ISAA Report. As above, an iterative approach to assessment will be undertaken starting with the closest site to the Morgan Generation Assets (Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC for grey seal and Strangford Loch SAC for harbour seal) being assessed in the first instance. In addition, in line with the NRW position paper (NRW, 2022d) the Pembrokeshire Marine/Sir Benfro Forol SAC will also be considered as the SAC supports the most grey seal pupping within the Celtic and Irish Seas part of the OSPAR Region III area.

1.8.1.7 In light of paragraphs 1.8.1.3 to 1.8.1.6, the list of the European sites considered in full for the Appropriate Assessment along with relevant Annex II marine mammal qualifying features are listed in Table 1.54.

Table 1.54: List of the European sites considered in full for the Appropriate Assessment along with relevant Annex II marine mammal qualifying features.

European site	Annex II marine mammal features
North Anglesey Marine/Gogledd Môn Forol SAC	• Harbour porpoise
North Channel SAC	• Harbour porpoise
Strangford Lough SAC	• Harbour seal
Murlough SAC	• Harbour seal
Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC	• Bottlenose dolphin • Grey seal
The Maidens SAC	• Grey seal
Cardigan Bay/Bae Ceredigion SAC	• Bottlenose dolphin
Pembrokeshire Marine/Sir Benfro Forol SAC	• Grey seal
Bristol Channel Approaches SAC	• Harbour porpoise
Lundy SAC	• Grey seal
Isles of Scilly Complex SAC	• Grey seal

1.8.1.8 As outlined in paragraph 1.8.1.7, for the sites listed above a full assessment has been undertaken using information supplied in volume 2 chapter 9: Marine mammals of the PEIR. For European sites located exclusively in Welsh, Irish or French waters an iterative approach has been followed, whereby a conclusion for the potential for an adverse effect is provided for each site based on the distance from the Morgan Generation Assets.

1.8.1.9 LSEs on these European sites were identified for the following impacts:

- During the construction and decommissioning phases
  - Injury and disturbance from underwater sound generated from piling
  - Injury and disturbance from underwater sound generation from UXO detonation
  - Injury and disturbance from underwater sound from pre-construction site investigation surveys
  - Injury and disturbance from underwater sound from vessels and other (non-piling) sound producing activities
  - Changes in prey availability.
- During the operations and maintenance phase
  - Underwater sound from vessels and other vessel activities.

1.8.1.10 Baseline information is provided in section 1.8.2 for the European sites identified in Table 1.54, including information to support the Appropriate Assessment such as site descriptions, feature information, conservation objectives and condition assessments for the relevant European sites.

1.8.1.11 Sections 1.8.3 and 1.8.4 presents the Stage 2 assessments (considering effects both alone and in-combination) for these European sites. A summary of all assessments undertaken within this report is provided in the concluding section of this report (section 1.10).

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Figure 1.8: Location of European Sites designated for Annex II marine mammal species for which an Appropriate Assessment is required.

1.8.2 Baseline information

1.8.2.1 Baseline information on the Annex II marine mammal features of the European sites identified for further assessment within the HRA process has been gathered through a comprehensive desktop study of existing studies and datasets, using the latest available information on marine mammals in the Irish Sea. The baseline is informed by the 12-month site-specific aerial survey data and baseline characterisation presented in volume 6, annex 9.1: Marine mammal technical report of the PEIR and volume 2, chapter 9: Marine mammals of the PEIR.

North Anglesey Marine/Gogledd Môn Forol SAC

Site description

1.8.2.2 The North Anglesey Marine/Gogledd Môn Forol SAC, which is 28.2km away from the Morgan Array Area, covers an area of 3,249km^2 and extends from Anglesey in a northwest direction into the Irish Sea. Water depths within the site range from mean low water tide level to 100m with average depths of around 40 to 50m across the site (NRW and JNCC, 2016). Seabed substrates across the SAC include rock, coarse sediment, sand and muds. These physical characteristics of the site are well aligned to the environmental variables determining the probability of presence and the density of harbour porpoise and the site has been recognised as an area with predicted persistent high densities of harbour porpoise (NRW and JNCC, 2016). The SAC provides important summer habitat for porpoises and is identified as part of the top 10% persistent high density areas for the summer seasons within the UK (NRW and JNCC, 2016).

Feature accounts

Harbour porpoise

1.8.2.3 Harbour porpoise are listed as Annex II species present as a qualifying feature and a primary reason for site selection.

1.8.2.4 Harbour porpoise are the most common and widespread cetacean in Welsh waters (Baines and Evans, 2012) with hot spots identified off the Pembrokeshire coast; the Lleyn Peninsula (to a lesser extent); in south Cardigan Bay; and in the Bristol Channel off the south coast of Wales (around the Gower Peninsula and in Newport Bay) (Baines and Evans, 2012).

1.8.2.5 As outlined above, the North Anglesey Marine/Gogledd Môn Forol site was identified as being within the top 10% of persistent high density areas for harbour porpoise in UK waters during the summer season (Heinänen and Skov, 2015). The Small Cetacean Abundance in the North Sea (SCANS)-II surveys in 2005 estimated that the site supports approximately 1084 individuals (95% Confidence Interval: 557 - 2111) for at least part of the year and represents approximately 4% of the population within the UK part of the Celtic and Irish Sea MU (JNCC, NRW and Department for Environment, Food and Rural Affairs (DAERA), 2019). This however cannot be considered as a site population estimate as this estimate is from a one-month survey in a single year (JNCC, NRW and DAERA, 2019).

Condition assessment

1.8.2.6 There is no condition assessment available for the harbour porpoise feature of the North Anglesey Marine/Gogledd Môn Forol SAC.

Conservation objectives

1.8.2.7 The conservation objectives as outlined in JNCC, NRW and DAERA (2019)[19] and considered in the assessment which are relevant to the harbour porpoise feature are outlined below.

1.8.2.8 To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining FCS for Harbour Porpoise in UK waters.

1.8.2.9 In the context of natural change, this will be achieved by ensuring that:

- Harbour porpoise is a viable component of the site
- There is no significant disturbance of the species
  - Noise disturbance within an SAC from a plan/project individually or in-combination is significant if it excludes harbour porpoises from more than:
    - 20% of the relevant area[20] of the site in any given day[21]
    - an average of 10% of the relevant area of the site over a season[22][23]
- The condition of supporting habitats and processes, and the availability of prey is maintained.

North Channel SAC

Site description

1.8.2.10 The North Channel SAC, which is 63.8km away from the Morgan Array Area, is located in between the North Channel and the northwest Irish Sea between Northern Ireland, Scotland and the Isle of Man and covers an area of 1,604km^2. The SAC runs along the east coast of Northern Ireland, connects with The Maidens SAC to the north and stands in proximity to the Murlough SAC and Strangford Lough SAC to the southwest. The SAC extends from coastal to offshore waters with most of the site ranging between 10 to 40m deep with a maximum of 150m to the east boundary. Seabed substrates across the SAC include mainly of coarse or sandy sediments, with patches of rock and mud and the site overlaps with the Pisces Reef Complex SAC.

[19] https://data.jncc.gov.uk/data/f4c19257-2341-46b3-8e29-49665cd8f3d2/NorthAnglesey-Conservation-Advice.pdf

[20] The relevant area is defined as that part of the SAC that was designated on the basis of higher persistent densities for that season (summer defined as April to September inclusive, winter as October to March inclusive).

[21] Applicable only in Habitats Regulations Assessments (HRA) due to impracticality of daily sound limit management of activities, but retrospective compliance analysis advised

[22] Summer defined as April to September inclusive, winter as October to March inclusive

[23] For example, a daily footprint of 19% for 95 days would result in an average of 19x95/183 days (summer) =9.86%

Feature accounts

Harbour porpoise

1.8.2.11 Harbour porpoise are listed as Annex II species present as a qualifying feature and a primary reason for site selection.

1.8.2.12 The site provides important winter habitat for harbour porpoise and some of the largest groups of harbour porpoise (up to 100 individuals) around Northern Ireland have been observed within the site. The site has been recognised as an area with predicted persistent high densities of harbour porpoise (IAMMWG, 2015). The SAC is estimated to support 1.2% of the UK Celtic and Irish Seas MU population and to be within the top 10% of persistent high density areas for the MU during the winter season (Heinänen and Skov, 2015). The SCANS-II surveys in 2005 estimated that the site supports approximately 537 individuals (95% Confidence Interval: 276 – 1,046) for at least part of the year (JNCC and DAERA, 2017). This however cannot be considered as a site population estimate as this estimate is derived from a one-month survey in a single year (JNCC and DAERA, 2017).

Condition assessment

1.8.2.13 There is no condition assessment available for the harbour porpoise feature of the North Channel SAC at the time of writing.

Conservation objectives

1.8.2.14 The conservation objectives as outlined in JNCC and DAERA (2019)[24] and considered in the assessment which are relevant to the harbour porpoise feature are outlined below.

1.8.2.15 To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining FCS for harbour porpoise in UK waters.

1.8.2.16 In the context of natural change, this will be achieved by ensuring that:

- Harbour porpoise is a viable component of the site
- There is no significant disturbance of the species and
  - Noise disturbance within an SAC from a plan/project individually or in-combination is significant if it excludes harbour porpoises from more than:
    - 20% of the relevant area of the site in any given day
    - an average of 10% of the relevant area of the site over a season
- The condition of supporting habitats and processes, and the availability of prey is maintained.

Strangford Lough SAC

Site description

1.8.2.17 Strangford Lough SAC, which is located 94.6km from the Morgan Array Area, extends from the north end 15km east of Central Belfast to Downpatrick in the southwest corner. The lough is a large marine inlet spanning 150km^2 on the east coast of County Down, of which about 50km^2 lies between high water mark mean tide and low water mark mean tide. The lough is separated from the Irish Sea by the Ards Peninsula to the east and is connected to the open sea by the Strangford Narrows. The triangular area around the lough mouth is exposed to high wave energy and this area has rock platforms, steeply-shelving rocky shores and a sandy seabed.

Feature accounts

Harbour seal

1.8.2.18 Harbour seal is a qualifying feature of the Strangford Lough SAC, however, is not a primary reason for site selection.

1.8.2.19 A review conducted by Culloch *et al.* (2018) reported that in Strangford Lough, there was a 2.01% and a 1.31% annual decrease in harbour seal adults and pups, respectively (using data from 1995 to 2014, inclusive). Although it is highly likely that varying effort across years and areas has played an influential role in the trends identified.

Condition assessment

1.8.2.20 Overall the condition assessment deemed that harbour seal are in unfavourable, declining condition although the condition of supporting habitats is currently unknown (DAERA, 2019)[25].

Conservation objectives

1.8.2.21 The conservation objectives outlined in DAERA (2018a)[26] and considered in the assessment which are relevant to the harbour seal feature are outlined below.

- To maintain (or restore where appropriate) the harbour seal feature to favourable condition
- Maintain and enhance, as appropriate, the harbour seal population
- Maintain and enhance, as appropriate, physical features used by harbour seal within the site.

[24] https://data.jncc.gov.uk/data/be0492aa-f1d6-4197-be22-e9a695227bdb/NorthChannel-conservation-advice.pdf

[25] https://www.daera-ni.gov.uk/sites/default/files/publications/daera/DAERA%20report%20-%20Strangford%20Lough%20subtidal%20Special%20Area%20of%20Conservation%20%28SAC%29%20Condition%20Assessment%202019%20-%20V2.0%20January%202022%20-%20Web.pdf

[26] https://www.daera-ni.gov.uk/sites/default/files/publications/doe/Strangford%20Lough%20SAC%20Conservation%20Objectives%202018_.pdf

Murlough SAC

Site description

1.8.2.22 The Murlough SAC, which is 98.4km away from the Morgan Array Area, is located on the south-east coast of Northern Ireland. The SAC encompass the shallow waters of the Dundrum Bay which represents the largest area of shallow sub-littoral sandbanks in Northern Ireland. The SAC spans over 119km^2 in the north-west Irish Sea.

Feature accounts

Harbour seal

1.8.2.23 Harbour seal is a qualifying feature of the Murlough SAC, however is not a primary reason for site selection.

1.8.2.24 The SAC is recognised as an important haul-out site for harbour seal with yearly maximum counts of 141 individuals. With a 25% maximum decline from the baseline values, a target to maintain a favourable condition of 106 individuals is set (DAERA, 2018b).

Condition assessment

1.8.2.25 There is no condition assessment available for the harbour seal feature of the Murlough SAC.

Conservation objectives

1.8.2.26 The conservation objectives outlined in DAERA (2018b)[27] and considered in the assessment which are relevant to the harbour seal feature are outlined below.

- To maintain (or restore where appropriate) the harbour seal feature to favourable condition
- To maintain (and if feasible enhance) population numbers and distribution of harbour seal
- To maintain and enhance, as appropriate, physical features used by harbour seals within the site.

Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC

Site description

1.8.2.27 The Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC is located 119.8km from the Morgan Array Area in northwest Wales and extends from Nefynon the north coast of Lleyn along the Meirionnydd coast to Clarach in Ceredigion south of the Dyfi estuary (NRW, 2018a). The site covers an area of about 146,023 ha (NRW, 2018a).

1.8.2.28 The nature of the seabed and coast and the range of environmental conditions present vary throughout the SAC with great differences in rock and sediment type, aspect, sediment movement, exposure to tidal currents and wave action, water clarity and salinity throughout the site. This diverse environment have created a wide range of habitats and associated communities of which some of which are unique to Wales (NRW, 2018a).

Feature accounts

1.8.2.29 Both bottlenose dolphin and grey seal are listed as Annex II species present as a qualifying feature, but not a primary reason for site selection. Accounts of each of the features are provided below.

Grey seal

1.8.2.30 Grey seals present within the SAC are thought to be a part of a wider north Wales population. Grey seals range throughout the open coast areas of the site and beyond but are commonly observed within the SAC around the Lleyn, Bardsey Island and the islands along the south Lleyn coast (NRW, 2018a).

1.8.2.31 The SAC contains several important pupping sites which are located around the north-west of the SAC including Bardsey Island, with the main period during which the majority of pups are born being September to October, but with some pupping activity occurring from early August to the end of November (NRW, 2018a). Haul-out sites are distributed throughout the SAC and non-pupping seals are present year-round at these haul out sites. Haul out sites are predominantly located on intertidal rocky outcrops, rock and boulder/cobble beaches, sea caves that are tidally exposed, and occasionally sandy beaches and tidally exposed sandflats (NRW, 2018a).

Bottlenose dolphin

1.8.2.32 Bottlenose dolphins do not form a discrete site based population within the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC but are seen as part of a wider population that ranges across waters of southwest UK and Ireland, and includes the Cardigan Bay/Bae Ceredigion SAC (NRW, 2018a). Important characteristics relating to population dynamics are deemed to be common to bottlenose dolphins in both the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC and Cardigan Bay/Bae Ceredigion SAC as both sites are within Cardigan Bay/Bae Ceredigion SAC. Population estimates for the bottlenose dolphins of the Cardigan Bay/Bae Ceredigion SAC in the years 2001-2007 (obtained from mark-recapture surveys), provided an estimate of 210 individuals for the population using Cardigan Bay/Bae Ceredigion SAC in 2007. A higher estimate of 379 individuals is made when calculated for the whole period 2001-2007 (NRW, 2018a).

1.8.2.33 As reported in Lohrengel *et al.* (2018) there has been an overall increase in the population size between 2001-2007 and a decline since then to 2001 levels but there is considerable variability between years and low confidence in some estimates (and the apparent trends are not significant). The decline in recent years may be related to animals moving away from the study area and spending the majority of their time in

[27] https://www.daera-ni.gov.uk/sites/default/files/publications/doe/Murlough%20SAC%20Conservation%20Objectives%202018%20%28002%29.pdf

other parts of Wales or beyond. The population is said to be declining in the short term (10 years), but stable in the medium term (since 2001).

1.8.2.34 Bottlenose dolphins are present in Welsh coastal waters year round, with a strong peak in numbers in summer. In Cardigan Bay they are most commonly seen within 10 miles of the coast, and most concentrated within two miles near headlands and estuaries. Calving has been documented within Cardigan Bay and new born and very young calves have been reported in the bay from April to September, suggesting a seasonal pattern to calving (NRW, 2018a).

Condition assessment

1.8.2.35 Table 1.55 outlines the indicative condition assessments of the relevant qualifying features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, overall the condition assessment deemed that grey seal and bottlenose dolphin are in favourable condition although the condition of supporting habitats is currently unknown (NRW, 2018b)[28]. There are no activities identified as having a direct impact on the site condition (NRW, 2018b).

Table 1.55: Condition assessment of the relevant Annex II marine mammal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC.

Component of species feature assessed	Indicative assessment	Key evidence type used	Level of agreement	Confidence in evidence	Component confidence level
Grey seal					
Population (e.g. size, structure, production, condition of species within site, contaminant burdens)	Favourable	Reports and expert judgement	Medium	Medium	Medium
Range (within site)	Favourable	Reports and expert judgement	Medium	Medium	Medium
Bottlenose dolphin					
Population (e.g. size, structure, production, condition of species within site, contaminant burdens)	Favourable	Monitoring data, reports	Medium	Medium	Medium
Range (within site)	Favourable	Monitoring data, reports	Medium	Medium	Medium

Conservation objectives

1.8.2.36 The conservation objectives relevant for grey seal and bottlenose dolphin features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC are outlined below (NRW, 2018a)[29].

1.8.2.37 Only conservation objectives relevant to the qualifying species (Annex II marine mammal qualifying features) of the SAC will be assessed in sections 1.8.3 and 1.8.4. Conservation objectives relating to the qualifying habitats of the SAC have been screened out in the HRA Stage 1 Screening Report.

1.8.2.38 To achieve favourable conservation status all the following, subject to natural processes, need to be fulfilled and maintained in the long-term. If these objectives are not met restoration measures will be needed to achieve favourable conservation status.

Species Features

- Grey seal
- Bottlenose dolphin.

Typical Species

1.8.2.39 The presence, abundance, condition and diversity of typical species is such that habitat quality is not degraded. Important elements include:

- Species richness
- Population structure and dynamics,
- Physiological heath,
- Reproductive capacity
- Recruitment
- Mobility.

Populations

1.8.2.40 The population is maintaining itself on a long-term basis as a viable component of its natural habitat. Important elements include:

- Population size
- Structure
- Production
- Condition of the species within the site.

1.8.2.41 As part of this objective it should be noted that for bottlenose dolphin and grey seal:

- Contaminant burdens derived from human activity are below levels that may cause physiological damage, or immune or reproductive suppression.

1.8.2.42 For grey seal populations should not be reduced as a consequence of human activity.

[28] https://cdn.cyfoethnaturiol.cymru/media/684243/indicative-condition-assessment-2018-for-pen-llyn-ar-sarnau-sacv2.pdf

[29] https://cdn.cyfoethnaturiol.cymru/media/688001/eng-pen-llyn-ar-sarnau-reg-37-report-2018.pdf

Range

1.8.2.43 The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future.

1.8.2.44 As part of this objective it should be noted that for bottlenose dolphin and grey seal:

- Their range within the SAC and adjacent inter-connected areas is not constrained or hindered
- There are appropriate and sufficient food resources within the SAC and beyond
- The sites and amount of supporting habitat used by these species are accessible and their extent and quality is stable or increasing.

Supporting habitats and species:

1.8.2.45 The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing. Important considerations include:

- Distribution
- Extent
- Structure
- Function and quality of habitat
- Prey availability and quality.

1.8.2.46 As part of this objective it should be noted that:

- The abundance of prey species subject to existing commercial fisheries needs to be equal to or greater than that required to achieve maximum sustainable yield and secure in the long term.
- The management and control of activities or operations likely to adversely affect the species feature is appropriate for maintaining it in favourable condition and is secure in the long term.
- Contamination of potential prey species should be below concentrations potentially harmful to their physiological health.
- Disturbance by human activity is below levels that suppress reproductive success, physiological health or long-term behaviour.

Restoration and recovery

1.8.2.47 As part of this objective it should be noted that for the bottlenose dolphin, populations should be increasing.

The Maidens SAC

Site description

1.8.2.48 The Maidens SAC, which is 141.8km away from the Morgan Array Area, is located in the North Channel to the north-east coast of Northern Ireland. The SAC groups small rocky reefs either awash or just emergent detached from the coast. Two rocks within the SAC can be considered islands (i.e. West Maiden and East Maiden). There are four reef areas in addition to the reef plateau between the Maiden islands. The SAC extends over 74.6km^2 and ranges between Mean High Water and 200m deep and can experience currents of up to 4 knots.

Feature accounts

Grey seal

1.8.2.49 Grey seal is a qualifying feature of The Maidens SAC, however is not a primary reason for site selection.

1.8.2.50 The emergent rocks, islands and waters within the SAC is recognised as important to provide haul-out site, resting sites and foraging areas for grey seal with a maximum count of 70 individuals recorded during a survey in July 2000. A target to maintain a favourable condition of 50 individuals is set (DAERA, 2017). Surveys in 2009 observed pupping and breeding on the site. In 2002, the SAC was one of the three regions with the largest numbers of grey seal around the coast of Northern Ireland (Northern Ireland Environment Agency (NIEA), 2012).

Condition assessment

1.8.2.51 There is no condition assessment available for the grey seal feature of The Maidens SAC.

Conservation objectives

1.8.2.52 The conservation objectives outlined in DAERA (2017)[30] and considered in the assessment which are relevant to the harbour seal feature are outlined below.

- To maintain (or restore where appropriate) the grey seal feature to favourable condition
- To maintain (and if feasible enhance) population numbers and distribution of grey seal
- To maintain and enhance, as appropriate, physical features used by grey seal within the site.

[30] https://www.daera-ni.gov.uk/sites/default/files/publications/daera/The%20Maidens%20SAC%20Conservation%20Objectives%202017.PDF

Cardigan Bay/Bae Ceredigion SAC

Site description

1.8.2.53 The Cardigan Bay/Bae Ceredigion SAC is located 188.2km from the Morgan Array Area off the north Pembrokeshire coast in the south region of Cardigan Bay. The SAC encompasses approximately 960km^2 and extends 12 miles offshore. The SAC has a wide range of sediment types from well sorted highly homogenous sands to well mixed muddy gravels, pebbles and cobbles. Sediments associated with coastal areas are predominantly sands with some intrusions of gravel (NRW, 2018c). The majority of the SAC is less than 30m deep but reaches 50m in the outer parts of the bay towards St. George's Channel. Species interactions within the SAC are complex and inter-related with bottlenose dolphin and grey seal being the primary top predators and therefore likely to be affected by changes at lower trophic levels (NRW, 2018c).

Feature accounts

Bottlenose dolphin

1.8.2.54 Bottlenose dolphin are present all year round in the Cardigan Bay/Bae Ceredigion SAC, with peak numbers and group size (of more than 60 individuals) observed during September and October. Recent estimates suggest that the Cardigan Bay population is made up of around 100-300 individuals (NRW, 2018c). Of individuals present within the SAC 30% have also been identified in the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC as well as to the north around the Isle of Anglesey, indicating the large home ranges of some individuals. Some individuals however show a more local residency pattern and exhibit smaller home ranges (NRW, 2018c). In coastal waters bottlenose dolphins tend to favour habitats with uneven topography and/or strong tidal currents, acoustic monitoring has also suggested the presence of reef and sandbanks for foraging. There have been high frequency of sightings along the coast from Aberaeron to Cardigan and around Fishguard which suggests these areas are of particular significance to bottlenose dolphin foraging.

Grey seal

1.8.2.55 Grey seal individuals present within the Cardigan Bay/Bae Ceredigion SAC do not forma a discrete population, they are thought to be part of the southwest England and Wales MU. The southwest Wales population is determined from pup counts and has been estimated at around 5000 individuals, pup production within the Cardigan Bay SAC represents a small proportion of this (NRW, 2018c). Seals are widely distributed within the site and also travel outside of the site. Small numbers of the population also make foraging trips further offshore and into the deeper waters of the Irish Sea. Most pupping occurs towards the southwest end of the SAC but takes place throughout the site at suitable locations such as undisturbed rocky beaches, coves and caves. Moulting and resting haul out sites are also located throughout the site although seals are usually seen haling out as individuals or in small groups rather than large groups (NRW, 2018c).

1.8.2.56 It should be noted that although grey seal is a designated feature of the Cardigan Bay/Bae Ceredigion SAC, as outlined 1.8.1.3 to 1.8.1.8 in line with the iterative process followed this feature is not assessed fully in section 1.8.3 and 1.8.4 for this SAC as the feature is assessed in full for the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC which is located at a reduced distance from the Morgan Generation Assets.

Condition assessment

1.8.2.57 Table 1.56 outlines the indicative condition assessments of the relevant qualifying features of the Cardigan Bay/Bae Ceredigion SAC, overall the condition assessment deemed that bottlenose dolphin are in favourable condition although the condition of supporting habitats is currently unknown (NRW, 2018b)[31]. There are no activities identified as having a direct impact on the site condition (NRW, 2018b).

Table 1.56: Condition assessment of the relevant Annex II marine mammal features of the Cardigan Bay/Bae Ceredigion SAC.

Component of species feature assessed	Indicative assessment	Key evidence type used	Level of agreement	Confidence in evidence	Component confidence level
Bottlenose dolphin					
Population (e.g. size, structure, production, condition of species within site, contaminant burdens)	Favourable	Monitoring data, reports	Medium	High	Medium
Range (within site)	Favourable	Monitoring data, reports	Medium	Medium	Medium

Conservation objectives

1.8.2.58 The conservation objectives outlined in NRW (2018c)[32] and considered in the assessment which are relevant to the bottlenose dolphin feature are outlined below.

1.8.2.59 Only conservation objectives relevant to qualifying species (Annex II marine mammal qualifying features) of the SAC will be assessed in section 1.8.3. Conservation objectives relating to the qualifying habitats of the SAC will not be considered on the basis of the findings of the HRA Stage 1 Screening Report.

1.8.2.60 To achieve favourable conservation status all the following, subject to natural processes, need to be fulfilled and maintained in the long-term. If these objectives are not met restoration measures will be needed to achieve favourable conservation status.

Species Features

[31] https://cdn.cyfoethnaturiol.cymru/media/684241/indicative-condition-assessment-2018-cardigan-bay-sacv2.pdf

[32] https://cdn.cyfoethnaturiol.cymru/media/687993/eng-cardigan-bay-reg-37-report-2018.pdf

- Grey seal
- Bottlenose dolphin.

Typical Species

1.8.2.61 The presence, abundance, condition and diversity of typical species is such that habitat quality is not degraded. Important elements include:

- Species richness
- Population structure and dynamics
- Physiological heath
- Reproductive capacity
- Recruitment
- Mobility.

Populations

1.8.2.62 The population is maintaining itself on a long-term basis as a viable component of its natural habitat. Important elements include:

- Population size
- Structure
- Production
- Condition of the species within the site.

1.8.2.63 As part of this objective it should be noted that for bottlenose dolphin and grey seal:

- Contaminant burdens derived from human activity are below levels that may cause physiological damage, or immune or reproductive suppression

1.8.2.64 For grey seal populations should not be reduced as a consequence of human activity.

Range

1.8.2.65 The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future.

1.8.2.66 As part of this objective it should be noted that for bottlenose dolphin and grey seal:

- Their range within the SAC and adjacent inter-connected areas is not constrained or hindered
- There are appropriate and sufficient food resources within the SAC and beyond
- The sites and amount of supporting habitat used by these species are accessible and their extent and quality is stable or increasing.

Supporting habitats and species

1.8.2.67 The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing. Important considerations include:

- Distribution
- Extent
- Structure
- Function and quality of habitat
- Prey availability and quality.

1.8.2.68 As part of this objective it should be noted that:

- The abundance of prey species subject to existing commercial fisheries needs to be equal to or greater than that required to achieve maximum sustainable yield and secure in the long term
- The management and control of activities or operations likely to adversely affect the species feature is appropriate for maintaining it in favourable condition and is secure in the long term
- Contamination of potential prey species should be below concentrations potentially harmful to their physiological health
- Disturbance by human activity is below levels that suppress reproductive success, physiological health or long-term behaviour.

Restoration and recovery

1.8.2.69 As part of this objective it should be noted that for the bottlenose dolphin populations should be increasing.

Pembrokeshire Marine/Sir Benfro Forol SAC

Site description

1.8.2.70 The Pembrokeshire Marine/Sir Benfro Forol SAC, which is located 237.6km from the Morgan Array Area, extends from north of Abereiddy on the north Pembrokeshire coast to the east of Manorbier in the south and encompasses the coasts of the islands of Ramsey, Skomer, Grssholm, Skokholm, the Bishops and Clerks and The Smalls. The SAC also overlaps wholly or in part with several other designated sites including the Skomer MCZ and several SPAs. Sediments across the site range from very fine, muds in sheltered area such as Milford Haven waterway, sands and gravels to pebbles and cobbles in deep subtidal areas which are subject stronger currents (NRW, 2018d). There are also strong tidal streams within the SAC.

Feature accounts

Grey seal

1.8.2.71 Grey seal are present as an Annex II species that are a primary reason for selection of this site.

1.8.2.72 Pembrokeshire in south-west Wales is representative of grey seal colonies in the south-west part of the breeding range in the UK. It is the largest breeding colony on the west coast south of the Solway Firth, representing over 2% of annual UK pup production. The south-west Wales population size is also determined from pup counts and has been estimated at approximately 5,000 individuals (Baines *et al.*, 1995). There was a steady increase in pup production from 2009 to 2015 with the greatest increase being at the mainland sites, although in 2014 and 2015 increases at the

island sites have also been recorded (NRW, 2018d). Pup production from 2015 to 2018 has shown the highest totals ever recorded with average production for 2013 to 2015 at 357 pups (NRW, 2018d). Pupping primarily takes place in the southwest end of the SAC (NRW, 2018d).

1.8.2.73 Grey seals are highly mobile species, which can travel great distances (SCOS, 2018; Carter *et al*., 2022). Seals are widely distributed within and travel far beyond the boundary of the Pembrokeshire Marine/Sir Benfro Forol SAC. Moulting and resting haul-out sites are distributed throughout the site, with a small number of sites are regularly used as haul-outs by large numbers of seals. Known winter moulting haul-outs and non-moulting/resting haul-outs are primarily located on offshore islands and remote, undisturbed and inaccessible rocky shores and beaches (NRW, 2018d).

Condition assessment

1.8.2.74 Table 1.57 outlines the indicative condition assessments of the relevant qualifying features of the Pembrokeshire Marine/Sir Benfro Forol SAC, overall the condition assessment deemed that grey seal are in favourable condition although the condition of supporting habitats is currently unknown (NRW, 2018e)[33]. There are no activities identified as having a direct impact on the site condition (NRW, 2018e).

Table 1.57: Condition assessment of the relevant Annex II marine mammal features of the Pembrokeshire Marine/Sir Benfro Forol SAC.

Component of species feature assessed	Indicative assessment	Key evidence type used	Level of agreement	Confidence in evidence	Component confidence level
Grey seal					
Population (e.g. size, structure, production, condition of species within site, contaminant burdens)	Favourable	Reports and expert judgement	High	Medium	Medium
Range (within site)	Favourable	Reports and expert judgement	Medium	Medium*	Medium

Conservation objectives

1.8.2.75 The conservation objectives outlined in NRW (2018d)[34] considered in the assessment which are relevant to the grey seal feature are outlined below.

1.8.2.76 Only conservation objectives relevant to qualifying species (Annex II marine mammal qualifying features) of the SAC will be assessed in section 1.8.3. Conservation objectives relating to the qualifying habitats of the SAC will not be considered on the basis of the findings of the HRA Stage 1 Screening Report.

1.8.2.77 To achieve favourable conservation status all the following, subject to natural processes, need to be fulfilled and maintained in the long-term. If these objectives are not met restoration measures will be needed to achieve favourable conservation status.

Species Features

- Grey seal.

Typical Species

1.8.2.78 The presence, abundance, condition and diversity of typical species is such that habitat quality is not degraded. Important elements include

- Species richness
- Population structure and dynamics
- Physiological health
- Reproductive capacity
- Recruitment
- Mobility.

Populations

1.8.2.79 The population is maintaining itself on a long-term basis as a viable component of its natural habitat. Important elements include:

- Population size
- Structure
- Production
- Condition of the species within the site.

1.8.2.80 As part of this objective it should be noted that for otter and grey seal:

- Contaminant burdens derived from human activity are below levels that may cause physiological damage, or immune or reproductive suppression.

1.8.2.81 For grey seal, populations should not be reduced as a consequence of human activity.

Range

1.8.2.82 The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future.

1.8.2.83 As part of this objective it should be noted that for otter and grey seal:

- Their range within the SAC and adjacent inter-connected areas is not constrained or hindered
- There are appropriate and sufficient food resources within the SAC and beyond
- The sites and amount of supporting habitat used by these species are accessible and their extent and quality is stable or increasing.

[33] https://cdn.cyfoethnaturiol.cymru/media/684242/indicative-condition-assessment-2018-pembrokeshire-marine-sacv2.pdf

[34] https://cdn.cyfoethnaturiol.cymru/media/687999/eng-pembrokeshire-marine-reg-37-report-2018.pdf

Supporting habitats and species

1.8.2.84 The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing. Important considerations include:

- Distribution
- Extent
- Structure
- Function and quality of habitat
- Prey availability and quality.

1.8.2.85 As part of this objective it should be noted that:

- The abundance of prey species subject to existing commercial fisheries needs to be equal to or greater than that required to achieve maximum sustainable yield and secure in the long term
- The management and control of activities or operations likely to adversely affect the species feature is appropriate for maintaining it in favourable condition and is secure in the long term
- Contamination of potential prey species should be below concentrations potentially harmful to their physiological health
- Disturbance by human activity is below levels that suppress reproductive success, physiological health or long-term behaviour.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Site description

1.8.2.86 Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC, which is 300.1km away from the Morgan Array Area, is located in English and Welsh waters, to the east of the Celtic Sea in the Bristol Channel. The SAC extends from the north coast of Cornwall in England to Carmarthen Bay in Wales and covers an area of 5,850km^2 with depths ranging from Mean Low Water to 70m on the west edge of the SAC. The site is composed of diverse habitats comprising small areas of rocky reefs, sandbanks, sea caves, sand/mudflats and salt meadows but it is mostly characterised by sandy and coarse sediment seabed. Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC encompasses the Lundy SAC which has grey seal as a qualifying feature and is described below.

Feature accounts

Harbour porpoise

1.8.2.87 Harbour porpoise are listed as Annex II species present as a qualifying feature and a primary reason for site selection.

1.8.2.88 While harbour porpoise is present year round within the boundaries of the SAC, the site provides important winter habitat for harbour porpoise with persistent higher densities throughout the site compared to other regions of the UK Celtic and Irish Seas MU (within top 10% densities of those for the MU in winter) (IAMMWG, 2015). The SAC is estimated to support 4.7% of the UK Celtic and Irish Seas MU population. The SCANS-II surveys in 2005 estimated that the site supports approximately 2100 individuals (95% Confidence Interval: 805 – 5,661) for at least part of the year (JNCC, Natural England and NRW, 2016). This however cannot be considered as a site population estimate as this estimate is from a one-month survey in a single year (JNCC, Natural England and NRW, 2016) and seasonal differences are likely to occur.

Condition assessment

1.8.2.89 There is no condition assessment available for the harbour porpoise feature of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC.

Conservation objectives

1.8.2.90 The conservation objectives as outlined in JNCC, Natural England, DAERA (2019)[35] and considered in the assessment which are relevant to the harbour porpoise feature are outlined below.

1.8.2.91 To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining FCS for harbour porpoise in UK waters.

1.8.2.92 In the context of natural change, this will be achieved by ensuring that:

- Harbour porpoise is a viable component of the site
- There is no significant disturbance of the species
  - Noise disturbance within an SAC from a plan/project individually or in-combination is significant if it excludes harbour porpoises from more than:
    - 20% of the relevant area of the site in any given day and
    - An average of 10% of the relevant area of the site over a season
- The condition of supporting habitats and processes, and the availability of prey is maintained.

Lundy SAC

Site description

1.8.2.93 The Lundy SAC, which is 334.9km away from the Morgan Array Area, is located in the outer Bristol Channel off north Devon. The Lundy SAC covers an area of 30.7km^2 around the small rocky island of Lundy. The site supports important granite reefs habitats that are biologically extremely rich. This SAC sits within the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC described in paragraph 1.8.2.86.

[35] https://data.jncc.gov.uk/data/505b3bab-a974-41e5-991c-c29ef3e01c0a/BCA-ConsAdvice.pdf

Feature accounts

Grey seal

1.8.2.94 Grey seal is a qualifying feature of the Lundy SAC, however is not a primary reason for site selection.

1.8.2.95 The SAC supports an average population of year round resident grey seals between 70 and 81 (2006-2013) with a maximum recorded of 239 in August 2011 (JNCC, 2015a; MacDonald, 2013). Pupping was observed on the site with 19 pups recorded on average between 2006 and 2013 with a maximum of 38 recorded in 2012 (MacDonald, 2013). Grey seals from the site have been functionally linked to at least 7 other sites along the north Cornwall and Devon coast (Chapman and Tyldesley, 2016; Sayer *et al*.,2018) and supports an important presence of grey seal within the whole West England and Welsh MU.

Condition assessment

1.8.2.96 There is no condition assessment available for the grey seal feature of the Lundy SAC.

Conservation objectives

1.8.2.97 The conservation objectives as outlined in Natural England (2018a)[36] and considered in the assessment which are relevant to the harbour porpoise feature are outlined below.

1.8.2.98 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its qualifying features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species
- The structure and function (including typical species) of qualifying natural habitats
- The structure and function of the habitats of qualifying species
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
- The populations of qualifying species
- The distribution of qualifying species within the site.

1.8.2.99 Only conservation objectives relevant to qualifying species (Annex II marine mammal qualifying features) of the SAC will be assessed in section 1.8.3. Conservation objectives relating to the qualifying habitats of the SAC will not be considered on the basis of the findings of the HRA Stage 1 Screening Report.

Isles of Scilly Complex SAC

Site description

1.8.2.100 The Isles of Scilly Complex, which is located 465km from the Morgan Array Area, spans over 268.5km^2 in the Atlantic ocean 40km southwest of Cornwall (England). The SAC surrounds the Isles of Scilly archipelago and supports extensive areas of intertidal and subtidal sandflats which host an exceptionally rich biodiversity. The islands are surrounded by reefs and rocky islets which provide exposed and sheltered coasts to the Atlantic currents and waves.

Feature accounts

Grey seal

1.8.2.101 Grey seal is a qualifying feature of the Isles of Scilly Complex SAC, however, is not a primary reason for site selection.

1.8.2.102 The SAC is considered to support a significant presence of grey seal with Eastern Isles, Northern Rocks and Western Rocks as the main haul-out sites. A total of 272 to 350 resident individuals year round (JNCC, 2015b; Lambert, 2001) and a maximum of 565 individuals in October 2016 (Sayer and Witt, 2018) have been recorded. Grey seals from the site have been functionally linked to at least 16 other sites across southwest England and Wales (Sayer and Witt, 2018). The SAC grey population accounts for around 40% of the pups born in southwest England region (Duck, 1996) with an increased from 111 to 227 pups born between 2010 and 2016 (Sayer and Witt, 2018).

Condition assessment

1.8.2.103 There is no condition assessment available for the grey seal feature of the Isles of Scilly Complex SAC.

Conservation objectives

1.8.2.104 The conservation objectives as outlined in Natural England (2018b)[37] and considered in the assessment which are relevant to the harbour porpoise feature are outlined below.

1.8.2.105 Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the FCS of its qualifying features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species
- The structure and function (including typical species) of qualifying natural habitats
- The structure and function of the habitats of qualifying species
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely

[36] http://publications.naturalengland.org.uk/publication/6356698386137088

[37] http://publications.naturalengland.org.uk/publication/6399318084812800

- The populations of qualifying species
- The distribution of qualifying species within the site.

1.8.2.106 Only conservation objectives relevant to qualifying species (Annex II marine mammal qualifying features) of the SAC will be assessed in section 1.8.3. Conservation objectives relating to the qualifying habitats of the SAC will not be considered on the basis of the findings of the HRA Stage 1 Screening Report.

Reference populations

1.8.2.107 When considering the potential for an adverse effect on site integrity for the identified SACs with Annex II marine mammal features the reference population used for assessment is the population of the MU in which the SAC is located.

1.8.2.108 For harbour porpoise, this is consistent with previous advice from stakeholders, the conservation advice for SACs which states that 'harbour porpoise in UK waters are considered part of a wider European population and the highly mobile nature of this species means that the concept of a 'site population' is not considered an appropriate basis for expressing conservation objectives for this species' (NRW, 2022d).

1.8.2.109 The MU population has also been used for bottlenose dolphin on the basis that photo-ID data strongly supports the theory that there is a single population across the MU. Photo-ID data has identified that individual dolphins move between the two SACs in North Wales (Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC and the Sarnauand Cardigan Bay/Bae Ceredigion SAC) and are highly connected (Feingold and Evans 2014; Lohrengel *et al.* 2018; Pesante *et al.,* 2008).

1.8.2.110 The same approach is also considered appropriate for grey seal and harbour seal. Evidence shows that individual grey seals move between the SACs, supporting the idea that there is connectivity between the Welsh SACs with a single population throughout the Northwest England and Wales MU present rather than distinct SAC populations. This is also supported by recent telemetry studies conducted by Wright and Sinclair (2022) which show connectivity between seal SACs in the Irish Sea.

1.8.2.111 The reference populations used within the Appropriate Assessment in section 1.8.3 and 1.8.4 are presented within Table 1.58.

Table 1.58: Information on reference populations for Annex II marine mammal features used within the Appropriate Assessment.

Annex II marine mammal feature	Density (animals per km^2)	Relevant MU	Abundance in MU
Harbour porpoise	0.097	Celtic and Irish Seas (IAMMWG, 2021)	62,517
Bottlenose dolphin	0.035	Irish Seas (IAMMWG, 2021)	293
Harbour seal	0.0008	Wales, NW England, N. Ireland SMUs (Wright and Sinclair, 2022)	1,427
Grey seal	0.196	OSPAR Region III/Wales, NW England, N. Ireland, SW Scotland SMU (Wright and Sinclair, 2022), plus Isle of Man reference population (Howe, 2018), plus east Ireland and southeast Ireland regions (Duck and Morris, 2019) hereafter known as 'grey seal reference population'.	60,780 13,563

1.8.3 Assessment of adverse effects alone

Injury and disturbance from underwater sound generated during piling

1.8.3.1 During the construction phase sound emissions from the piling of foundations may lead to auditory injury and disturbance of marine mammals.

1.8.3.2 The assessment of LSE in the HRA Stage 1 Screening Report identified that during construction and decommissioning, LSE could not be ruled out for the potential impact of injury and disturbance from underwater sound generated during piling. This relates to the European sites and Annex II marine mammal features as listed in Table 1.53.

1.8.3.3 The following sections explain how this potential impact on Annex II marine mammal features of the SACs outlined in Table 1.54have been quantified and assessed.

1.8.3.4 The MDS considered for the assessment of potential impacts on Annex II marine mammal features from underwater sound generated during piling is presented in Table 1.59.

Table 1.59: Maximum design scenario considered for the assessment of potential impacts on marine mammals from injury and disturbance from underwater sound generated during piling during the construction phase.

Phase	Maximum design scenario	Justification
Construction phase	Monopiles: • Wind turbines: installation of up to 68 wind turbines with a 16m diameter monopile foundations installed by impact piling • OSPs: installation of one OSP with foundations consisting of two 16m diameter piled monopile foundations installed by impact piling • Maximum hammer energy of up to 5,500kJ • Up to two vessels piling concurrently (minimum distance 875m, maximum distance 28.5km, between piling vessels) • Maximum of up to 9.5 hours of piling for a monopile with a cumulative total of up to 665 hours • Consecutive piling over a maximum of 24 hours • One monopile installed per 24 hours per vessel = 70 days for a single vessel (maximum temporal) or 35 days for two vessels (maximum spatial) Pin piles • Wind turbines: installation up to 68 3-legged jacket foundations with one pile per leg (a total of up to 204 piles), or up to 2 piles per leg (a total of 408 piles), and each pile with a diameter of 5.5m installed by impact piling • OSP: installation of one OSP with 6-legged jacket foundations, with three piles per leg (a total of 18 piles) and each pile with a diameter of 5.5m installed by impact piling • Maximum hammer energy of up to 3,700kJ • Up to two vessels piling concurrently (minimum distance 875m, maximum distance 28.5km, between piling vessels) • Wind turbines: maximum duration of up to 8.02 hours per pile (where only a single pin-pile is used per leg) or up to 4.01 hours per pile (where two pin-piles are used per leg, which also equates to 8.02 hours per leg), total duration of pilling per wind turbine foundation = 16.04 hours of pilling per day (with a cumulative of up to 1,638 hours); installation of wind turbines over 103 days (=16.04 hours of piling per day; up to two piles per day) • OSP foundation: maximum duration of up to 8.02 hours piling per pile with a cumulative total of up to 144.36 hours; installation of OSP over 9 days (=16.04 hours piling per day) • Consecutive piling over a maximum of 24 hours • Single piling of 103 days for wind turbine plus approx. 9 days for OSP = 112 days (maximum temporal) or 56 days for two vessels (maximum spatial). Total piling phase (foundation installation) of up to two years within a four-year construction programme.	For both monopiles and pin piles the largest hammer energy and maximum spacing between concurrent piling events would lead to the largest spatial extent of ensonification at any one time. Minimum spacing between concurrent piling represents the highest risk of injury to marine mammals as sound from adjacent foundations could combine to produce a greater radius of effect compared to a single piling event. For both monopiles and pin piles the maximum temporal scenario was assessed on the greatest number of days on which piling could occur based on the number of piles that could be installed within a 24-hour period. Consecutive piling is assumed over a maximum period of 24 hours.

Measures adopted as part of the Morgan Generation Assets

1.8.3.5 Measures adopted as part of the Morgan Generation Assets which are of relevance to the assessment of potential impacts on Annex II marine mammals from from underwater sound are presented in Table 1.60.

Table 1.60: Measures adopted as part of the Morgan Generation Assets relevant to the assessment of adverse effect on European sites designated for Annex II marine mammal features from underwater sound.

Measure	Justification	How the measure will be secured
Primary measures: Measures included as part of the project design		
Implementation of initiation stage, piling soft start and ramp up measures in the draft MMMP. During piling operations, an initiation stage and soft starts will be used. This will involve the implementation of a low hammer energy with a low number of strikes used initially, followed by lower hammer energies at a higher strike rate at the beginning of the piling sequence before energy input is 'ramped up' (increased) over time to required higher levels. For monopiles, a 10 minute initiation phase is used with hammer energy of 550kJ (10% of full power piling) at a strike rate of 0.67 per minute (1 strike every 90 seconds) and then soft start duration is 20 minutes, with a hammer energy of 550kJ (10% of full power piling) and strike rate of 10 per minute. Ramp up will then increase from 550 to 5,500kJ with strike rate of 15 strike per minute for 20 minutes. For pin-piles, a 10 minute initiation phase is used with hammer energy of 300kJ at a strike rate of 0.67 per minute (1 strike every 90 seconds) and then soft start duration is 20 minutes with hammer energy of 300kJ with strike rate of 10 per minute. Ramp up will then increase from 300 to 3,700kJ with strike rate of 15 strike per minute for 20 minutes.	This measure will minimise the risk of injury to marine mammal and fish species in the immediate vicinity of piling operations, allowing individuals to move away from the area before sound levels reach a level at which injury may occur. It is considered that compliance with these guidelines will, in most cases, reduce the risk of injury to marine mammals to negligible levels.	Proposed to be secured through a condition in the marine licence(s)
Inclusion of low order techniques as a clearance option. Where detonation of UXO using low order techniques occurs this is considered to be primary mitigation, noting however, that it is not possible to fully commit to this measure at this stage	Low order techniques generate less underwater sound than high order techniques and therefore present a lower risk to sound sensitive receptors such as marine mammals during UXO clearance. Noting the position statement from statutory authorities on UXO clearance (DEFRA, 2021), the option to clear UXOs with low order techniques has been considered as a potential primary mitigation measure as part of this assessment (SNCBs, 2022). Note, however, that low order techniques are not always possible and are dependent upon the individual situations surrounding each UXO. Given that it is possible that high order detonation may be used the draft MMMP will also include mitigation to reduce the risk of injury from UXO clearance.	Proposed to be secured through a condition in the marine licence(s)
Tertiary measures: Measures required to meet legislative requirements, or adopted standard industry practice		
Development of and adherence to a draft MMMP, based on a draft MMMP submitted alongside the Environmental Statement. The draft MMMP will present appropriate mitigation for activities that could potentially lead to injurious effects on marine mammals including: piling, UXO clearance and some types of geophysical activities. The draft MMMP will be developed on the basis of the most recent published statutory guidance and in consultation with key stakeholders. <u>Piling</u>: for the purpose of developing the draft MMMP, a mitigation zone will be defined based on the maximum predicted injury range from the dual metric sound modelling for the maximum spatial scenario (monopiles and pin piles) and across all marine mammal species. The Draft MMMP will set out the measures to apply in advance of and during piling activity including the use of: • Marine Mammal Observers (MMOs) • Passive Acoustic Monitoring (PAM) • Acoustic Deterrent Devices (ADD) Therefore following the latest JNCC guidance (JNCC, 2010a). <u>UXO clearance</u>: Measures including visual and acoustic monitoring, the use of an ADD and soft start charges will be applied to deter animals from the mitigation zone as defined by sound modelling for the largest possible UXO following the latest JNCC guidance (JNCC, 2010b). <u>Geophysical surveys</u> Mitigation for injury during high resolution geophysical surveys using a sub-surface sensor from a conventional vessel may involve the use of MMOs and PAM to ensure that the risk of injury over the defined mitigation zone is reduced in line with JNCC guidance (JNCC, 2017). Soft start is not possible for SBP equipment but will be applied for other high resolution surveys where possible. Note also, some multi-beam surveys in shallow waters (<200m) are not subject to the requirements of mitigation.	The implementation of an approved MMMP will mitigate for the risk of physical or permanent auditory injury to marine mammals within a pre-defined 'mitigation zone' for each activity. The mitigation zone is determined considering the largest injury zone across all species for each relevant activity. The use of an approved MMMP will also minimise the potential for collision risk, or potential injury to, marine mammals and other marine megafauna (e.g. basking shark and sea turtles). The MMMP will include visual and acoustic monitoring as a minimum over the defined mitigation zones to ensure animals are clear before the activity commences. Additional measures to deter animals from injury risk zones may be applied in some instances (e.g. ADDs or soft start charges).	Proposed to be secured through a condition in the marine licence(s)

Measure	Justification	How the measure will be secured
An offshore Environmental Management Plan (EMP) with measures to minimise disturbance to marine mammals from transiting vessels, requiring them to: • Not deliberately approach marine mammals as a minimum • Avoid abrupt changes in course or speed should marine mammals approach the vessel to bow-ride. The offshore EMP will be adhered to at all times.	To minimise the potential for collision risk, or potential injury to, marine mammals and megafauna.	An offshore EMP will be issued to all Project vessel operators. Proposed to be secured through a condition in the marine licence(s).

Construction phase

Information to support assessment

Injury

1.8.3.6 The assessment of effects on marine mammals from piling considered both a maximum spatial and maximum temporal scenario for monopile and pin pile foundations. Maximum spatial scenarios assume concurrent piling of either monopiles or pin piles (leading to the largest area of effect at any one time) whilst maximum temporal scenarios are for single piling of either foundation (leading to the greatest number of days of piling). For full details on the piling scenarios assessed, see volume 2, chapter 9: Marine mammals of the PEIR.

1.8.3.7 For marine mammals, injury thresholds are based on both SPL_{pk} (i.e. unweighted) and marine mammal hearing-weighted SEL_{cum} as per the latest guidance (Southall *et al.,* 2019) (see volume 3, annex 3.1: Underwater sound technical report of the PEIR). The maximum spatial effect was predicted for monopiles with a hammer energy of 5,500kJ. At hammer initiation instantaneous injury leading to Permanent Threshold Shift (PTS), based on SPL_{pk}, could occur out to a maximum range of 299m across all species, with the maximum range predicted for harbour porpoise (Table 1.61). Using the same metric the maximum range of injury was predicted at 961m at full hammer (although this assumes animals do not move away at the start of piling, which is unlikely). Considering cumulative exposure using the SEL_{cum} metric the risk of PTS was predicted to occur out to a maximum range of 2,727m as predicted for harbour porpoise assuming concurrent piling (Table 1.62).

1.8.3.8 Spatial effects were smaller for the 2,800kJ pin piles with a maximum range of 186m for instantaneous injury (at hammer initiation) and 707m at full hammer based on harbour porpoise (Table 1.61). Injury ranges were considerably smaller for the pin piles compared to monopiles due to: 1) lower source levels; 2) shorter installation time (relevant for the SEL_{cum} metric); and 3) reduction in source levels once the pile is below the water line (the maximum level occurred during the very short period of piling just before the pile is fully submerged).

1.8.3.9 The maximum temporal effect was predicted as the longest duration for either monopiles or pin piles. Whilst the effect of PTS is considered to result in permanent injury to animals, the risk of animals being exposed to sound levels leading to auditory injury would occur during piling only. Piling will be intermittent over a two year piling phase and will occur on a maximum of up to 70 days for monopiles or 74 days for pin piles.

1.8.3.10 Tertiary mitigation in the form of a draft MMMP will be implemented as a result of the potential injury ranges predicted for marine mammals and in order to reduce the risk of PTS. Such mitigation will include deployment of an ADD as recommended in the JNCC guidelines (2010) to deter animals from the area of impact.

Table 1.61: Summary of SPL_{pk} PTS injury ranges and areas of effect for marine mammals for single monopile and single pin pile installation (N/E = threshold not exceeded).

Species	Threshold (unweighted peak)	Hammer energy level	Monopile		Pin pile	
			Range of effect (m)	Area of effect (km^2)	Range of effect (m)	Area of effect (km^2)
Harbour porpoise [Very High Frequency (VHF)]	202dB re 1 µPa (pk)	Initiation (first strike)	299	0.28	186	0.12
		Full energy (maximum)	961	2.90	707	1.57
Bottlenose dolphin [High Frequency (HF)]	230dB re 1 µPa (pk)	Initiation (first strike)	29	0.002	16	0.001
		Full energy (maximum)	94	0.03	62	0.01
Phocids (Grey seal and harbour seal) [Phocid Carnivores in Water (PCW)]	218dB re 1 µPa (pk)	Initiation (first strike)	25	0.002	46	0.01
		Full energy (maximum)	255	0.20	176	0.10

Table 1.62: Summary of SEL_{cum} PTS injury ranges and areas of effect for marine mammals for monopile and pin pile installation (N/E = threshold not exceeded).

Species	Threshold (SEL weighted)	Scenario	Monopile		Pin pile	
			Range of effect (m)	Area of effect (km^2)	Range of effect (m)	Area of effect (km^2)
Harbour porpoise (VHF)	PTS - 155dB re 1 μPa^2s	Single	1,665	8.71	N/E	0.00
		Concurrent	2,727	23.33	N/E	0.00
		Consecutive (24hrs)	1,725	9.35	N/E	0.00
Bottlenose (HF)	PTS - 185dB re 1 μPa^2s	Single	N/E	0.00	N/E	0.00
		Concurrent	N/E	0.00	N/E	0.00
		Consecutive (24hrs)	N/E	0.00	N/E	0.00
Phocids (Grey seal and harbour seal) (PCW)	PTS - 185dB re 1 μPa^2s	Single	N/E	0.00	N/E	0.00
		Concurrent	N/E	0.00	N/E	0.00
		Consecutive (24hrs)	N/E	0.00	N/E	0.00

Harbour porpoise

1.8.3.11 For monopiles, with primary and tertiary mitigation applied, and based on the largest predicted range of 20m (i.e. using the SEL_{cum} metric), the maximum number of individuals that could be potentially injured calculated using the highest density value of 0.247 animals per km^2 is no more than one harbour porpoise. The range of effect is predicted to be localised to within the Morgan Array Area and therefore there is no potential for spatial overlap with the North Anglesey Marine/Gogledd Môn Forol SA– the closest site designated for harbour porpoise - which is located at a distance of 28.2km.

1.8.3.12 Volume 2, chapter 9: Marine mammals of the PEIR shows that the use of an ADD reduced the maximum injury zones based on the SEL_{cum} metric at monopiles and pin piles with respect to harbour porpoise (however the threshold had still been exceeded for the species) suggesting that there is a residual risk of injury to animals.

Bottlenose dolphin

1.8.3.13 For bottlenose dolphin with primary and tertiary mitigation applied, and based on the largest predicted range of 94m (i.e. using the SPL_{pk} metric), there is no residual risk of injury during piling.

Grey seal

1.8.3.14 For both grey seal, with primary and tertiary mitigation applied, and based on the largest predicted range of 255m (i.e. using the SPL_{pk} metric), the maximum number of individuals that could be potentially injured calculated using based on Carter *et al*. (2022) densities is no more than one animal.

Harbour seal

1.8.3.15 For both harbour seal, with primary and tertiary mitigation applied, and based on the largest predicted range of 255m (i.e. using the SPL_{pk} metric), the maximum number of individuals that could be potentially injured calculated using based on Carter *et al*. (2022) densities is no more than one animal.

Disturbance

1.8.3.16 Disturbance during piling was predicted to have far-reaching effects across the north part of the Irish Sea, noting however, that the extent is likely to be an overestimate as it assumes that the sound maintains its impulsive characteristics at large distances, which is considered unlikely to be the case (see volume 2, chapter 9: Marine mammals of the PEIR). For this reason, the potential number of animals predicted to be disturbed should be interpreted with caution and subject to the caveats highlighted by Southall *et al.* (2021) with respect to environmental context (see volume 2, chapter 9: Marine mammals of the PEIR). The estimated numbers of animals predicted to experience potential disturbance as a result of different piling scenarios is presented in volume 2, chapter 9: Marine mammals of the PEIR, with the most conservative disturbance estimates summarised below for each relevant Annex II marine mammal feature.

1.8.3.17 The National Marine Fisheries Service (NMFS) guidelines suggest a precautionary level of 140dB re 1µPa (rms) to indicate the onset of low-level marine mammal disturbance effects for all mammal groups for impulsive sound (NMFS, 2005), although this is not considered likely to lead to a 'significant' disturbance response. The assessment adopted the NMFS criteria of non-trivial (strong) disturbance (160dBrms) and trivial (mild) disturbance (140dBrms) for all impacts other than for piling which used a dose-response approach. For more information on the dose-response approach see volume 2, chapter 9: Marine mammals of the PEIR.

Harbour porpoise

1.8.3.18 The most conservative estimate of disturbance led to up to 1,370 animals (based on peak seasonal density) predicted to experience potential disturbance from concurrent piling of monopiles at a maximum hammer energy of 5,500kJ (based on the dose-response approach). This equates to 2.19% of the Celtic and Irish Seas MU population. As a comparison with the US NMFS thresholds (NMFS, 2005) for mild and strong disturbance ($140dB_{rms}$ and $160dB_{rms}$ respectively), it can be estimated that up to 248 animals are predicted to experience strong disturbance (i.e. above $160dB_{rms}$ ≡150dB sound exposure level single strike (SEL_{ss})), whist up to 1,038 animals are likely to experience mild disturbance (between 140 and $160dB_{rms}$ ≡ 130 to 150dB SEL_{ss}).

Bottlenose dolphin

1.8.3.19 The outermost sound contours predicted from the maximum hammer energy of 5,500kJ reaches the coastal areas of North Wales and England and therefore overlaps with the key distribution of bottlenose dolphin. The most conservative estimate of disturbance led to up to 16 animals predicted to experience potential disturbance from concurrent piling of monopiles at a maximum hammer energy of 5,500kJ. This equates to 5.28% of the Irish Sea MU population. However, of these, up to 15 of those animals are predicted to experience mild disturbance (between 140 and $160dB_{rms}$) whist no more than one animal is likely to experience strong disturbance (above $160dB_{rms}$).

1.8.3.20 This is a highly conservative estimate using high density values for the coastal regions and assumes a uniform distribution throughout the area. In addition, the 6km coastal area lies approximately 30km from the nearest boundary of the Morgan Array Area and at this distance the received level from piling will have lost much of the impulsive characteristics (see volume 2, chapter 9: Marine mammals of the PEIR). Thus, the estimated number of bottlenose dolphin with the potential to be disturbed in offshore waters, should be interpreted with caution as this is likely to be an overestimate.

Grey seal

1.8.3.21 For grey seal, the most conservative estimate of disturbance led to up to 48 animals (Carter *et al.* (2022) densities) predicted to experience potential disturbance from concurrent piling of monopiles at a maximum hammer energy of 5,500kJ. This equates to 0.35% of the grey seal reference population (Wales, NW England, SW Scotland and Northern Ireland SMUs) or 0.08% of the OSPAR Region III population.

Harbour seal

1.8.3.22 For harbour seal, the most conservative estimate of disturbance led to up to one animal (using densities from Carter *et al.* (2022)) predicted to experience potential disturbance from concurrent piling of monopiles at a maximum hammer energy of 5,500kJ. This equates to 0.009% of the harbour seal reference population (Wales, NW England, Northern Ireland SMUs).

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

Injury

1.8.3.23 As outlined in paragraph 1.8.3.11 for monopiles, with primary and tertiary mitigation applied, and based on the largest predicted range the maximum number of harbour porpoise that could be potentially injured is no more than one animal. Volume 2, chapter 9: Marine mammals of the PEIR concluded that the range of effect is predicted to be localised to within the Morgan Array Area and there is no potential for spatial overlap with the North Anglesey Marine/Gogledd Môn Forol SAC.

1.8.3.24 Whilst PTS could affect a small number of animals (one animal) leading to measurable changes at an individual level, this is unlikely to affect the wider population. The residual number of animals predicted to experience PTS were carried forward to the Interim Population Consequences of Disturbance Model (iPCoD) modelling assessment alongside disturbance to understand the implications at a population level and the model demonstrated that there would be no long-term effect on the population (see appendix A of volume 2, chapter 9: Marine mammals of the PEIR).

Disturbance

1.8.3.25 In line with guidance from stakeholders (JNCC, NRW and Natural England) the Effective Deterrence Range (EDR) approach has been used for the assessment of disturbance associated with pile driving during the construction phase for harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC. The EDR approach, as outlined in JNCC (2020a) recommends the use of 26km for piling (monopiles without sound mitigation at source) which is informed by studies from Tougaard *et al.* (2013) and Dähne *et al.* (2013). The use of a 26km EDR would therefore rule out potential disturbance to harbour porpoise features of all SACs screened into the HRA Stage 2 ISAA Report.

1.8.3.26 Figure 1.9 shows there is no potential overlap between the 26km EDR and the North Anglesey Marine/Gogledd Môn Forol SAC. The assessment considered piling at the closest location within the Morgan Generation Assets to the North Anglesey Marine/Gogledd Môn Forol SAC and showed no overlap in disturbance, and therefore does not give a significant sound disturbance within a harbour porpoise SAC.

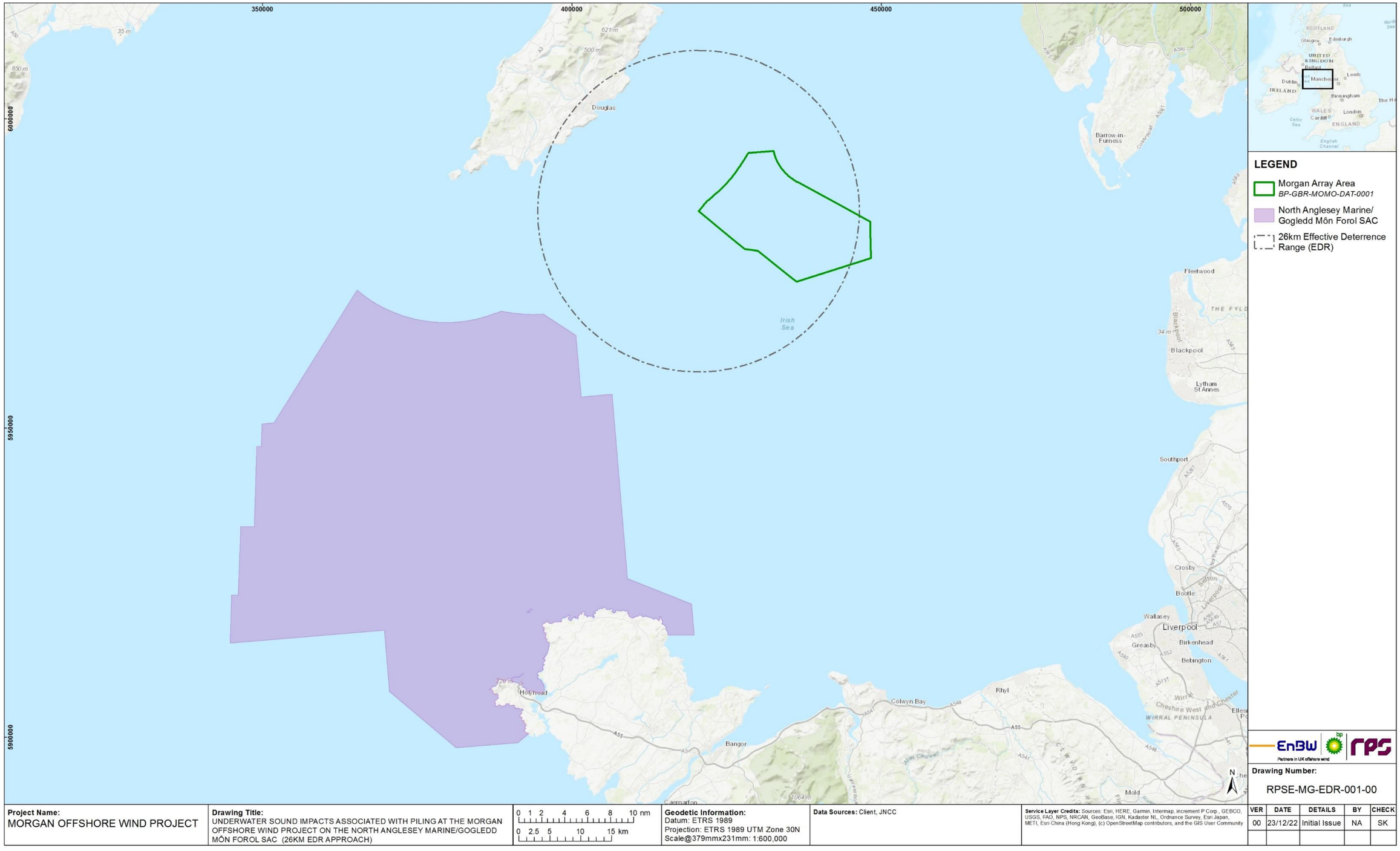


Figure 1.9: Spatial overlap of underwater sound impacts associated with piling at the Morgan Generation Assets on the North Anglesey Marine/Gogledd Môn Forol SAC based on the 26km EDR approach.

Conclusions

1.8.3.27 Adverse effects on the harbour porpoise features which undermine the conservation objectives of the North West Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of underwater sound generated from piling. An assessment of the impact of underwater sound generated from pilling against each relevant conservation objective (as presented in paragraphs 1.8.2.7 to 1.8.2.9) is discussed in Table 1.63. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.63: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC for underwater sound generated from piling.

Conservation Objective	Conclusion
The species is a viable component of the site	As outlined in paragraph 1.8.3.11, there is the potential for no more than one animal to be injured during piling activities associated with the construction phase. In addition, the implementation of the MMMP will reduce the number of individuals affected further as harbour porpoise features will be deterred beyond the predicted injury ranges. As outlined in paragraph 1.8.3.27, the EDR range of 26km does not overlap with the North Anglesey Marine/Gogledd Môn Forol SAC and therefore does not exceed either of the thresholds for significant disturbance. Underwater sound associated with piling for the Morgan Generation Assets is therefore not predicted to restrict the objective of the population being able to maintain itself as a viable component of its natural habitat over the long-term. Similarly, underwater sound generated from piling associated with Morgan Generation Assets is not predicted to significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species (see volume 2, chapter 9: Fish and shellfish ecology of the PEIR), effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not prevent prey species populations from being maintained in the long term.

1.8.3.28 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

North Channel SAC

Harbour porpoise

Injury

1.8.3.29 The North Channel SAC is located at an increased distance to the Morgan Generation Assets (63.8km from the Morgan Array Area) than the North Anglesey Marine/Gogledd Môn Forol SAC, assessed in paragraphs 1.8.3.23 to 1.8.3.28. As the North Channel SAC is located at an increased distance from the Morgan Generation Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not lower magnitude (i.e. no more than one individual affected by PTS).

Disturbance

1.8.3.30 The North Channel SAC is located 63.8km from the Morgan Array Area, which is beyond the 26km EDR outlined in JNCC (2020a). There is therefore no spatial overlap with the North Channel SAC and the thresholds for significant disturbance would not be exceeded.

Conclusions

1.8.3.31 Adverse effects on the harbour porpoise features which undermine the conservation objectives of the SAC will not occur as a result of underwater sound generated from piling. An assessment of the impact of underwater sound generated from piling against each relevant conservation objective (as presented in paragraphs 1.8.2.12 to 1.8.2.14) is discussed in Table 1.64. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.64: Conclusions against the conservation objectives of the North Channel SAC for underwater sound generated from piling.

Conservation Objective	Conclusion
The species is a viable component of the site	As outlined in paragraph 1.8.3.11, there is the potential for no more than one animal to be injured during piling activities associated with the construction phase. In addition, the implementation of the MMMP will reduce the number of individuals affected further as harbour porpoise will be deterred beyond the predicted injury ranges. The North Channel SAC is located 63.8km from the Morgan Array Area, which is beyond the 26km EDR outlined in JNCC (2020a). There is therefore no spatial overlap with the North Channel SAC, the thresholds for significant disturbance would not be exceeded. Underwater sound associated with piling for the Morgan Generation Assets is therefore not predicted to restrict the objective of the population being able to maintain itself as a viable component of its natural habitat over the long-term. Similarly, underwater sound generated from piling associated with Morgan Generation Assets is not predicted to significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species (see volume 2, chapter 9: Fish and shellfish ecology of the PEIR), effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not prevent prey species populations from being maintained in the long term.

1.8.3.32 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Strangford Lough SAC

Harbour seal

Injury

1.8.3.33 For harbour seal, with primary and tertiary mitigation detailed in Table 1.60 applied, and based on the largest predicted range of 255m (i.e. using the SPL_{pk} metric), the maximum number of harbour seal that could be potentially injured calculated using based on Carter *et al*. (2022) densities is no more than one animal.

Disturbance

1.8.3.34 As outlined in paragraph 1.8.3.22, for harbour seal, the most conservative estimate of disturbance led to up to one animal which equates to 0.009% of the harbour seal reference population (Wales, NW England, Northern Ireland SMUs). Volume 2,

chapter 9: Marine mammals of the PEIR concluded that the impact could also result in a very small effect on the distribution of harbour seal during piling only and may affect the fecundity of very small numbers in the context of the reference population (up to 0.009% of the combined total of MU population at any one time) over the medium term. However, due to the very small numbers and small proportion of the population affected the magnitude of the impact is unlikely to lead to a population-level effect and this species was not carried forward for further assessment within the iPCoD model framework.

Conclusions

1.8.3.35 Adverse effects on the harbour seal feature which undermine the conservation objectives of the Strangford Lough SAC will not occur as a result of underwater sound generated from piling. An assessment of the impact of underwater sound generated from piling against each relevant conservation objective (as presented in paragraph 1.8.2.21) is discussed in Table 1.65. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.65: Conclusions against the conservation objectives of the Strangford Lough SAC for underwater sound generated from piling.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	For harbour seal, with primary and tertiary mitigation detailed in Table 1.24 applied, no more than one animal is predicted to be injured during piling activities associated with the construction phase. For harbour seal, the most conservative estimate of disturbance was up to one animal predicted to experience potential disturbance which equates to 0.009% of the harbour seal reference population (Wales, NW England, Northern Ireland SMUs). During piling. for harbour seal, the most conservative estimate of disturbance led to up to one animal which equates to 0.009% of the harbour seal reference population (Wales, NW England, Northern Ireland SMUs). This could result in a very small effect on the distribution of harbour seal during piling only and may affect the fecundity of very small numbers in the context of the reference population (up to 0.009% of the combined total of MU population at any one time) over the medium term. However, due to the very small numbers and small proportion of the population affected the impact is not considered to lead to a population-level effect. Underwater sound from piling associated with the Morgan Generation Assets will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from piling associated with the Morgan Generation Assets will not prevent the harbour seal population numbers and distribution from being maintained or enhanced in the long term.
To maintain (and if feasible enhance) population numbers and distribution of harbour seal	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound from piling to result in adverse effects on the physical features used by harbour seal within the site. Therefore, underwater sound from piling associated with the Morgan Generation Assets will prevent physical features used by harbour seal within the site from being maintained or enhanced.

1.8.3.36 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Strangford Lough SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Murlough SAC

Harbour seal

1.8.3.37 The Murlough SAC is located at an increased distance to the Morgan Generation Assets (98.4km from the Morgan Array Area) than the Strangford Lough SAC, assessed in paragraphs 1.8.3.33 to 1.8.3.36. As the Murlough SAC is located at an increased distance from the Morgan Generation Assets than the Strangford Lough SAC it is considered that effects would be of similar if not lower magnitude. (i.e. with the primary and tertiary mitigation detailed in Table 1.60 applied, no more than one harbour seal is predicted to be affected by PTS during piling).

Conclusions

1.8.3.38 Adverse effects on the harbour seal feature which undermine the conservation objectives of the Murlough SAC will not occur as a result of underwater sound generated from piling. An assessment of the impact of underwater sound generated from piling against each relevant conservation objective (as presented in paragraph 1.8.2.26) is discussed in Table 1.66. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.66: Conclusions against the conservation objectives of the Murlough SAC for underwater sound generated from piling.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	For harbour seal, with primary and tertiary mitigation detailed in Table 1.24 applied, no more than one animal is predicted to be injured during piling activities associated with the construction phase. For harbour seal, the most conservative estimate of disturbance was up to one animal predicted to experience potential disturbance which equates to 0.009% of the harbour seal reference population (Wales, NW England, Northern Ireland SMUs). During piling. for harbour seal, the most conservative estimate of disturbance led to up to one animal which equates to 0.009% of the harbour seal reference population (Wales, NW England, Northern Ireland SMUs). This could result in a very small effect on the distribution of harbour seal during piling only and may affect the fecundity of very small numbers in the context of the reference population (up to 0.009% of the combined total of MU population at any one time) over the medium term. However, due to the very small numbers and small proportion of the population affected the impact is not considered to lead to a population-level effect. Underwater sound from piling associated with the Morgan Generation Assets will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from piling associated with the Morgan Generation Assets will not prevent the harbour seal population numbers and distribution from being maintained or enhanced in the long term.
To maintain (and if feasible enhance) population numbers and distribution of harbour seal	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound from piling to result in adverse effects on the physical features used by harbour seal within the site. Therefore, underwater sound from piling associated with the Morgan Generation Assets will prevent physical features used by harbour seal within the site from being maintained or enhanced.

1.8.3.39 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Murlough SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC

Bottlenose dolphin

Injury

1.8.3.40 As outlined in paragraph 1.8.3.13 for bottlenose dolphin, with primary and tertiary mitigation detailed in Table 1.60 applied there is no residual risk of injury during piling.

Disturbance

1.8.3.41 As outlined in paragraphs 1.8.3.19 and 1.8.3.20, the most conservative estimate of disturbance would result in up to 16 animals predicted to experience potential disturbance from concurrent piling of monopiles at a maximum hammer energy of 5,500kJ, which equates to 5.28% of the Irish Sea MU population. Volume 2, chapter 9: Marine mammals of the PEIR does however state that the estimated number of bottlenose dolphin with the potential to be disturbed in offshore waters, should be interpreted with caution as this is likely to be an overestimate as the estimates use coastal regions density values and assume a uniform distribution throughout the area. In addition, the 6km coastal area lies approximately 30km from the nearest boundary of the Morgan Array Area and at this distance the received level from piling will have lost much of the impulsive characteristics.

1.8.3.42 Whilst approximately 5.3% of the reference population would be affected during piling the results of the iPCoD modelling suggest that over the duration of the impact and up to 25 years after the start of piling there would be no long-term effects on the bottlenose dolphin population. The impact could result in some measurable changes to individuals that are disturbed (i.e. interruption of feeding or breeding and/or displacement to alternative areas). however, there would be no population-level consequences of disturbance. Further information on the iPCoD modelling is provide in Appendix A of volume 2, chapter 9: Marine mammals of the PEIR.

Grey seal

Injury

1.8.3.43 As outlined in parapgraph 1.8.3.14 for grey seal, with the primary and tertiary mitigation detailed in Table 1.60 applied, and based on the largest predicted range of 255m, the maximum number of individuals of either species that could be potentially injured calculated based on Carter *et al*. (2022) densities is no more than one animal.

Disturbance

1.8.3.44 As outlined in paragraph 1.8.3.21 for grey seal, the most conservative estimate of disturbance led to up to 48 animals which equates to 0.35% of the grey seal reference population or 0.08% of the OSPAR Region III population.

1.8.3.45 The potential for barrier effects (i.e. the ability to move between key areas such as haul-out sites and foraging areas offshore) was considered for both concurrent and single piling scenarios. Volume 2, chapter 9: Marine mammals of the PEIR considered that grey seal close to the coast could experience mild disturbance but that this would be unlikely to lead to barrier effects, (i.e. preventing animals from using the foraging grounds in waters along the coast) as animals are unlikely to be excluded from the coastal areas. Furthermore, grey seal has a large foraging range (up 448km reported in Carter *et al*. (2022)) and could therefore move to alternative foraging grounds during piling. Animals would, however, be likely to avoid offshore areas where received levels during piling exceed thresholds for strong disturbance. In addition, there may be an energetic cost associated with longer foraging trips and alternative habitat may be sub-optimal in terms of abundance of key prey species.

1.8.3.46 In summary, as outlined above a small proportion (up to 0.35% of the grey seal reference population, or 0.08% of OSPAR Region III) would be affected during piling. and the results of the iPCoD modelling predicts that over the duration of the impact and up to 25 years after the start of piling there would be no long-term effects on the grey seal reference population or the OSPAR Region III population.

Conclusions

1.8.3.47 Adverse effects on the bottlenose dolphin and grey seal features which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC will not occur as a result of underwater sound generated from piling. An assessment of the impact of underwater sound generated from piling against each relevant conservation objective (as presented in paragraphs 1.8.2.36 to 1.8.2.47) is discussed in Table 1.67. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.67: Conclusions against the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC for underwater sound generated from piling.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	For both bottlenose dolphin and grey seal, with primary and tertiary mitigation applied there is no residual risk of injury or no more than one animal to be injured respectively during piling activities associated with the construction phase. For bottlenose dolphin the most conservative estimate of disturbance led to up to 16 animals predicted to experience potential disturbance, which equates to 5.28% of the Irish Sea MU. For grey seal the most conservative estimate of disturbance led to up to 48 animals which equates to 0.35% of the grey seal reference population or 0.08% of the OSPAR Region III population. Grey seal close to the coast could experience mild disturbance but that this would be unlikely to lead to barrier effects and considering the large foraging range of grey seal (up 448km reported in Carter *et al*. (2022)), seals could move to alternative foraging grounds during piling. The iPCoD modelling predicts that over the duration of the impact and up to 25 years after the start of piling there would be no long-term effects on the bottlenose dolphin or grey seal reference population. Therefore, underwater sound as a result of piling associated with the Morgan Generation Assets will not prevent the populations of bottlenose dolphin and grey seal from maintaining themselves on a long-term basis as a viable component of their natural habitats. Similarly, underwater sound as a result of piling will not adversely affect the population size, structure, production, and condition of bottlenose dolphin and grey seal within the site. The bottlenose dolphin and grey seal populations within the site is such that their natural ranges of the populations are not being reduced or likely to be reduced for the foreseeable future as a result of underwater sound impacts associated with piling.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and	Habitats and processes will not be affected by underwater sound. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species (see volume 2, chapter 9: Fish and shellfish ecology of the PEIR), effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term. The presence, abundance, condition and diversity of habitats and species required to support bottlenose dolphin and grey seal will not be adversely affected. Underwater sound as a result of

Conservation Objective	Conclusion
population beyond the site is stable or increasing	piling associated with the Morgan Generation Assets will not prevent the distribution, abundance and populations dynamics of bottlenose dolphin and grey seal within the site and populations beyond the site from remaining stable or increasing.

1.8.3.48 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

The Maidens SAC

Grey seal

1.8.3.49 The Maidens SAC is located at an increased distance to the Morgan Generation Assets (141.8km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, assessed in paragraphs 1.8.3.40 to 1.8.3.48. As The Maidens SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC it is considered that effects would be of similar if not lower magnitude (i.e. with the primary and tertiary mitigation detailed in Table 1.60 applied, no more than one grey seal is predicted to be affected by PTS during piling).

Conclusions

1.8.3.50 Adverse effects on the grey seal feature which undermine the conservation objectives of The Maidens SAC will not occur as a result of underwater sound generated from piling. An assessment of the impact of underwater sound generated from piling against each relevant conservation objective (as presented in paragraph 1.8.2.52) is discussed in Table 1.68. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.68: Conclusions against the conservation objectives of The Maidens SAC for underwater sound generated from piling.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the grey seal feature to favourable condition	For grey seal, with the primary and tertiary mitigation detailed in Table 1.24 applied, there is no more than one animal is predicted to be injured during piling activities associated with the construction phase. For grey seal the most conservative estimate of disturbance led to up to 48 animals predicted to experience potential disturbance which equates to 0.35% of the grey seal reference population or 0.08% of the OSPAR Region III population. Grey seal close to the coast could experience mild disturbance but that this would be unlikely to lead to barrier effects and considering the large foraging range of grey seal (up 448km reported in Carter *et al*. (2022)), seals could move to alternative foraging grounds during piling. The iPCoD modelling predicts that over the duration of the impact and up to 25 years after the start of piling there would be no long-term effects on the grey seal population. Underwater sound from piling associated with the Morgan Generation Assets will therefore not prevent the grey seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from piling associated with the Morgan Generation Assets will therefore not prevent the population numbers and distribution of grey seal from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of grey seal	
Maintain and enhance, as appropriate, physical features used by grey seal within the site	There is no pathway for underwater sound from piling to result in adverse effects on the physical features of grey seal. Therefore, underwater sound from piling associated with the Morgan Generation Assets will not prevent the extent and distribution of the habitats of grey seal from being maintained or restored.

1.8.3.51 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of The Maidens SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Cardigan Bay/Bae Ceredigion SAC

Bottlenose dolphin

1.8.3.52 The Cardigan Bay/Bae Ceredigion SAC is located at an increased distance to the Morgan Generation Assets (188.2km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, assessed in paragraphs 1.8.3.40 to 1.8.3.48. As the Cardigan Bay/Bae Ceredigion SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC it is considered that effects would be of similar if not lower magnitude (i.e. with the primary and tertiary mitigation detailed in Table 1.60 applied, there is no residual risk of injury during piling).

Conclusions

1.8.3.53 Adverse effects on the bottlenose dolphin feature which undermine the conservation objectives of Cardigan Bay/Bae Ceredigion SAC will not occur as a result of underwater sound generated from piling. An assessment of the impact of underwater sound generated from piling against each relevant conservation objective (as presented in paragraphs 1.8.2.58 to 1.8.2.69) is discussed in Table 1.69. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.69: Conclusions against the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC for underwater sound generated from piling.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	For bottlenose dolphin, with the primary and tertiary mitigation detailed in Table 1.24 applied, there is no residual risk of injury during piling. For bottlenose dolphin the most conservative estimate of disturbance led to up to 16 animals predicted to experience potential disturbance, which equates to 5.28% of the MU. However, the iPCoD modelling predicts that over the duration of the impact and up to 25 years after the start of piling there would be no long-term effects on the bottlenose dolphin population. Therefore, underwater sound as a result of piling will not prevent the features' population from maintaining itself on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound as a result of piling associated with Morgan Generation Assets will not adversely affect the population size, structure, production, and condition of bottlenose dolphin within
Important elements are population size, structure, production, and condition of the species within the site	

Conservation Objective	Conclusion
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	the site. The population of bottlenose dolphin within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future as a result of underwater sound impacts associated
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	Habitats and processes will not be affected by underwater sound. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species (see volume 2, chapter 8: Fish and shellfish ecology of the PEIR), effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term. The presence, abundance, condition and diversity of habitats and species required to support bottlenose dolphin will not be adversely affected. Underwater sound as a result of piling associated with the Morgan Generation Assets will not prevent the distribution, abundance and populations dynamics of bottlenose dolphin within the site and populations beyond the site from remaining stable or increasing.

1.8.3.54 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.3.55 The Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance to the Morgan Generation Assets (237.6km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, assessed in paragraphs 1.8.3.40 to 1.8.3.48. As the Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC it is considered that effects would be of similar if not lower magnitude. (i.e. with the primary and tertiary mitigation detailed in Table 1.60 applied, no more than one grey seal is predicted to be affected by PTS during piling).

Conclusions

1.8.3.56 Adverse effects on the grey seal features which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of underwater sound generated from piling. An assessment of the impact of underwater sound generated from piling against each relevant conservation objective (as presented in paragraphs 1.8.2.75 to 1.8.2.85) is discussed in Table 1.70. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.70: Conclusions against the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC for underwater sound generated from piling.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	For grey seal, with the primary and tertiary mitigation detailed in Table 1.24 applied, there is no more than one animal is predicted to be injured during piling activities associated with the construction phase. For grey seal the most conservative estimate of disturbance led to up to 48 animals predicted to experience potential disturbance which equates to 0.35% of the grey seal reference population or 0.08% of the OSPAR Region III population. Grey seal close to the coast could experience mild disturbance but that this would be unlikely to lead to barrier effects and considering the large foraging range of grey seal (up 448km reported in Carter *et al*. (2022)), seals could move to alternative foraging grounds during piling. The iPCoD modelling predicts that over the duration of the impact and up to 25 years after the start of piling there would be no long-term effects on the grey seal reference population. Therefore, underwater sound as a result of piling associated with Morgan Generation Assets will not prevent the grey seal population from maintaining itself on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound as a result of piling associated with Morgan Generation Assets will also not adversely affect the population size, structure, production, and condition of grey seal within the site. The population of grey seal within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future as a result of underwater sound impacts associated with piling.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	Habitats and processes will not be affected by underwater sound. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species (see volume 2, chapter 8: Fish and shellfish ecology of the PEIR), effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term. The presence, abundance, condition and diversity of habitats and species required to support grey seal will not be adversely affected. Underwater sound as a result of piling associated with the Morgan Generation Assets will not prevent the distribution, abundance and populations dynamics of grey seal within the site and populations beyond the site from remaining stable or increasing.

1.8.3.57 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

Injury

1.8.3.58 The Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located at an increased distance to the Morgan Generation Assets (300.1km from the Morgan Array Area) than the North Anglesey Marine/Gogledd Môn Forol SAC, assessed in paragraphs 1.8.3.23 to 1.8.3.28. As the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located at an increased distance from the Morgan Generation Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not lower magnitude (i.e. no more than one individual affected by PTS).

Disturbance

1.8.3.59 The Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located 300.1km from the Morgan Array Area, which is outside the 26km EDR outlined in JNCC (2020a). There is therefore no spatial overlap with the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC, the thresholds for significant disturbance would not be exceeded.

Conclusions

1.8.3.60 Adverse effects on the harbour porpoise features which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC will not occur as a result of underwater sound generated from piling. An assessment of the impact of underwater sound generated from piling against each relevant conservation objective (as presented in paragraphs 1.8.2.90 to 1.8.2.92) is discussed in Table 1.71. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.71: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC for underwater sound generated from piling.

Conservation Objective	Conclusion
The species is a viable component of the site	As outlined in paragraph 1.8.3.11, there is the potential for no more than one harbour porpoise to be injured during piling activities associated with the construction phase. In addition, the implementation of the MMMP will reduce the number of individuals affected further as harbour porpoise features will be deterred beyond the predicted injury ranges. The Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located 300.1km from the Morgan Array Area, which is outside the 26km EDR outlined in JNCC (2020a). There is therefore no spatial overlap with the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC, the thresholds for significant disturbance would not be exceeded. Underwater sound generated from piling associated with Morgan Generation Assets is therefore not predicted to restrict the objective of the population being able to maintain itself as a viable component of its natural habitat over the long-term. Similarly, underwater sound generated from piling associated with Morgan Generation Assets is not predicted to significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species (see volume 2, chapter 9: Fish and shellfish ecology of the PEIR), effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not prevent prey species populations from being maintained in the long term.

1.8.3.61 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Lundy SAC

Grey seal

1.8.3.62 The Lundy SAC is located at an increased distance to the Morgan Generation Assets (334.9km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, assessed in paragraphs 1.8.3.40 to 1.8.3.48. As the Lundy SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude (i.e. with the primary and tertiary mitigation detailed in Table 1.60 applied, no more than one grey seal is predicted to be affected by PTS during piling).

Conclusions

1.8.3.63 Adverse effects on the harbour porpoise feature which undermine the conservation objectives of the Lundy SAC will not occur as a result of underwater sound generated from piling. An assessment of the impact of underwater sound generated from piling against each relevant conservation objective (as presented in paragraphs 1.8.2.97 to 1.8.2.99) is discussed in Table 1.72. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.72: Conclusions against the conservation objectives of the Lundy SAC for underwater sound generated from piling.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound from piling to result in adverse effects on the habitats of grey seal. Therefore, underwater sound from piling associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of grey seal or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	For grey seal, with the primary and tertiary mitigation detailed in Table 1.24 applied, there is no more than one animal is predicted to be injured during piling activities associated with the construction phase. For grey seal the most conservative estimate of disturbance led to up to 48 animals predicted to experience potential disturbance which equates to 0.35% of the grey seal reference population or 0.08% of the OSPAR Region III population. Grey seal close to the coast could experience mild disturbance but that this would be unlikely to lead to barrier effects and considering the large foraging range of grey seal (up 448km reported in Carter *et al*. (2022)), seals could move to alternative foraging grounds during piling. The iPCoD modelling predicts that over the duration of the impact and up to 25 years after the start of piling there would be no long-term effects on the grey seal reference population. Therefore, underwater sound from piling associated with the Morgan Generation Assets will not prevent the population and the distribution of grey seal within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.3.64 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lundy SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Isles of Scilly Complex SAC

Grey seal

1.8.3.65 The Isles of Scilly Complex SAC is located at an increased distance to the Morgan Generation Assets (465km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, assessed in paragraphs 1.8.3.40 to 1.8.3.48. As the Isles of Scilly Complex SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude (i.e. with the primary and tertiary mitigation detailed in Table 1.60 applied, no more than one grey seal is predicted to be affected by PTS during piling).

Conclusions

1.8.3.66 Adverse effects on the harbour porpoise feature which undermine the conservation objectives of the Isles of Scilly Complex SAC will not occur as a result of underwater sound generated from piling. An assessment of the impact of underwater sound generated from piling against each relevant conservation objective (as presented in paragraphs 1.8.2.104 to 1.8.2.106) is discussed in Table 1.73. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.73: Conclusions against the conservation objectives of the Isles of Scilly Complex SAC for underwater sound generated from piling.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound from piling to result in adverse effects on the habitats of grey seal. Therefore, underwater sound from piling associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of grey seal or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	For grey seal, with the primary and tertiary mitigation detailed in Table 1.24 applied, there is no more than one animal is predicted to be injured during piling activities associated with the construction phase. For grey seal the most conservative estimate of disturbance led to up to 48 animals predicted to experience potential disturbance which equates to 0.35% of the grey seal reference population or 0.08% of the OSPAR Region III population. Grey seal close to the coast could experience mild disturbance but that this would be unlikely to lead to barrier effects and considering the large foraging range of grey seal (up 448km reported in Carter *et al*. (2022)), seals could move to alternative foraging grounds during piling. The iPCoD modelling predicts that over the duration of the impact and up to 25 years after the start of piling there would be no long-term effects on the grey seal reference population. Therefore, underwater sound from piling associated with the Morgan Generation Assets will not prevent the population and the distribution of grey seal within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.3.67 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Isles of Scilly Complex SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Sites assessed in line with the iterative approach

1.8.3.68 As outlined in paragraphs 1.8.1.3 to 1.8.1.8, following the iterative approach adopted for this HRA Stage 2 ISAA Report, the closest European site to the Morgan Generation Assets within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment in the sections above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA Report, are located at a greater distance from the Morgan Generation Assets and, on this basis, it is considered that effects on the marine mammal features of these sites would be of similar if not lower magnitude than those concluded for the sites subject to a full assessment. The conclusions of the assessments presented in paragraphs 1.8.3.23 to 1.8.3.67 are, therefore, deemed to be applicable for the remaining sites presented below in paragraphs 1.8.3.69 to 1.8.3.91.

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.3.69 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is no risk of an adverse effect on the integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Cardigan Bay/Bae Ceredigion SAC

Grey seal

1.8.3.70 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (paragraphs 1.8.3.40 to 1.8.3.48), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets alone.

Rockabill to Dalkey Island SAC

1.8.3.71 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the

North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Rockabill to Dalkey Island SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Saltee Islands SAC

1.8.3.72 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (paragraphs 1.8.3.40 to 1.8.3.48), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Saltee Islands SAC as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets alone.

Roaringwater Bay and Islands SAC

1.8.3.73 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Roaringwater Bay and Islands SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Blasket Islands SAC

1.8.3.74 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Blasket Islands SAC as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Mers Celtiques - Talus du golfe de Gascogne SCI

1.8.3.75 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Mers Celtiques - Talus du golfe de Gascogne SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Abers - Côte des legends SCI

1.8.3.76 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Abers - Côte des legends SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Ouessant-Molène SCI

1.8.3.77 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ouessant-Molène SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Côte de Granit rose-Sept-Iles SCI

1.8.3.78 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côte de Granit rose-Sept-Iles SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Anse de Goulven, dunes de Keremma SCI

1.8.3.79 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Goulven, dunes de Keremma SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Tregor Goëlo SCI

1.8.3.80 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Tregor Goëlo SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Côtes de Crozon SCI

1.8.3.81 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côtes de Crozon SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Chaussée de Sein SCI

1.8.3.82 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Chaussée de Sein SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Cap Sizun SCI

1.8.3.83 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap Sizun SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Récifs du talus du golfe de Gascogne SCI

1.8.3.84 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Récifs du talus du golfe de

Gascogne SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Anse de Vauville SCI

1.8.3.85 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Vauville SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Cap d'Erquy-Cap Fréhel SCI

1.8.3.86 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap d'Erquy-Cap Fréhel SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Baie de Saint-Brieuc – Est SCI

1.8.3.87 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Saint-Brieuc – Est SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Banc et récifs de Surtainville SCI

1.8.3.88 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Banc et récifs de Surtainville SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.8.3.89 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Estuaire de la Rance SCI

1.8.3.90 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Estuaire de la Rance SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Baie du Mont Saint-Michel SCI

1.8.3.91 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.23 to 1.8.3.32), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie du Mont Saint-Michel SCI as a result of underwater sound associated with piling from the Morgan Generation Assets alone.

Injury and disturbance from underwater sound generation from UXO detonation

1.8.3.92 UXO detonation during the construction phase may result in hearing damage/auditory injury or behavioural disturbance/displacement (including barrier effects) of marine mammals.

1.8.3.93 The assessment of LSE in the HRA Stage 1 Screening Report identified that during construction and decommissioning, LSE could not be ruled out for the potential impact of Injury and disturbance from underwater sound generated from UXO. This relates to the sites listed in Table 1.53.

1.8.3.94 The following sections explain how this potential impact on Annex II marine mammal features of the SACs oulined in Table 1.54 have been quantified and assessed.

1.8.3.95 The MDS considered for the assessment of potential impacts on Annex II marine mammals for underwater sound from UXO detonation is presented inTable 1.77.

Table 1.74: Maximum design scenario considered for the assessment of potential impacts on marine mammals from injury and disturbance from underwater sound generation from UXO detonation.

Phase	Maximum design scenario	Justification
Construction phase	• Clearance of up to 13 UXOs within the Morgan Array Area • A range of UXO sizes assessed from 25kg up to 907kg with 130kg the most likely maximum • For high order detonation donor charges of 1.2kg (most common) and 3.5kg (single barracuda blast charge) • Up to 0.5kg NEQ clearance shot for neutralisation of residual explosive material at each location • Clearance during daylight hours only • Low order clearance charge size of 0.08kg • Low yield clearance configurations of 0.75kg charges (up to 4x0.75kg.	Maximum number and maximum size of UXOs encountered in the Morgan Array Area. Due to uncertainties in size of UXOs the assessment presents a range, highlighting the most likely size (common) to be encountered. Most likely and maximum donor charges assessed for high order detonation. Assumption of a clearance shot of up to 0.5kg at all locations although noting that this may not always be required. For low order/low yield clearance charges are based on the maximum required to initiate clearance event.

Measures adopted as part of the Morgan Generation Assets

1.8.3.96 The measures adopted as part of the Morgan Generation Assets that are relevant to the effects of underwater sound generation from UXO detonations during the construction phase are outlined in Table 1.60

Construction phase

Information to support assessment

Injury -PTS

1.8.3.97 Volume 2, chapter 9: Marine mammals of the PEIR presents the impact ranges for low order and low yield UXO clearance activities, donor charges used in high order UXO clearance and high order clearance of UXO. The number of animals predicted to experience PTS due to low order UXO is less than one animal for bottlenose dolphin, grey seal and harbour seal and up to five harbour porpoise. The number of animals predicted to experience PTS due to high order clearance of UXO is less than one bottlenose dolphin and harbour seal, up to two grey seal and up to 184 harbour porpoise. Additional information is provided in volume 2, chapter 9: Marine mammals of the PEIR.

1.8.3.98 As reported in volume 2, chapter 9: Marine mammals of the PEIR, an explosive mass of 907kg (high order explosion) yielded the largest PTS ranges for all species, with the greatest range of effects (15,360m) predicted for harbour porpoise (SPL_{pk}). However, the more common 130kg charge sees this injury range reduce to 8,045m for harbour porpoise (SPL_{pk}). Conservatively, the number of harbour porpoise that could be potentially injured, based on the peak seasonal densities from the Morgan digital aerial surveys, was estimated as 184 animals for 907kg UXO high order explosion equating to 0.29% of the Celtic and Irish Seas MU. Predicted numbers were much smaller for the 130kg UXOs with up to 51 animals potentially experiencing PTS. For low order techniques, the largest range of 2,290m was predicted from the 4x0.75kg low-yield charges, which could injury up to five harbour porpoise within this range.

1.8.3.99 The underwater sound assessment found that the maximum injury (PTS) range estimated for bottlenose dolphin using the SPL_{pk} metric is 890m for the detonation of charge size of 907kg, but this is reduced to 464m for 130kg and 268m for 25kg. Therefore conservatively, during high order detonation of any size of UXO up to the maximum the number of individuals that could be potentially injured for any of these species (based on densities presented in volume 2, chapter 9: Marine mammals of the PEIR) was estimated as no more than one animal. With reference to the wider population, this equated to very small proportions of the relevant MU (0.03%). For low order techniques, the injury ranges were considerably lower with a maximum of 133m estimated with no more than one animal of any species likely to be present within this range.

1.8.3.100 The underwater sound assessment found that the maximum injury (PTS) range estimated for grey seal using the SPL_{pk} metric was 3,015m for the detonation of charge size of 907kg, but this was reduced to 1,580m for 130kg and 910m for 25kg. Therefore conservatively, the number of individuals that could be potentially injured, based on the inshore densities, was estimated as up to two animals for 907kg UXO high order explosion, which equates to 0.01% of the grey seal reference population or 0.0019% of the OSPAR III population, and less than one animal for both 130kg UXO and 25kg UXO. For low order techniques, the maximum range predicted was up to 449m and there would be no more than one animal potentially within this impact range.

1.8.3.101 The underwater sound assessment found that the maximum injury (PTS) range estimated for harbour seal using the SPL_{pk} metric was 3,015m for the detonation of charge size of 907kg, but this was reduced to 1,580m for 130kg and 910m for 25kg. Therefore conservatively, the number of individuals that could be potentially injured, was estimated as less than one animal for 907kg UXO high order explosion, 130kg UXO and 25kg UXO, which equates to up to 0.0001% of the reference population (Wales, NW England and Northern Ireland SMUs). For low order techniques, the maximum range predicted was up to 449m and there would be no more than one animal potentially within this impact range.

1.8.3.102 Further detail on underwater sound modelling of UXO clearance are provided in volume 3, annex 3.1: Underwater sound technical report of the PEIR and volume 2, chapter 9: Marine mammals of the PEIR.

Behavioural displacement (TTS as a proxy)

1.8.3.103 Within volume 2, chapter 9: Marine mammals of the PEIR a second threshold assessed was the onset of TTS where the resulting effect would be a potential temporary loss in hearing. Whilst similar ecological functions would be inhibited in the short term due to TTS, these are reversible on recovery of the animal's hearing and therefore not considered likely to lead to any long-term effects on the individual. The onset of TTS also corresponds to a 'moving away response' as this is the threshold at which animals are likely to move away or flee from the ensonified area. Thus, the onset of TTS also reflects the threshold at which behavioural displacement could occur.

1.8.3.104 As before, the assessment of TTS considered low order and low yield UXO clearance activities, donor charges for high order UXO disposal and high order explosions as there is potential for high order explosions. The largest ranges using SPL_{pk} were predicted for clearance of the 907kg UXO with potential TTS/moving away response over a distance of up to approximately 28km for harbour porpoise. Ranges predicted for other species using SPL_{pk} were smaller for all other species, with potential TTS/moving away response over a distance of up to 1.6km for bottlenose dolphin and 5.5km for grey seal and harbour seal.

1.8.3.105 As seen for PTS, the highest number of animals affected, based on high order detonation of a 907kg UXO, was found for harbour porpoise where up to 623 animals could experience TTS within the 28km impact range equating to 1% of the MU population (based on SPL_{pk}). For bottlenose dolphin less than one animal could experience TTS within the 1.6km impact range (based on SPL_{pk}). The number of grey seal within a predicted 5.5km TTS range was estimated as four animals (0.03% of the grey seal reference population or 0.007% of the OSPAR Region III population) (based on SPL_{pk}) and for harbour seal less than one animal could experience TTS within the 5.5km impact range (based on SPL_{pk}).

1.8.3.106 Further detail on sound modelling of UXO clearance are provided in volume 3, annex 3.1: Underwater sound technical report of the PEIR and volume 2, chapter 9: Marine mammals of the PEIR.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

1.8.3.107 The conclusions presented onwards are based on the assessment for high order clearance.

1.8.3.108 As outlined in paragraph 1.8.3.98,1.8.3.98 the number of harbour porpoise that could be potentially injured was estimated as 184 animals for 907kg UXO high order explosion which equates to 0.29% of the Celtic and Irish Seas MU. For TTS, as outlined in paragraph 1.8.3.104 1.8.3.105, the number of harbour porpoise potentially affected by TTS based on high order detonation of a 907kg UXO, was up to 623 animals which equates to 1% of the MU population.

1.8.3.109 With the implementation of primary measures in place, (outlined in Table 1.60) volume 2, chapter 9: Marine mammals of the PEIR identified that there would be a residual risk of injury over a range of 2,290m that would require further mitigation. Where low order/low yield measures are not possible there is a maximum risk of injury (predicted for harbour porpoise) out to approximately 15km for a 907kg UXO and approximately 8km for a 130kg UXO. Therefore, tertiary mitigation will be applied as part of a MMMP in line with standard industry practice (JNCC, 2010). Tertiary mitigation will therefore also include the use of ADDs and scare charges to deter animals from the injury zone (see Table 1.60). With the tertiary mitigation applied, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced.

1.8.3.110 For harbour porpoise, the ranges of effect are large and there is considered to be a residual risk of PTS to a small number of individuals. Whilst it is difficult to quantify this residual risk, it is anticipated that there would be some measurable changes at an individual level but this would not manifest to population level effects demonstrated by the small proportion of the CIS MU potentially affected.

Conclusions

1.8.3.111 Adverse effects on the harbour porpoise features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of underwater sound from UXO detonation. An assessment of the impact of underwater sound from UXO detonation against each relevant conservation objective (as presented in paragraphs 1.8.2.7 to 1.8.2.8) is discussed in Table 1.75.

Table 1.75: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC for underwater sound generated from UXO detonation.

Conservation Objective	Conclusion
The species is a viable component of the site	As outlined in paragraph 1.8.3.109, where low order/low yield measures are not possible there is a maximum risk of injury (predicted for harbour porpoise) out to 15km for a 907kg UXO and 8km for a 130kg UXO. The North Anglesey Marine/Gogledd Môn Forol SAC is located 28.2km from the Morgan Generation Assets therefore there is no overlap between the potential impact zone and the SAC. Due to the mobile nature of harbour porpoise, there is potential for harbour porpoise to be present within the impact zone. With tertiary mitigation applied it is anticipated that animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. Whilst it is anticipated that there would be some measurable changes at an individual level, this would not manifest to population level effects demonstrated by the small proportion of the CIS MU potentially affected (0.29%). TTS is reversible and therefore animals that experience this effect this are anticipated to fully recover. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not prevent harbour porpoise from remaining a viable component of the SAC.
There is no significant disturbance of the species	TTS and behavioural disturbance is considered reversible and therefore animals that experience this effect are anticipated to fully recover. It is, however, recognised that where tertiary mitigation applies deterrence measures (i.e. ADD and soft start charges) by their nature would contribute to, rather than reduce, the moving away response (behavioural disturbance). Any behavioural disturbance would occur during a short time period during the construction phase and is not anticipated to have long term population effects on the feature (i.e. features are anticipated to fully recover). There is no spatial overlap of the injury ranges associated with UXO detonation and the SAC and therefore harbour porpoise will not be excluded from any part of the SAC and the disturbance thresholds will not be exceeded. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not result in significant disturbance of harbour porpoise.
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Supporting habitats and processes will not be affected by underwater sound from UXO detonation associated with Morgan Generation Assets (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species, effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not affect prey species populations being maintained in the long term.

1.8.3.112 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of underwater sound from UXO detonation from the Morgan Generation Assets alone.

North Channel SAC

Harbour porpoise

1.8.3.113 The North Channel SAC is located at an increased distance to the Morgan Generation Assets (63.8km from the Morgan Array Area) than the North Anglesey Marine/Gogledd Môn Forol SAC, assessed in paragraphs 1.8.3.107 to 1.8.3.112. As the North Channel SAC is located at an increased distance from the Morgan Generation Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.3.114 Adverse effects on the harbour porpoise features which undermine the conservation objectives of the North Channel SAC will not occur as a result of underwater sound from UXO detonation. An assessment of the impact of underwater sound from UXO detonation against each relevant conservation objective (as presented in paragraphs 1.8.2.14 to 1.8.2.16) is discussed in Table 1.76.

Table 1.76: Conclusions against the conservation objectives of the North Channel SAC for underwater sound generated from UXO detonation.

Conservation Objective	Conclusion
The species is a viable component of the site	As outlined in paragraph 1.8.3.109, where low order/low yield measures are not possible there is a maximum risk of injury (predicted for harbour porpoise) out to 15km for a 907kg UXO and 8km for a 130kg UXO. The North Channel SAC is located 63.8km from the Morgan Generation Assets, therefore there is no overlap between the potential impact zone and the SAC. Due to the mobile nature of harbour porpoise, there is potential for harbour porpoise to be present within the impact zone. With tertiary mitigation applied it is anticipated that animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. Whilst it is anticipated that there would be some measurable changes at an individual level, this would not manifest to population level effects demonstrated by the small proportion of the CIS MU potentially affected (0.29%). TTS is reversible and therefore animals that experience this effect this are anticipated to fully recover. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not prevent harbour porpoise from remaining a viable component of the SAC.
There is no significant disturbance of the species	TTS and behavioural disturbance is considered reversible and therefore animals that experience this effect are anticipated to fully recover. It is, however, recognised that where tertiary mitigation applies deterrence measures (i.e. ADD and soft start charges) by their nature would contribute to, rather than reduce, the moving away response (behavioural disturbance). Any behavioural disturbance would occur during a short time period during the construction phase and is not anticipated to have long term population effects on the feature (i.e. features are anticipated to fully recover). There is no spatial overlap of the injury ranges associated with UXO detonation and the SAC and therefore harbour porpoise will not be excluded from any part of the SAC and the disturbance thresholds will not be exceeded. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not result in significant disturbance of harbour porpoise.
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Supporting habitats and processes will not be affected by underwater sound from UXO detonation associated with Morgan Generation Assets (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species, effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not affect prey species populations being maintained in the long term.

1.8.3.115 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result of underwater sound from UXO detonation from the Morgan Generation Assets alone.

Strangford Lough SAC

Harbour seal

1.8.3.116 As outlined in paragraph 1.8.3.101, considering the maximum injury (PTS) range estimated for harbour seal using the SPL_{pk}, the number of individuals that could be potentially injured was estimated as less than one animal for 907kg UXO high order explosion, 130kg UXO and 25kg UXO, which equates to up to 0.0001% of the reference population (Wales, NW England and Northern Ireland SMUs).

1.8.3.117 Tertiary mitigation will be applied as part of a MMMP in line with standard industry practice (JNCC, 2010). Tertiary mitigation will therefore also include the use of ADDs and scare charges to deter animals from the injury zone. With tertiary mitigation applied, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced.

1.8.3.118 As outlined in paragraph 1.8.3.101, the number of animals at risk of potential PTS would be very small, with the implementation of tertiary mitigation this would be further reduced. There may be some measurable changes at an individual level (for less than one animal) but that this would not manifest to population level effects demonstrated by the small proportion of the SMU potentially affected.

Conclusions

1.8.3.119 Adverse effects on the harbour seal features which undermine the conservation objectives of the Strangford Lough SAC will not occur as a result of underwater sound from UXO detonation. An assessment of the impact of underwater sound from UXO detonation against each relevant conservation objective (as presented in paragraph 1.8.2.21) is discussed in Table 1.77. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.77: Conclusions against the conservation objectives of the Strangford Lough SAC for underwater sound generated from UXO detonation.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	The number of animals at risk of potential PTS would be very small (less than one animal), with the implementation of tertiary mitigation this would be further reduced. There may be some measurable changes at an individual level (for less than one animal) but that this would not manifest to population level effects demonstrated by the small proportion of the SMU potentially affected. TTS impacts are reversible and therefore animals that experience this effect this are anticipated to fully recover. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not prevent the harbour seal feature from being maintained or restored to favourable conservation status. Similarly, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not prevent the harbour seal population from being maintained or enhanced. It should be noted that no condition assessments are available for this SAC, as outlined in section 1.8.2.
Maintain and enhance, as appropriate, the harbour seal population	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	Physical features used by harbour seal within the site will not be affected by underwater sound from UXO detonation associated with Morgan Generation Assets (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species, effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not prevent physical features used by harbour seal from being maintained or enhanced.

1.8.3.120 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Strangford Lough SAC as a result of underwater sound from UXO detonation from the Morgan Generation Assets alone.

Murlough SAC

Harbour seal

1.8.3.121 Underwater sound impacts as a result of UXO detonation on harbour seal features of the Murlough SAC are considered to be similar to those associated with Strangford Loch SAC due to the proximity of the locations. The Murlough SAC is located at an increased distance to the Morgan Generation Assets (98.4km from the Morgan Array Area) than the Strangford Lough SAC, assessed in paragraphs 1.8.3.116 to 1.8.3.120. As the Murlough SAC is located at an increased distance from the Morgan Generation Assets than the Strangford Lough SAC it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.3.122 Adverse effects on the harbour seal features which undermine the conservation objectives of the Murlough SAC will not occur as a result of underwater sound from UXO detonation. An assessment of the impact of underwater sound from UXO detonation against each relevant conservation objective (as presented in paragraph 1.8.2.26) is discussed in Table 1.78. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.78: Conclusions against the conservation objectives of the Murlough SAC for underwater sound generated from UXO detonation.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	The number of animals at risk of potential PTS would be very small (less than one animal), with the implementation of tertiary mitigation this would be further reduced. There may be some measurable changes at an individual level (for less than one animal) but that this would not manifest to population level effects demonstrated by the small proportion of the SMU potentially affected. TTS impacts are reversible and therefore animals that experience this effect this are anticipated to fully recover. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not prevent the harbour seal feature from being maintained or restored to favourable conservation status. Similarly, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not prevent the harbour seal population and distribution from being maintained or enhanced. It should be noted that no condition assessments are available for this SAC, as outlined in section 1.8.2.
To maintain (and if feasible enhance) population numbers and distribution of harbour seal	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	Physical features used by harbour seal within the site will not be affected by underwater sound from UXO detonation associated with Morgan Generation Assets (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species, effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not prevent physical features used by harbour seal from being maintained or enhanced.

1.8.3.123 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Murlough SAC as a result of underwater sound from UXO detonation from the Morgan Generation Assets alone.

Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC

Bottlenose dolphin

1.8.3.124 As outlined in paragraph 1.8.3.99, considering the maximum injury (PTS) range estimated for bottlenose dolphin using the SPL_{pk} metric (890m), the maximum number of individuals that could be potentially injured (based on densities presented in volume 2, chapter 9: Marine mammals of the PEIR) was estimated to be no more than one. With reference to the wider population, this equated to very small proportions of the relevant MU (0.03%). For low order techniques, the injury ranges were considerably lower. As outlined in paragraph 1.8.3.105, less than one bottlenose dolphin could experience TTS within the 1.6km impact range, which equates to 0.34% of the MU.

1.8.3.125 Tertiary mitigation will be applied as part of a MMMP in line with standard industry practice (JNCC, 2010). Tertiary mitigation will therefore also include the use of ADDs and scare charges to deter animals from the injury zone. With tertiary mitigation applied it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced.

1.8.3.126 As outlined in paragraph 1.8.3.99, the number of animals at risk of potential PTS would be very small, with the implementation of tertiary mitigation, this would be further reduced. There may be some measurable changes at an individual level (for less than one animal) but that this would not manifest to population level effects demonstrated by the small proportion of the CIS MU potentially affected.

Grey seal

1.8.3.127 As outlined in paragraph 1.8.3.100, considering the maximum injury (PTS) range estimated for grey seal using the SPL_{pk} metric, the number of individuals that could be potentially injured, based on the inshore densities, was estimated as two animals for 907kg UXO high order explosion, which equates to 0.01% of the grey seal reference population or 0.0019% of the OSPAR III population. For grey seal, The number of grey seal within a predicted 5.5km TTS range was estimated as four animals (0.03% of the grey seal reference population or 0.007% of the OSPAR Region III population) (based on SPL_{pk}).

1.8.3.128 Tertiary mitigation will be applied as part of a MMMP in line with standard industry practice (JNCC, 2010). Tertiary mitigation will therefore also include the use of ADDs and scare charges to deter animals from the injury zone. With tertiary mitigation applied it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced.

1.8.3.129 As outlined in paragraph 1.8.3.100, the number of animals at risk of potential PTS would be very small, with the implementation of tertiary mitigation, this would be further reduced. There may be some measurable changes at an individual level (for less than one animal) but that this would not manifest to population level effects demonstrated by the small proportion of the CIS MU potentially affected.

Conclusions

1.8.3.130 Adverse effects on the bottlenose dolphin and grey seal features which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC will not occur as a result of underwater sound from UXO detonation. An assessment of the impact of underwater sound from UXO detonation against each relevant conservation objective (as presented in paragraphs 1.8.2.36 to 1.8.2.47) is discussed in Table 1.79. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.79: Conclusions against the conservation objectives of Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC for underwater sound generated from UXO detonation.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	The number of animals at risk of potential PTS would be very small (less than one bottlenose dolphin and up to two grey seal), with the implementation of tertiary mitigation, this would be further reduced. There may be some measurable changes at an individual level (less than one bottlenose dolphin and up to two grey seal), but that this would not manifest to population level effects demonstrated by the small proportion of the MUs potentially affected. TTS impacts are reversible and therefore animals that experience this effect are anticipated to fully recover. Therefore, injury and disturbance from underwater sound generated from UXO detonation associated with Morgan Generation Assets will not prevent the bottlenose dolphin and grey seal populations from maintaining themselves on a long-term basis as a viable component of their natural habitats. Similarly, underwater sound as a result of UXO detonation associated with Morgan Generation Assets will not adversely affect the population size, structure, production, and condition of bottlenose dolphin and grey seal within the site. The populations of bottlenose dolphin and grey seal within the site is such that the natural ranges of the populations are not being reduced or likely to be reduced for the foreseeable future as a result of underwater sound impacts associated with UXO detonation.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	The presence, abundance, condition and diversity of supporting habitats and processes will not be affected by underwater sound from UXO detonation associated with Morgan Generation Assets (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species, effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not affect the distribution, abundance and populations dynamics of bottlenose dolphin and grey seal within the site and population beyond the site from remaining stable or increasing.

1.8.3.131 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC as a result of underwater sound from UXO detonation from the Morgan Generation Assets alone.

The Maidens SAC

Grey seal

1.8.3.132 The Maidens SAC is located at an increased distance to the Morgan Generation Assets (141.8km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, assessed in paragraphs 1.8.3.124 to 1.8.3.131. As The Maidens SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.3.133 Adverse effects on the bottlenose dolphin and grey seal features which undermine the conservation objectives of The Maidens SAC will not occur as a result of underwater sound from UXO detonation. An assessment of the impact of underwater sound from UXO detonation against each relevant conservation objective (as presented in paragraph 1.8.2.52) is discussed in Table 1.80. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.80: Conclusions against the conservation objectives of The Maidens SAC for underwater sound generated from UXO detonation.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the grey seal feature to favourable condition	The number of grey seal at risk of potential PTS would be very small (up to two animals), with the implementation of tertiary mitigation this would be further reduced. There may be some measurable changes at an individual level (for up to two animals) but that this would not manifest to population level effects demonstrated by the small proportion of the SMU potentially affected. TTS impacts are reversible and therefore animals that experience this effect this are anticipated to fully recover. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not prevent the grey seal feature from being maintained or restored to favourable conservation status. Similarly, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not prevent the population and distribution of grey seal from being maintained or enhanced. It should be noted that no condition assessments are available for this SAC, as outlined in section 1.8.2.
Maintain and enhance, as appropriate, the grey seal population	
Maintain and enhance, as appropriate, physical features used by grey seal within the site	Physical features used by grey seal within the site will not be affected by underwater sound from UXO detonation associated with Morgan Generation Assets (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species, effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not prevent physical features from being maintained or enhanced.

1.8.3.134 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of The Maidens SAC as a result of underwater sound from UXO detonation from the Morgan Generation Assets alone.

Cardigan Bay/Bae Ceredigion SAC

1.8.3.135 The Cardigan Bay/Bae Ceredigion SAC is located at an increased distance to the Morgan Generation Assets (188.2km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, assessed in paragraphs 1.8.3.1241.8.3.124 to 1.8.3.131. As the Cardigan Bay/Bae Ceredigion SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude.

Bottlenose dolphin

1.8.3.136 As outlined in paragraph 1.8.3.99, considering the maximum injury (PTS) range estimated for bottlenose dolphin using the SPL_{pk} metric (890m), the maximum number of individuals that could be potentially injured (based on densities presented in volume 2, chapter 9: Marine mammals of the PEIR) was estimated to be no more than one. With reference to the wider population, this equated to very small proportions of the relevant MU (0.03%). For low order techniques, the injury ranges were considerably

lower. As outlined in paragraph 1.8.3.105, less than one bottlenose dolphin could experience TTS within the 1.6km impact range, which equates to 0.34% of the MU.

1.8.3.137 Tertiary mitigation will be applied as part of a MMMP in line with standard industry practice (JNCC, 2010). Tertiary mitigation will therefore also include the use of ADDs and scare charges to deter animals from the injury zone. With tertiary mitigation applied it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced.

1.8.3.138 As outlined in paragraph 1.8.3.99, the number of animals at risk of potential PTS would be very small, with the implementation of tertiary mitigation, this would be further reduced. There may be some measurable changes at an individual level (for less than one animal) but that this would not manifest to population level effects demonstrated by the small proportion of the CIS MU potentially affected.

Conclusions

1.8.3.139 Adverse effects on the bottlenose dolphin features which undermine the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC will not occur as a result of underwater sound from UXO detonation. An assessment of the impact of underwater sound from UXO detonation against each relevant conservation objective (as presented in paragraphs 1.8.2.58 to 1.8.2.69) is discussed in Table 1.81. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.81: Conclusions against the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC for underwater sound generated from UXO detonation.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	The number of animals at risk of potential PTS would be very small (less than one bottlenose dolphin), with the implementation of tertiary mitigation, this would be further reduced. There may be some measurable changes at an individual level (less than one bottlenose dolphin), but that this would not manifest to population level effects demonstrated by the small proportion of the MUs potentially affected. TTS impacts are reversible and therefore animals that experience this effect are anticipated to fully recover. Therefore, injury and disturbance from underwater sound generated from UXO detonation associated with Morgan Generation Assets will not prevent the population of bottlenose dolphin from maintaining itself on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound as a result of UXO detonation associated with Morgan Generation Assets will not adversely affect the population size, structure, production, and condition of bottlenose dolphin within the site. The population of bottlenose dolphin within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future as a result of underwater sound impacts associated with piling.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	The presence, abundance, condition and diversity of supporting habitats and processes will not be affected by underwater sound from UXO detonation associated with Morgan Generation Assets (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species, effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not affect the distribution, abundance and populations dynamics of bottlenose dolphin within the site and population beyond the site from remaining stable or increasing.

1.8.3.140 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from UXO detonation from the Morgan Generation Assets alone.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.3.141 The Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance to the Morgan Generation Assets (237.6km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, assessed in paragraphs 1.8.3.124 to 1.8.3.131. As the Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.3.142 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of underwater sound from UXO detonation. An assessment of the impact of underwater sound from UXO detonation against each relevant conservation objective (as presented in paragraphs 1.8.2.75 to 1.8.2.85) is discussed in Table 1.82. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.82: Conclusions against the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC for underwater sound generated from UXO detonation.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	The number of animals at risk of potential PTS would be very small (up to two animals), with the implementation of tertiary mitigation this would be further reduced. There may be some measurable changes at an individual level (for up to two animals) but that this would not manifest to population level effects demonstrated by the small proportion of the SMU potentially affected. TTS impacts are reversible and therefore animals that experience this effect this are anticipated to fully recover. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not prevent the grey seal population from maintaining itself on a long-term basis as a viable component of its natural habitat. Similarly, the grey seal population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future as a result of injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	The presence, abundance, condition and diversity of supporting habitats and processes will not be affected by underwater sound from UXO detonation associated with Morgan Generation Assets (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species, effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not affect the distribution, abundance and populations dynamics of grey seal

Conservation Objective	Conclusion
	within the site and population beyond the site from remaining stable or increasing.

1.8.3.143 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of The Pembrokeshire Marine/Sir Benfro Forol SAC as a result of underwater sound from UXO detonation from the Morgan Generation Assets alone.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

1.8.3.144 The Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located at an increased distance to the Morgan Generation Assets (300.1km from the Morgan Array Area) than the North Anglesey Marine/Gogledd Môn Forol SAC, assessed in paragraphs 1.8.3.107 to 1.8.3.112. As the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located at an increased distance from the Morgan Generation Assets than the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from the Morgan Array Area), it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.3.145 Adverse effects on the harbour porpoise features which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC will not occur as a result of underwater sound from UXO detonation. An assessment of the impact of underwater sound from UXO detonation against each relevant conservation objectives (as presented in paragraphs 1.8.2.90 to 1.8.2.92) is discussed in Table 1.83.

Table 1.83: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC for underwater sound generated from UXO detonation.

Conservation Objective	Conclusion
The species is a viable component of the site	As outlined in paragraph 1.8.3.109, where low order/low yield measures are not possible there is a maximum risk of injury (predicted for harbour porpoise) out to 15km for a 907kg UXO and 8km for a 130kg UXO. The Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located 300.1km from the Morgan Generation Assets, therefore there is no overlap between the potential impact zone and the SAC. Due to the mobile nature of harbour porpoise, there is potential for harbour porpoise to be present within the impact zone. With tertiary mitigation applied it is anticipated that animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. Whilst it is anticipated that there would be some measurable changes at an individual level, this would not manifest to population level effects demonstrated by the small proportion of the CIS MU potentially affected (0.29%). TTS is reversible and therefore animals that experience this effect this are anticipated to fully recover. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not prevent harbour porpoise from remaining a viable component of the SAC.
There is no significant disturbance of the species	TTS and behavioural disturbance is considered reversible and therefore animals that experience this effect are anticipated to fully recover. It is, however, recognised that where tertiary mitigation applies deterrence measures (i.e. ADD and soft start charges) by their nature would contribute to, rather than reduce, the moving away response (behavioural disturbance). Any behavioural disturbance would occur during a short time period during the construction phase and is not anticipated to have long term population effects on the feature (i.e. features are anticipated to fully recover). There is no spatial overlap of the injury ranges associated with UXO detonation and the SAC and therefore harbour porpoise will not be excluded from any part of the SAC and the disturbance thresholds will not be exceeded. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not result in significant disturbance of harbour porpoise.
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Supporting habitats and processes will not be affected by underwater sound from UXO detonation associated with Morgan Generation Assets (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species, effects are not considered to be significant or long-term ensuring that the Morgan Generation Assets will not affect prey species populations being maintained in the long term.

1.8.3.146 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of underwater sound from UXO detonation from the Morgan Generation Assets alone.

Lundy SAC

Grey seal

1.8.3.147 The Lundy SAC is located at an increased distance to the Morgan Generation Assets (334.9km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, assessed in paragraphs 1.8.3.124 to 1.8.3.131. As the Lundy SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.3.148 Adverse effects on the grey seal features which undermine the conservation objectives of the Lundy SAC will not occur as a result of underwater sound from UXO detonation. An assessment of the impact of underwater sound from UXO detonation against each relevant conservation objective (as presented in paragraphs 1.8.2.97 and 1.8.2.98) is discussed in Table 1.84. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.84: Conclusions against the conservation objectives of the Lundy SAC for underwater sound generated from UXO detonation.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound from UXO detonation to result in adverse effects on the habitats of grey seal (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function the habitats of grey seal or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	The number of animals at risk of potential PTS would be very small (up to two animals), with the implementation of tertiary mitigation, this would be further reduced. There may be some measurable changes at an individual level (for up to two animals) but that this would not manifest to population level effects demonstrated by the small proportion of the SMU potentially affected. TTS impacts are reversible and therefore animals that experience this effect this are anticipated to fully recover. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not adversely affect the population and distribution of grey seal within the SAC.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.3.149 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lundy SAC as a result of underwater sound from UXO detonation from the Morgan Generation Assets alone.

Isles of Scilly Complex SAC

Grey seal

1.8.3.150 The Isles of Scilly Complex SAC is located at an increased distance to the Morgan Generation Assets (465km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, assessed in paragraphs 1.8.3.124 to 1.8.3.131. As The Isles of Scilly Complex SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.3.151 Adverse effects on the grey seal features which undermine the conservation objectives of the Isles of Scilly Complex SAC will not occur as a result of underwater sound from UXO detonation. An assessment of the impact of underwater sound from UXO detonation against each relevant conservation objective (as presented in paragraphs 1.8.2.104 and 1.8.2.105) is discussed in Table 1.85. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.85: Conclusions against the conservation objectives of the Isles of Scilly Complex SAC for underwater sound generated from UXO detonation.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound from UXO detonation to result in adverse effects on the habitats of the grey seal (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function the habitats of grey seal or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely [are maintained or restored]	
The populations of qualifying species [are maintained or restored]	The number of animals at risk of potential PTS would be very small (up to two animals), with the implementation of tertiary mitigation, this would be further reduced. There may be some measurable changes at an individual level (for up to two animals) but that this would not manifest to population level effects demonstrated by the small proportion of the SMU potentially affected. TTS impacts are reversible and therefore animals that experience this effect this are anticipated to fully recover. Therefore, injury and disturbance from underwater sound generation from UXO detonation associated with Morgan Generation Assets will not adversely affect the population and distribution of grey seal within the SAC.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.3.152 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Isles of Scilly Complex SAC as a result of underwater sound from UXO detonation from the Morgan Generation Assets alone.

Sites assessed in line with the iterative approach

1.8.3.153 As outlined in paragraphs 1.8.1.3 to 1.8.1.8, following the iterative approach adopted for this HRA Stage 2 ISAA Report, the closest European site to the Morgan Generation Assets within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment in the sections above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA Report, are located at a greater distance from the Morgan Generation Assets and, on this basis, it is considered that effects on the marine mammal features of these sites would be of similar if not lower magnitude than those concluded for the sites subject to a full assessment. The conclusions of the assessments presented in paragraphs 1.8.3.107 to 1.8.3.152 are, therefore, deemed to be applicable for the remaining sites presented below in paragraphs 1.8.3.154 to 1.8.3.176.

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.3.154 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Cardigan Bay/Bae Ceredigion SAC

Grey seal

1.8.3.155 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (paragraphs 1.8.3.124 to 1.8.3.131), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets alone.

Rockabill to Dalkey Island SAC

1.8.3.156 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Rockabill to Dalkey Island SAC as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Saltee Islands SAC

1.8.3.157 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (paragraphs 1.8.3.124 to 1.8.3.131), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Saltee Islands SAC as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets alone.

Roaringwater Bay and Islands SAC

1.8.3.158 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Roaringwater Bay and Islands SAC as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Blasket Islands SAC

1.8.3.159 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Blasket Islands SAC as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Mers Celtiques - Talus du golfe de Gascogne SCI

1.8.3.160 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Mers Celtiques - Talus du golfe de Gascogne SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Abers - Côte des legends SCI

1.8.3.161 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Abers - Côte des legends SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Ouessant-Molène SCI

1.8.3.162 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ouessant-Molène SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Côte de Granit rose-Sept-Iles SCI

1.8.3.163 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côte de Granit rose-Sept-Iles SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Anse de Goulven, dunes de Keremma SCI

1.8.3.164 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Goulven, dunes de Keremma SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Tregor Goëlo SCI

1.8.3.165 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Tregor Goëlo SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Côtes de Crozon SCI

1.8.3.166 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côtes de Crozon SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Chaussée de Sein SCI

1.8.3.167 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the

North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Chaussée de Sein SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Cap Sizun SCI

1.8.3.168 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap Sizun SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Récifs du talus du golfe de Gascogne SCI

1.8.3.169 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Récifs du talus du golfe de Gascogne SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Anse de Vauville SCI

1.8.3.170 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Vauville SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Cap d'Erquy-Cap Fréhel SCI

1.8.3.171 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap d'Erquy-Cap Fréhel SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Baie de Saint-Brieuc – Est SCI

1.8.3.172 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Saint-Brieuc – Est SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Banc et récifs de Surtainville SCI

1.8.3.173 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Banc et récifs de Surtainville SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.8.3.174 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Estuaire de la Rance SCI

1.8.3.175 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Estuaire de la Rance SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Baie du Mont Saint-Michel SCI

1.8.3.176 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.107 to 1.8.3.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie du Mont Saint-Michel SCI as a result of underwater sound associated with UXO detonation from the Morgan Generation Assets alone.

Injury and disturbance from underwater sound from pre-construction site investigation surveys

1.8.3.177 Site investigation surveys during the construction phase have the potential to cause direct or indirect effects (including hearing injury or behavioural disturbance) on marine mammals.

1.8.3.178 Several sonar-like survey types will potentially be used for the geophysical surveys, including MBES, SSS, SBES, SBP and UHRS (0.05-4kHz; 182dB re 1µPa re 1m (rms)). The equipment likely to be used can typically work at a range of signal frequencies, depending on the distance to the seabed and the required resolution. For sonar-like sources the signal is highly directional, acts like a beam and is emitted in pulses. Sonar-based sources are considered as continuous (non-impulsive) because they generally comprise a single (or multiple discrete) frequency as opposed to a broadband signal with high kurtosis, high peak pressures and rapid rise times. Unlike the sonar-like survey sources, the UHRS is likely to utilise a sparker, which produces an impulsive, broadband source signal. A full description of the source sound levels for geophysical survey activities is provided in volume 3, annex 3.1: Underwater sound technical report of the PEIR.

1.8.3.179 The assessment of LSE in the HRA Stage 1 Screening Report identified that during construction and decomissioning, LSE could not be ruled out for the potential impact of underwater sound from pre-construction site investigation surveys. This relates to the designated sites listed in Table 1.53and relevant Annex II marine mammal features.

1.8.3.180 The assessment is undertaken as an iterative approach and considers the closest site in the first instance and the sites suggested in NRW (2022d). The following sections explain how this potential impact on Annex II marine mammal features of the SACs oulined in Table 1.54 have been quantified and assessed.

1.8.3.181 The MDS considered for the assessment of potential impacts on Annex II marine mammals for underwater sound from pre-construction site investigation surveys is presented in Table 1.86.

Table 1.86: Maximum design scenario considered for the assessment of potential impacts on marine mammals from injury and disturbance from pre-construction site investigation surveys during the construction phase.

Phase	Maximum design scenario	Justification
Construction phase	• Geophysical site investigation activities include: – MBES - 200-500kHz; 180-240dB re 1µPa re 1m (rms) – SSS - 200-700kHz; 216-228dB re 1µPa re 1m (rms) – SBES - 20-400kHz; 180-240dB re 1µPa re 1m (rms) – SBP - 0.2-14kHz chirp; 2-7kHz pinger; 200-240 chirp dB re 1µPa re 1m (rms); 200-235 pinger dB re 1µPa re 1m (rms) – UHRS (0.05-4kHz; 182dB re 1µPa re 1m (rms)) • Geotechnical site investigation activities include: – Boreholes – Cone penetration tests (CPTs) – Vibrocores. Pre-construction site investigation surveys will involve the use of several geophysical/geotechnical survey vessels and take place over up to a period of up to eight months.	Range of geophysical and geotechnical activities likely to be undertaken using equipment typically employed for these types of surveys. Parameters chosen resulted in the greatest range of effect (e.g. highest source, fastest pulse rate, longest pulse duration) and as such were those that would lead to the greatest spatial extent for injury.

Measures adopted as part of the Morgan Generation Assets

1.8.3.182 The measures adopted as part of the Morgan Generation Assets that are relevant to effects from underwater sound from pre-construction site investigation surveys are outlined in Table 1.60.

Construction phase

Information to support assessment

1.8.3.183 Potential impacts of site investigation surveys will depend on the characteristic of the source, survey design, frequency bands and water depth. Sonar like sources have very strong directivity which effectively means that there is only potential for injury when a marine mammal is directly underneath the sound source. Once the animal moves outside of the main beam, there is no potential for injury.

Injury

1.8.3.184 For geotechnical surveys, injury to marine mammals is unlikely to occur beyond a few tens of metres and sound from vessels themselves is likely to deter marine mammals beyond this range. The underwater sound assessment demonstrated that the PTS threshold was not exceeded for most marine mammal species, except harbour porpoise. PTS is expected to occur during CPTs out to a maximum of 55m for harbour porpoise, and for vibro-coring to a maximum of 79m. The maximum range for PTS from geophysical surveys (SBP) is 254m for harbour porpoise. For bottlenose dolphin, the maximum PTS is expected to occur out to 41m for MBES and for grey seal and harbour seal out to 40m due to SBP.

1.8.3.185 Due to low impact ranges, for all marine species, there is the potential for less than one animal to experience PTS (and no animals where the threshold is not exceeded) as a result of geophysical and geotechnical site investigation surveys.

Disturbance

1.8.3.186 The estimated maximum ranges for onset of disturbance are based on sound level being greater than the 120dB re 1µPa (rms) threshold applicable for all Annex II marine mammals species, noting that this threshold is for ‘mild disturbance’ and therefore is not likely to result in displacement of animals. The disturbance ranges as a result of geophysical and geotechnical site-investigation surveys (see volume 2, chapter 9: Marine mammals of the PEIR) will be higher than those presented for PTS. Most of the predicted ranges are within 100s of meters, however the largest distance over which the disturbance could occur is out to approximately 55km during vibro-coring. This is due to the higher source levels for this piece of equipment compared to other types of survey equipment. For geophysical surveys, the maximum disturbance ranges were predicted for the SBP with mild disturbance potentially up to 17.3km. For impulsive sound sources (UHRS (sparker) and cone penetration testing), the largest distance over which mild disturbance could occur is out to 1,350m, and the largest distance over which strong disturbance could occur is out to 158m. Quantitatively, this would lead to maximum disturbance of less than one animal for all Annex II marine mammal species.

1.8.3.187 For impulsive sound sources, there is an understanding of the difference between strong and mild disturbance, whereas for non-impulsive (continuous) sound sources, there is only a single available threshold (120dB re 1µPa (rms)), which is classed as the distance beyond which no animals would be disturbed. Given that ranges for disturbance for non-impulsive sound sources (MBES, SSS, SBES, SBP (chirp/pinger), borehole drilling and vibro-coring), are presented up to the 120dB re 1µPa (rms) threshold, and there is no distinction between mild and strong disturbance, it can be assumed that not all animals found within those ranges would be disturbed. Moreover, for those animals disturbed, there is likely to be a proportional response (i.e. not all animals will be disturbed to the same extent), although there is no dose-response curve available to apply in the context of non-impulsive sound sources. It is important to note that the life history of an individual and the context will also influence the likelihood of an individual to exhibit an aversive response to sound, and it must be highlighted that these impacts will not be continuous over the construction phase, instead carried out over a shorter number of days within the period. Therefore, given the limited quantitative information available, as described above, any simplified calculation would likely lead to an unrealistic overestimation of the number of animals likely to be disturbed. As such, this value has not been quantified.

1.8.3.188 However, all geotechnical and geophysical surveys will be very short duration (over a period of several months), activities are likely to be intermittent and animals are expected to recover quickly after cessation of the survey activities. It is expected that, to some extent, marine mammals will be able to adapt their behaviour to reduce impacts on survival and reproduction rates and tolerate elevated levels of underwater sound during site investigation surveys.

1.8.3.189 Mitigation for injury during geophysical surveys using a sub-surface sensor from a conventional vessel will involve the use of MMOs and PAM to ensure that the risk of injury over the defined mitigation zone is reduced in line with JNCC guidance (JNCC, 2017). The largest range was predicted as 254m (for SBP) and it is considered that standard industry measures will be effective at reducing the risk of injury over this distance. Some multi-beam surveys in shallow waters (<200m) are not subject to the requirements of mitigation (JNCC, 2017). Requirements for mitigation will be agreed with the consultees post PEIR submission.

1.8.3.190 Therefore, the impact of site investigation surveys leading to behavioural effects and injury is predicted to be of local spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility (with animals returning to baseline levels soon after surveys have ceased).

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

1.8.3.191 As outlined in paragraph 1.8.3.184, ranges for harbour porpoise within which there is a risk of PTS are small with a maximum of 79m for geotechnical surveys and 254m for geophysical surveys. The number of harbour porpoise to potentially experience PTS is less than one animal and the risk of injury reduced with tertiary mitigation in place. Since sonar-based systems have strong directivity and that the site investigation surveys will be of short term duration and intermittent, there is no adverse effects leading to auditory injury for harbour porpoise associated with underwater sound from pre-construction site investigation surveys for the Morgan Generation Assets.

1.8.3.192 Given the distance from the Morgan Generation Assets to the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km to Morgan Array Area), it is expected that harbour porpoise will avoid the area of the survey. Noting that pre-construction site investigation surveys will not be undertaken nearby or within this SAC and potential disturbance impact zones will no overlap with SAC except for vibro-coring but with harbour porpoise recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the North Anglesey Marine/Gogledd Môn Forol SAC.

1.8.3.193 Therefore, the impact is not predicted to result in auditory injury of harbour porpoise and there is negligible risk of behavioural disturbance of harbour porpoise.

Conclusions

1.8.3.194 Adverse effects on the harbour porpoise features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of underwater sound from pre-construction site investigation surveys. An assessment of the impact of underwater sound from pre-construction site investigation surveys against each relevant conservation objective (as presented in paragraphs 1.8.2.7 to 1.8.2.8) is discussed in Table 1.87. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.87: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC for underwater sound generated from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not affect the survivability and reproductive potential of harbour porpoise using the designated site. Harbour porpoise will remain a viable component of the site. Similarly, underwater sound as a result of pre-construction site investigation surveys associated with Morgan Generation Assets will not significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound from pre-construction site investigation surveys to result in adverse effects on the habitats of harbour porpoise. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not hinder the conditions of supporting habitats and processes or reduce the availability of prey.

1.8.3.195 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of underwater sound from pre-construction site investigation surveys from the Morgan Generation Assets alone.

North Channel SAC

Harbour porpoise

1.8.3.196 Impacts of underwater sound from pre-construction site investigation surveys on harbour porpoise features of the North Channel SAC are predicted to be similar to those associated with the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area) outlined in paragraphs 1.8.3.191 to 0, due to the proximity of the locations. As the North Channel SAC (63.8km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.197 Therefore, the impact is not predicted to result in auditory injury of harbour porpoise and there is negligible risk of behavioural disturbance of harbour porpoise.

Conclusions

1.8.3.198 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the North Channel SAC will not occur as a result of underwater sound from pre-construction site investigation surveys. An assessment of the impact of underwater sound from pre-construction site investigation surveys against each relevant conservation objective (as presented in paragraphs 1.8.2.14 to 1.8.2.16) is discussed in Table 1.88. Where the justifications and supporting evidence

are the same for more than one conservation objective, the assessments have been grouped.

Table 1.88: Conclusions against the conservation objectives of the North Channel SAC for underwater sound generated from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not affect the survivability and reproductive potential of harbour porpoise using the designated site. Harbour porpoise will remain a viable component of the site. Similarly, underwater sound as a result of pre-construction site investigation surveys associated with Morgan Generation Assets will not significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound from pre-construction site investigation surveys to result in adverse effects on the habitats of harbour porpoise. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not hinder the conditions of supporting habitats and processes or reduce the availability of prey.

1.8.3.199 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result of underwater sound from pre-construction site investigation surveys from the Morgan Generation Assets alone.

Strangford Lough SAC

Harbour seal

1.8.3.200 As outlined in paragraph 1.8.3.184, range for harbour seal within which there is a risk of PTS is small with a maximum of 40m for geophysical surveys (for geotechnical surveys, thresholds are not exceeded). The number of harbour seal to potentially experience PTS is less than one animal. Since sonar-based systems have strong directivity and that the site investigation surveys will be of short term duration and intermittent, there is no adverse effects leading to auditory injury for harbour seal associated with underwater sound from pre-construction site investigation surveys for Morgan Generation Assets.

1.8.3.201 Given the distance from the Morgan Generation Assets to the Strangford Lough SAC (94.6km to Morgan Array Area), there is no overlap between the potential disturbance impact zones and the SAC and animals within the site are unlikely to be disturbed. Noting that pre-construction site investigation surveys will not be undertaken nearby or within this SAC, therefore with harbour seal recovering quickly after the surveys have ceased, behavioural disturbance is unlikely to be significant. Only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the Strangford Lough SAC.

1.8.3.202 Therefore, the impact is not predicted to result in auditory injury of harbour seals and there is negligible risk of behavioural disturbance of harbour seals.

Conclusions

1.8.3.203 Adverse effects on the qualifying Annex II harbour seal features which undermine the conservation objectives of the Strangford Lough SAC will not occur as a result of underwater sound from pre-construction site investigation surveys. An assessment of the impact of underwater sound from pre-construction site investigation surveys against each relevant conservation objective (as presented in paragraph 1.8.2.21) is discussed in Table 1.89. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.89: Conclusions against the conservation objectives of the Strangford Lough SAC for underwater sound generated from pre-construction site investigation surveys.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that there is no potential for injury within range of the SAC, that the sound of the survey vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound as a result of pre-construction site investigation surveys of Morgan Generation Assets will not prevent the population of harbour seal from being maintained or enhanced.
Maintain and enhance, as appropriate, the harbour seal population	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound from pre-construction site investigation surveys to result in adverse effects on the physical features used by harbour seal within the site. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.3.204 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Strangford Lough SAC as a result of underwater sound from pre-construction site investigation surveys from the Morgan Generation Assets alone.

Murlough SAC

Harbour seal

1.8.3.205 Underwater sound from pre-construction site investigation surveys on harbour seal features of the Murlough SAC are predicted to be similar to those associated with the Strangford Lough SAC (94.6km from Morgan Array Area) outlined in paragraphs 1.8.3.200 and 0, due to the proximity of the locations. As the Murlough SAC (98.4km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Strangford Lough SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.206 Therefore, the impact is not predicted to result in auditory injury of harbour seal and there is negligible risk of behavioural disturbance of harbour seal.

Conclusions

1.8.3.207 Adverse effects on the qualifying Annex II harbour seal features which undermine the conservation objectives of the Murlough SAC will not occur as a result of underwater sound from pre-construction site investigation surveys. An assessment of the impact of underwater sound from pre-construction site investigation surveys against each relevant conservation objective (as presented in paragraph 1.8.2.26) is discussed in

Table 1.90. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.90: Conclusions against the conservation objectives of the Murlough SAC for underwater sound generated from pre-construction site investigation surveys.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that there is no potential for injury within range of the SAC, that the sound of the survey vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound as a result of pre-construction site investigation surveys of Morgan Generation Assets will not prevent the population and distribution of harbour seal from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of harbour seal	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound from pre-construction site investigation surveys to result in adverse effects on the physical features used by harbour seal within the site. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.3.208 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Murlough SAC as a result of underwater sound from pre-construction site investigation surveys from the Morgan Generation Assets alone.

Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC

Bottlenose dolphin

1.8.3.209 As outlined in paragraph 1.8.3.184, the range for bottlenose dolphin within which there is a risk of PTS is small with a maximum of 41m for geophysical surveys (for geotechnical surveys, thresholds are not exceeded). The number of bottlenose dolphin to potentially experience PTS is less than one animal. Since sonar-based systems have strong directivity and that the site investigation surveys will be of short term duration and intermittent, there are no adverse effects leading to auditory injury for bottlenose dolphin associated with underwater sound from pre-construction site investigation surveys for Morgan Generation Assets.

1.8.3.210 Given the distance from the Morgan Generation Assets to the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km to Morgan Array Area), there is no overlap between the potential disturbance impact zones and the SAC and bottlenose dolphins are expected to avoid the area of the survey. Therefore, animals within the site are unlikely to be disturbed. For the estimates, coastal regions density values are used and assume a uniform distribution throughout the area. Therefore, in the case of surveys within Morgan Array Area, lower densities of bottlenose dolphin than the ones used in the estimates are expected with less individuals from this SAC to be present in offshore waters. Noting that pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with bottlenose dolphins recovering quickly after the surveys have ceased behavioural disturbance is unlikely to be significant. Only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC.

1.8.3.211 Therefore, the impact is not predicted to result in auditory injury of bottlenose dolphin and there is negligible risk of behavioural disturbance of bottlenose dolphin.

Grey seal

1.8.3.212 As outlined in paragraph 1.8.3.184, range for grey seal within which there is a risk of PTS is small with a maximum of 40m for geophysical surveys (for geotechnical surveys, thresholds are not exceeded). The number of grey seal to potentially experience PTS is less than one animal. Since sonar-based systems have strong directivity and that the site investigation surveys will be of short term duration and intermittent, there is no adverse effects leading to auditory injury for grey seal associated with underwater sound from pre-construction site investigation surveys for Morgan Generation Assets.

1.8.3.213 Given the distance from the Morgan Generation Assets to the SAC (119.8km to Morgan Array Area), there is no overlap between the potential disturbance impact zones and the SAC and grey seal within the site are unlikely to be disturbed. Grey seal densities used in the estimates are more reflective of inshore densities. Therefore, in the case of surveys within Morgan Array Area, lower densities of grey seal than the ones used in the estimates are expected with less individuals from this SAC to be present in offshore waters. Noting that pre-construction site investigation surveys will not be undertaken nearby or within this SAC and with grey seals recovering quickly after the pre-construction site investigation surveys have ceased, behavioural disturbance is unlikely to be significant. Only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC.

1.8.3.214 Therefore, the impact is not predicted to result in auditory injury of grey seal and there is negligible risk of behavioural disturbance of grey seal.

Conclusions

1.8.3.215 Adverse effects on the qualifying Annex II bottlenose dolphin and grey seal features which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC will not occur as a result of underwater sound from pre-construction site investigation surveys. An assessment of the impact of underwater sound from pre-construction site investigation surveys against each relevant conservation objective (as presented in paragraphs 1.8.2.36 to 1.8.2.47) is discussed in Table 1.91. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.91: Conclusions against the conservation objectives of Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC for underwater sound generated from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent the populations of bottlenose dolphin and grey seal from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound as a result of UXO detonation associated with Morgan Generation Assets will not adversely affect the population size, structure, production, and
Important elements are population size, structure, production, and condition of the species within the site	

Conservation Objective	Conclusion
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	condition of bottlenose dolphin and grey seal within the site. Underwater sound as a result of pre-construction site investigation surveys for Morgan Generation Assets will not reduce nor likely reduce the natural range of the populations of bottlenose dolphin and grey seal for the foreseeable future.
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound from pre-construction site investigation surveys to result in adverse effects on the habitats of bottlenose dolphin and grey seal. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of bottlenose dolphin and grey seal.

1.8.3.216 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC as a result of underwater sound from pre-construction site investigation surveys from the Morgan Generation Assets alone.

The Maidens SAC

Grey seal

1.8.3.217 Underwater sound from pre-construction site investigation surveys on grey seal features of The Maidens SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.212 to 1.8.3.216. As The Maidens SAC (121.1km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.218 Therefore, the impact is not predicted to result in auditory injury of grey seal and there is negligible risk of behavioural disturbance of grey seal.

Conclusions

1.8.3.219 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of The Maidens SAC will not occur as a result of underwater sound from pre-construction site investigation surveys. An assessment of the impact of underwater sound from pre-construction site investigation surveys against each relevant conservation objective (as presented in paragraph 1.8.2.52) is discussed in Table 1.92. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.92: Conclusions against the conservation objectives of The Maidens SAC for underwater sound generated from pre-construction site investigation surveys.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the grey seal feature to favourable condition	Given that there is no potential for injury within range of the SAC, that the sound of the survey vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent the grey seal feature from being maintained or restored to favourable condition. Similarly, underwater sound as a result of pre-construction site investigation surveys of Morgan Generation Assets will not prevent the population and distribution of grey seal from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of grey seal	
Maintain and enhance, as appropriate, physical features used by grey seal within the site	There is no pathway for underwater sound from pre-construction site investigation surveys to result in adverse effects on the physical features used by grey seal within the site. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent physical features used by grey seal within the site from being maintained or enhance.

1.8.3.220 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of The Maidens SAC as a result of underwater sound from pre-construction site investigation surveys from the Morgan Generation Assets alone.

Cardigan Bay/Bae Ceredigion SAC

Bottlenose dolphin

1.8.3.221 Underwater sound from pre-construction site investigation surveys on bottlenose dolphin features of the Cardigan Bay/Bae Ceredigion SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.212 to 1.8.3.216. As the Cardigan Bay/Bae Ceredigion SAC (188.2km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.222 Therefore, the impact is not predicted to result in auditory injury of bottlenose dolphin and there is negligible risk of behavioural disturbance of bottlenose dolphin.

Conclusions

1.8.3.223 Adverse effects on the qualifying Annex II bottlenose dolphin features which undermine the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC will not occur as a result of underwater sound from pre-construction site investigation surveys. An assessment of the impact of underwater sound from pre-construction site investigation surveys against each relevant conservation objective (as presented in paragraphs 1.8.2.58 to 1.8.2.69) is discussed in Table 1.93. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.93: Conclusions against the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC for underwater sound generated from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent the populations of bottlenose dolphin from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound as a result of UXO detonation associated with Morgan Generation Assets will not adversely affect the population size, structure, production, and condition of bottlenose dolphin within the site. Underwater sound as a result of pre-construction site investigation surveys for Morgan Generation Assets will not reduce nor likely reduce the natural range of the populations of bottlenose dolphin for the foreseeable future.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound from pre-construction site investigation surveys to result in adverse effects on the habitats of bottlenose dolphin. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of bottlenose dolphin.

1.8.3.224 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from pre-construction site investigation surveys from the Morgan Generation Assets alone.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.3.225 Underwater sound from pre-construction site investigation surveys on grey seal features of the Pembrokeshire Marine/Sir Benfro Forol SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.212 to 1.8.3.216. As the Pembrokeshire Marine/Sir Benfro Forol SAC (237.6km from Morgan Array) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.226 Therefore, the impact is not predicted to result in auditory injury of grey seal and there is negligible risk of behavioural disturbance of grey seal.

Conclusions

1.8.3.227 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of underwater sound from pre-construction site investigation surveys. An assessment of the impact of underwater sound from pre-construction site investigation surveys against each relevant conservation objective (as presented in paragraphs 1.8.2.75 to 1.8.2.85) is discussed in Table 1.94. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.94: Conclusions against the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC for underwater sound generated from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent the populations of grey seal from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound as a result of UXO detonation associated with Morgan Generation Assets will not adversely affect the population size, structure, production, and condition of grey seal within the site. Underwater sound as a result of pre-construction site investigation surveys for Morgan Generation Assets will not reduce nor likely reduce the natural range of the populations of grey seal for the foreseeable future.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound from pre-construction site investigation surveys to result in adverse effects on the habitats of grey seal. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of grey seal.

1.8.3.228 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result of underwater sound from pre-construction site investigation surveys from the Morgan Generation Assets alone.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

1.8.3.229 Underwater sound from pre-construction site investigation surveys on harbour porpoise features of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC are predicted to be similar to those associated with the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area) outlined in paragraphs 1.8.3.191 to 1.8.3.195. As the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC (300.1km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.230 Therefore, the impact is not predicted to result in auditory injury of harbour porpoise and there is negligible risk of behavioural disturbance of harbour porpoise.

Conclusions

1.8.3.231 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC will not occur as a result of underwater sound from pre-construction site investigation surveys. An assessment of the impact of underwater sound from pre-construction site investigation surveys against each relevant conservation objective (as presented in paragraphs 1.8.2.90 to 1.8.2.92) is discussed in Table 1.95. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.95: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC for underwater sound generated from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not affect the survivability and reproductive potential of harbour porpoise using the designated site. Harbour porpoise will remain a viable component of the site. Similarly, underwater sound as a result of pre-construction site investigation surveys associated with Morgan Generation Assets will not significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound from pre-construction site investigation surveys to result in adverse effects on the habitats of harbour porpoise. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not hinder the conditions of supporting habitats and processes or reduce the availability of prey.

1.8.3.232 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of underwater sound from pre-construction site investigation surveys from the Morgan Generation Assets alone.

Lundy SAC

Grey seal

1.8.3.233 Underwater sound from pre-construction site investigation surveys on grey seal features of the Lundy SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.212 to 1.8.3.216. As the Lundy SAC (334.9km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.234 Therefore, the impact is not predicted to result in auditory injury of grey seal and there is negligible risk of behavioural disturbance of grey seal.

Conclusions

1.8.3.235 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Lundy SAC will not occur as a result of underwater sound from pre-construction site investigation surveys. An assessment of the impact of underwater sound from pre-construction site investigation surveys against each relevant conservation objective (as presented in paragraphs 1.8.2.97 and 1.8.2.98) is discussed in Table 1.96. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.96: Conclusions against the conservation objectives of the Lundy SAC for underwater sound generated from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound from pre-construction site investigation surveys to result in adverse effects on the habitats of grey seal neither on the habitats structure, function and supporting processes. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of grey seal from being maintained or restored or prevent the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent the population and distribution of grey seal from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.3.236 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lundy SAC as a result of underwater sound from pre-construction site investigation surveys from the Morgan Generation Assets alone.

Isles of Scilly Complex SAC

Grey seal

1.8.3.237 Underwater sound from pre-construction site investigation surveys on grey seal features of the Isles of Scilly Complex SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.212 to 1.8.3.216. As the Isles of Scilly Complex SAC (465km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.238 Therefore, the impact is not predicted to result in auditory injury of grey seal and there is negligible risk of behavioural disturbance of grey seal.

Conclusions

1.8.3.239 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Isles of Scilly Complex SAC will not occur as a result of underwater sound from pre-construction site investigation surveys. An assessment of the impact of underwater sound from pre-construction site investigation surveys against each relevant conservation objective (as presented in paragraphs 1.8.2.104 and 1.8.2.105) is discussed in Table 1.97. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.97: Conclusions against the conservation objectives of the Isles of Scilly Complex SAC for underwater sound generated from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound from pre-construction site investigation surveys to result in adverse effects on the habitats of grey seal neither on the habitats structure, function and supporting processes. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of grey seal from being maintained or restored or prevent the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets will not prevent the population and distribution of grey seal from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.3.240 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Isles of Scilly Complex SAC as a result of underwater sound from pre-construction site investigation surveys from the Morgan Generation Assets alone.

Sites assessed in line with the iterative approach

1.8.3.241 As outlined in paragraphs 1.8.1.3 to 1.8.1.8, following the iterative approach adopted for this HRA Stage 2 ISAA Report, the closest European site to the Morgan Generation Assets within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment in the sections above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA Report, are located at a greater distance from the Morgan Generation Assets and, on this basis, it is considered that effects on the marine mammal features of these sites would be of similar if not lower magnitude than those concluded for the sites subject to a full assessment. The conclusions of the assessments presented in paragraphs 1.8.3.191 to 1.8.3.240 are, therefore, deemed to be applicable for the remaining sites presented below in paragraphs 1.8.3.242 to 1.8.3.264.

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.3.242 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Cardigan Bay/Bae Ceredigion SAC

Grey seal

1.8.3.243 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs 1.8.3.212 to 1.8.3.216), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Rockabill to Dalkey Island SAC

1.8.3.244 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Rockabill to Dalkey Island SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Saltee Islands SAC

1.8.3.245 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs 1.8.3.212 to 1.8.3.216), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Saltee Islands SAC as a result of underwater sound vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Roaringwater Bay and Islands SAC

1.8.3.246 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Roaringwater Bay and Islands SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Blasket Islands SAC

1.8.3.247 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Blasket Islands SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Mers Celtiques - Talus du golfe de Gascogne SCI

1.8.3.248 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Mers Celtiques - Talus du golfe de Gascogne SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Abers - Côte des legends SCI

1.8.3.249 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Abers - Côte des legends SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Ouessant-Molène SCI

1.8.3.250 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ouessant-Molène SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Côte de Granit rose-Sept-Iles SCI

1.8.3.251 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côte de Granit rose-Sept-Iles SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Anse de Goulven, dunes de Keremma SCI

1.8.3.252 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Goulven, dunes de Keremma SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Tregor Goëlo SCI

1.8.3.253 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Tregor Goëlo SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Côtes de Crozon SCI

1.8.3.254 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côtes de Crozon SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Chaussée de Sein SCI

1.8.3.255 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Chaussée de Sein SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Cap Sizun SCI

1.8.3.256 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap Sizun SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Récifs du talus du golfe de Gascogne SCI

1.8.3.257 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Récifs du talus du golfe de Gascogne SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Anse de Vauville SCI

1.8.3.258 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Vauville SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Cap d'Erquy-Cap Fréhel SCI

1.8.3.259 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap d'Erquy-Cap Fréhel SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Baie de Saint-Brieuc – Est SCI

1.8.3.260 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the

North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Saint-Brieuc – Est SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Banc et récifs de Surtainville SCI

1.8.3.261 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Banc et récifs de Surtainville SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.8.3.262 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Estuaire de la Rance SCI

1.8.3.263 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Estuaire de la Rance SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Baie du Mont Saint-Michel SCI

1.8.3.264 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.191 to 1.8.3.199), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie du Mont Saint-Michel SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets alone.

Injury and disturbance from underwater sound from vessels and other (non-piling) sound producing activities

1.8.3.265 The assessment of LSE during in the HRA Stage 1 Screening Report identified that during construction, operations and maintenance and decommissioning, LSE could not be ruled out for the potential impact of underwater sound from vessels and other activities. This relates to the designated sites listed in paragraph 1.8.1.7 and relevant Annex II marine mammal features. The assessment is undertaken as an iterative approach and considers the closest site in the first instance and the sites suggested in NRW (2022d).

1.8.3.266 Non-piling, sound producing activities and increased vessel movements during the construction operations and maintenance and decommissioning phases have the potential to result in a range of impacts on marine mammals such as avoidance behaviour or displacement and masking of vocalisations or changes in vocalisation rate. During the construction phase of the Morgan Generation Assets, the increased levels of vessel activity will contribute to the total underwater sound levels, but the movements will be limited to within the Morgan Array Area and will likely follow existing shipping routes to/from the ports.

1.8.3.267 Vessel use during the operations and maintenance phase of the Morgan Generation Assets may lead to injury and/or disturbance to Annex II marine mammals species. A variety of vessel types will be used during routine operations and maintenance activities, including Crew Transfer Vessels (CTVs)/workboats, jack-up vessels, cable repair vessels, Service Operation Vessels (SOVs) or similar vessels, excavators/backhoe dredgers.

1.8.3.268 The assessment of potential impacts from elevated underwater sound due to vessel use and other (non-piling) activities is based on vessel and/or activity basis, considering the maximum injury/disturbance range as assessed in volume 3, annex 3.1: Underwater sound technical report of the PEIR. However, several activities could be potentially occurring at the same time and therefore ranges of effects may extend from several vessels/locations where the activity is carried out and potentially overlap.

1.8.3.269 From underwater sound emitted by vessels, the main drivers influencing the magnitude of the potential impact are vessel type, speed and ambient sound levels (Wilson *et al.*, 2007). Baseline levels of vessel traffic around Morgan Array Area are at a high level, largely due to ferry routes but also due occasional vessel traffic movements associated with jack-ups and other platforms occurring in the region (see volume 6, annex 12.1: Navigational Risk Assessment of the PEIR).

1.8.3.270 The MDS considered for the assessment of potential impacts on Annex II marine mammal features from underwater sound from vessels and other non-pilling sound producing activities is presented in Table 1.98.

Table 1.98: Maximum design scenario considered for the assessment of potential impacts on marine mammals from underwater sound from vessels and other (non-piling) sound producing activities.

Phase	Maximum design scenario	Justification
Construction phase	**Vessels:** • Up to a total of 80 construction vessels on site at any one time (22 main installation and support vessels, eight tug/anchor handlers, ten cable lay installation and support vessels, two guard vessels, seven survey vessels,11 seabed preparation vessels, 13 CTVs, three scour protection installation vessels and four cable protection installation vessels) • Up to 2,004 installation vessel movements (return trips) during construction (521 main installation and support vessels, 74 tug/anchor handlers, 48 cable lay installation and support vessels, 68 guard vessel, 33 survey vessels, 42 seabed preparation vessels, 1,155 CTVs, 41 scour protection installation vessels and 22 cable protection installation vessels) **Other activities:** • Up to 100% of overall piles are anticipated to require drilling (107 4-legged wind turbine jacket foundations with a jacket leg diameter of 2.6m and four 4-legged OSP jacket foundations with a jacket leg diameter of 3.0m); up to two concurrent drilling vessels • Burial of up to 500km of inter-array cables and 50km of interconnector cables via ploughing, trenching and jetting; cable burial and rock dumping. Maximum offshore construction duration of up to 4 years.	The MDS considers the maximum number of vessels on site at any one time and greatest number of round trips during each phase of the Morgan Generation Assets. This represents the broadest range of vessel types and therefore sound signatures within the marine environment to affect marine mammal receptors. The MDS considers the maximum durations which activities could be conducted for.
Operations and maintenance phase	• Up to a total of 21 operations and maintenance vessels on site at any one time (six CTVs/workboats, three jack-up vessels, four cable repair vessels, four Service Operation Vessels (SOV) or similar and four excavators/backhoe dredgers) • Up to 2,351 operations and maintenance vessel movements (return trips) each year (2,190 CTVs/workboats, 25 jack-up vessels, 16 cable repair vessels, 104 SOV or similar and 16 excavators/backhoe dredgers) • Operational lifetime of up to 35 years.	
Decommissioning phase	• Vessels used for a range of decommissioning activities such as removal of foundations • Sound from vessels assumed to be as per vessel activity described for construction phase above.	

Measures adopted as part of the Morgan Generation Assets

1.8.3.271 The measures adopted as part of the Morgan Generation Assets that are relevant to effects from underwater sound from pre-construction site investigation surveys are outlined in Table 1.60.

Construction and decommissioning phases

Information to support assessment

Auditory injury

1.8.3.272 A detailed underwater sound modelling assessment has been carried out to investigate the potential for injurious and behavioural effects on marine mammals resulting from elevated underwater sound (non-impulsive sound), using the latest criteria (see volume 3, annex 3.1: Underwater sound technical report of the PEIR). A conservative assumption has been made that all individual marine mammals will respond aversively to increases in vessel sound (i.e. that there is no intra or inter-specific variation or context-dependent differences). The distance over which effects may occur will, however, vary according to the species, the ambient sound levels, hearing ability, vertical space use and behavioural response differences.

1.8.3.273 SELs have been estimated for each vessel type based on 24 hours continuous operation, although it is important to note that it is highly unlikely that any marine mammal would stay at a stationary location or within a fixed radius of a vessel for 24 hours. Therefore, the acoustic modelling has been undertaken based on an animal swimming away from the source (or the source moving away from an animal). The sound modelling results indicate that the threshold for PTS was not exceeded for any species for all vessels, drilled piling and all cable burial activities. Therefore, there is no risk of PTS occurring to marine mammals as a result of elevated underwater sound due to vessel use, drilled piling or cable burial activities. Acoustic modelling was conducted for TTS for completeness (see volume 3, annex 3.1: Underwater sound technical report of the PEIR), however ranges indicated are likely to be overestimates. Ranges for TTS were between <15m and 5,700m for vessels, and between <10m and 4,480m for drilled piling and cable burial activities. Whilst the likelihood of auditory injury to animals is considered unlikely, the maximum duration of the construction phase is up to four years (48 months).

Behavioural disturbance

1.8.3.274 Disturbance from vessel sound is likely to occur only where vessel sound associated with the construction of the Morgan Generation Assets exceeds the background ambient sound level. The Morgan Generation Assets is located in a relatively busy shipping area and therefore background sound levels are likely to be relatively high. (see paragraph 1.8.3.269).

1.8.3.275 A detailed underwater sound modelling assessment has been carried out to investigate the potential for behavioural effects on marine mammals resulting from increased vessel sound and other activities. The estimated ranges within which there is a potential for disturbance to marine are presented in Table 1.99.

1.8.3.276 The greatest modelled disturbance range was for survey and support vessels, CTVs, scour/cable protection and seabed preparation/installation vessels, at 21km, for all marine mammal species (Table 1.99). Cable trenching resulted in disturbance ranges of 18km, whilst sandwave clearance, construction and installation, rock placement and cable installation vessels, had disturbance ranges out to 8km. Cable laying also had disturbance ranges of 8km, and tug/anchor handlers had a disturbance range of 6km. In comparison, boulder clearance has the potential to result in a disturbance range of 1km; jack-up rigs had a disturbance range of 10m (0.01km); and drilled piling had a disturbance range of 1.4km.

Table 1.99: Estimated disturbance ranges for marine mammals as a result of vessels and other (non-piling) sound producing activities.

Threshold	Disturbance range (km)
Vessels	
Sandwave clearance, Installation vessel, construction vessel (Dynamic Positioning), rock placement vessel and cable installation vessels	8
Boulder Clearance	1
Tug/anchor handlers, Guard vessels	6
Survey vessel and support vessels, CTVs, Scour/Cable Protection/Seabed Preparation/Installation Vessels	21
Other activities	
Cable trenching	18
Cable laying	8
Jack-up rig	<0.01
Drilled piling	1.4

1.8.3.277 For impulsive sound sources, there is an understanding of the difference between strong and mild disturbance, whereas for non-impulsive (continuous) sound sources, there is only a single available threshold (120dB re 1µPa (rms)), which is classed as the distance beyond which no animals would be disturbed. Given that ranges for disturbance for vessels are presented up to the 120dB re 1µPa (rms) threshold, and there is no distinction between mild and strong disturbance, it can be assumed that not all animals found within those ranges (Table 1.99) would be disturbed. Moreover, for those animals disturbed, there is likely to be a proportional response of animals within the modelled contours (i.e. not all animals will be disturbed to the same extent), although there is no dose-response curve available to apply in the context of vessel disturbance. It is important to note that the life history of an individual and the context will also influence the likelihood of an individual to exhibit an aversive response to sound. It must also be highlighted that these potential impacts will not be continuous over the construction phase, instead carried out over a shorter number of days within the period. Therefore, given the limited quantitative information available, as described above, any simplified calculation would likely lead to an unrealistic overestimation of the number of animals likely to be disturbed. As such, this value has not been quantified.

1.8.3.278 The potential impact, for injury and disturbance, is predicted to be of local spatial extent, medium term duration and intermittent. Given the existing levels of vessel activity in the area, it is expected that marine mammals could tolerate the effects of disturbance without any potential impact on reproduction and survival rates and would return to previous activities once the potential impact had ceased.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

1.8.3.279 As outlined in paragraph 1.8.3.273, there is no risk of PTS on harbour porpoise from vessel use, drilled piling or cable burial activities. With the small ranges for TTS and the distance of Morgan Array Area to this SAC (28.2km), it is unlikely that harbour porpoise will be injured. Since other activities and vessel traffic will be short term duration and intermittent, there is no adverse effects leading to auditory injury for harbour porpoise associated with underwater sound from vessels and other activities for Morgan Generation Assets.

1.8.3.280 Given the distance from the Morgan Generation Assets to the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km to Morgan Array Area), there is no overlap between the potential disturbance impact zone and the SAC and harbour porpoise within the site are unlikely to be disturbed. Activities and vessel movements will be restricted to the Morgan Array Area, and large vessels, producing low frequency sound, will likely follow existing shipping routes. Therefore, a slight increase from the existing levels of traffic in the vicinity of the Morgan Generation Assets may not result in high levels of disturbance and thus, behavioural disturbance is unlikely to be significant (see paragraph 1.8.3.278). Only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC.

1.8.3.281 Therefore, the potential impact is not predicted to result in auditory injury of harbour porpoises and there is negligible risk of behavioural disturbance of harbour porpoises (see volume 2, chapter 9: Marine mammals of the PEIR).

Conclusions

1.8.3.282 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of underwater sound from vessels and other activities. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.7 to 1.8.2.8) is discussed in Table 1.100. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.100: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC for underwater sound generated from vessels and other non-piling activities during the construction and decommissioning phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury and disturbance within range of the SAC, that harbour porpoise are likely to avoid vessels, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of the qualifying species. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the habitats processes or reduce the availability of prey.

1.8.3.283 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

North Channel SAC

Harbour porpoise

1.8.3.284 Underwater sound from vessels and other activities on harbour porpoise features of the North Channel SAC are predicted to be similar to those associated with the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area) outlined in paragraphs 1.8.3.279 to 1.8.3.283. As the North Channel SAC (63.8km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.285 Therefore, the potential impact is not predicted to result in auditory injury of harbour porpoise and there is negligible risk of behavioural disturbance of harbour porpoise.

Conclusions

1.8.3.286 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the North Channel SAC will not occur as a result of underwater sound from vessels and other activities. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.14 to 1.8.2.16) is discussed in Table 1.101. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.101: Conclusions against the conservation objectives of the North Channel SAC for underwater sound generated from vessels and other non-piling activities during the construction and decommissioning phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury and disturbance within range of the SAC, that harbour porpoise are likely to avoid vessels, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of the qualifying species. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the habitats processes or reduce the availability of prey.

1.8.3.287 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Strangford Lough SAC

Harbour seal

1.8.3.288 As outlined in paragraph 1.8.3.273, there is no risk of PTS on harbour seal from vessel use, drilled piling or cable burial activities. With the small ranges for TTS and the distance of Morgan Array Area to this SAC (94.6km), it is unlikely that harbour seal will be injured. Since other activities and vessel traffic will be short term duration and intermittent, there is no adverse effects leading to auditory injury for harbour seal associated with underwater sound from vessels and other activities for Morgan Generation Assets.

1.8.3.289 Given the distance from the Morgan Generation Assets to the Strangford Lough SAC (94.6km to Morgan Array Area), there is no overlap between the potential disturbance impact zone and the SAC and harbour seal within the site are unlikely to be disturbed. Activities and vessel movements will be restricted to the Morgan Array Area and large vessels, producing low frequency sound, will likely follow existing shipping routes. Therefore, a slight increase from the existing levels of traffic in the vicinity of the Morgan Generation Assets may not result in high levels of disturbance and thus, behavioural disturbance is unlikely to be significant (see paragraph 1.8.3.278). Only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC.

1.8.3.290 Therefore, the potential impact is not predicted to result in auditory injury of harbour seals and there is negligible risk of behavioural disturbance of harbour seals.

Conclusions

1.8.3.291 Adverse effects on the qualifying Annex II harbour seal features which undermine the conservation objectives of the Strangford Lough SAC will not occur as a result of underwater sound from vessels and other activities. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraph 1.8.2.21) is discussed in Table 1.102. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.102: Conclusions against the conservation objectives of the Strangford Lough SAC for underwater sound generated from vessels and other non-piling activities during the construction and decommissioning phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the harbour seal population from being maintained or enhanced.
Maintain and enhance, as appropriate, the harbour seal population	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the physical features used by harbour seal within the site. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.3.292 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Strangford Lough SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Murlough SAC

Harbour seal

1.8.3.293 Underwater sound from vessels and other activities on harbour seal features of the Murlough SAC are predicted to be similar to those associated with the Strangford Lough SAC (94.6km from Morgan Array Area) outlined in paragraphs 1.8.3.288 to 1.8.3.292. As the Murlough SAC (98.4km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Strangford Lough SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.294 Therefore, the potential impact is not predicted to result in auditory injury of harbour seal and there is negligible risk of behavioural disturbance of harbour seal.

Conclusions

1.8.3.295 Adverse effects on the qualifying Annex II harbour seal features which undermine the conservation objectives of the Murlough SAC will not occur as a result of underwater sound from vessels and other activities. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraph 1.8.2.26) is discussed in Table 1.103. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.103: Conclusions against the conservation objectives of the Murlough SAC for underwater sound generated from vessels and other non-piling activities during the construction and decommissioning phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the harbour seal population numbers and distribution from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of harbour seal	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the physical features used by harbour seal within the site. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.3.296 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Murlough SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC

Bottlenose dolphin

1.8.3.297 As outlined in paragraph 1.8.3.273, there is no risk of PTS on bottlenose dolphin from vessel use, drilled piling or cable burial activities. With the small ranges for TTS and the distance of Morgan Array Area to this SAC (119.8km), it is unlikely that bottlenose dolphin will be injured. Since other activities and vessel traffic will be short term duration and intermittent, there is no adverse effects leading to auditory injury for bottlenose dolphin associated with underwater sound from vessels and other activities for Morgan Generation Assets.

1.8.3.298 Activities with the largest disturbance ranges, including sandwave clearance installation, construction, rock placement and cable laying vessels will be operating at distances from the coastline of Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC and are unlikely to affect coastal bottlenose dolphin populations. Given the distance from the Morgan Generation Assets to the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km to Morgan Array Area), there is no overlap between the potential disturbance impact zone and the SAC and bottlenose dolphin within the site are unlikely to be disturbed. Activities and vessel movements will be restricted to the Morgan Array Area, and large vessels, producing low frequency sound, will likely follow existing shipping routes. Therefore, a slight increase from the existing levels of traffic in the vicinity of the Morgan Generation Assets may not result in high levels of disturbance and thus, behavioural disturbance is unlikely to be significant (see paragraph 1.8.3.278). Only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC.

1.8.3.299 Therefore, the potential impact is not predicted to result in auditory injury of bottlenose dolphins and there is negligible risk of behavioural disturbance of bottlenose dolphins.

Grey seal

1.8.3.300 As outlined in paragraph 1.8.3.273, there is no risk of PTS on grey seal from vessel use, drilled piling or cable burial activities. With the small ranges for TTS and the distance of Morgan Array Area to this SAC (119.8km), it is unlikely that grey seal will be injured. Since other activities and vessel traffic will be short term duration and intermittent, there is no adverse effects leading to auditory injury for grey seal associated with underwater sound from vessels and other activities for Morgan Generation Assets.

1.8.3.301 Given the distance from the Morgan Generation Assets to the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km to Morgan Array Area), there is no overlap between the potential disturbance impact zone and the SAC and grey seal within the site are unlikely to be disturbed. Activities and vessel movements will be restricted to the Morgan Array Area, and large vessels, producing low frequency sound, will likely follow existing shipping routes. Therefore, a slight increase from the existing levels of traffic in the vicinity of the Morgan Generation Assets may not result in high levels of disturbance and thus, behavioural disturbance is unlikely to be significant (see paragraph 1.8.3.278). Only a small area will be affected when compared to available foraging habitat in the Irish Sea and it will not affect important areas for foraging and reproduction within the SAC.

1.8.3.302 Therefore, the potential impact is not predicted to result in auditory injury of grey seals and there is negligible risk of behavioural disturbance of grey seals.

Conclusions

1.8.3.303 Adverse effects on the qualifying Annex II bottlenose dolphin and grey seal features which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC will not occur as a result of underwater sound from vessels and other activities. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.36 to 1.8.2.47) is discussed in Table 1.104. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.104: Conclusions against the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC for underwater sound generated from vessels and other non-piling activities during the construction and decommissioning phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the populations of bottlenose dolphin and grey seal from being maintained on a long-term basis as a viable component of their natural habitats. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not reduce nor likely reduce for the foreseeable future the natural ranges of the populations of bottlenose dolphin and grey seal.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of bottlenose dolphin and grey seal. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of bottlenose dolphin and grey seal.

1.8.3.304 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

The Maidens SAC

Grey seal

1.8.3.305 Underwater sound from vessels and other activities on grey seal features of The Maidens SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.300 to 1.8.3.304. As The Maidens SAC (141.8km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.306 Therefore, the potential impact is not predicted to result in auditory injury of grey seal and there is negligible risk of behavioural disturbance of grey seal.

Conclusions

1.8.3.307 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of The Maidens SAC will not occur as a result of underwater sound from vessels and other activities. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraph 1.8.2.52) is discussed in Table 1.105. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.105: Conclusions against the conservation objectives of The Maidens SAC for underwater sound generated from vessels and other non-piling activities during the construction and decommissioning phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the grey seal feature to favourable condition	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the grey seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the grey seal population numbers and distribution from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of grey seal	
Maintain and enhance, as appropriate, physical features used by grey seal within the site	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the physical features used by grey seal within the site. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will prevent physical features used by grey seal within the site from being maintained or enhance.

1.8.3.308 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of The Maidens SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Cardigan Bay/Bae Ceredigion SAC

Bottlenose dolphin

1.8.3.309 Underwater sound from vessels and other activities on bottlenose dolphin features of the Cardigan Bay/Bae Ceredigion SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.300 to 1.8.3.304. As the Cardigan Bay/Bae Ceredigion SAC (188.2km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.310 Therefore, the potential impact is not predicted to result in auditory injury of bottlenose dolphins and there is negligible risk of behavioural disturbance of bottlenose dolphins.

Conclusions

1.8.3.311 Adverse effects on the qualifying Annex II bottlenose dolphin features which undermine the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC will not occur as a result of underwater sound from vessels and other activities. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.58 to 1.8.2.69) is discussed in Table 1.106. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.106: Conclusions against the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC for underwater sound generated from vessels and other non-piling activities during the construction and decommissioning phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the population of bottlenose dolphin from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not reduce nor likely reduce for the foreseeable future the natural range of the population of bottlenose dolphin.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of bottlenose dolphin. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the population of bottlenose dolphin.

1.8.3.312 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.3.313 Underwater sound from vessels and other activities on grey seal features of the Pembrokeshire Marine/Sir Benfro Forol SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.300 to 1.8.3.304. As the Pembrokeshire Marine/Sir Benfro Forol SAC (237.6km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.314 Therefore, the potential impact is not predicted to result in auditory injury of grey seals and there is negligible risk of behavioural disturbance of grey seals.

Conclusions

1.8.3.315 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of underwater sound from vessels and other activities. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.75 to 1.8.2.85) is discussed in Table 1.107. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.107: Conclusions against the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC for underwater sound generated from vessels and other non-piling activities during the construction and decommissioning phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the population of grey seal from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not reduce nor likely reduce for the foreseeable future the natural range of the population of grey seal.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of grey seal. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the population of grey seal.

1.8.3.316 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

1.8.3.317 Underwater sound from vessels and other activities on harbour porpoise features of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC are predicted to be similar to those associated with the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area) outlined in paragraphs 1.8.3.279 to 1.8.3.283. As the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC (300.1km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets

than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.318 Therefore, the potential impact is not predicted to result in auditory injury of harbour porpoise and there is negligible risk of behavioural disturbance of harbour porpoise.

Conclusions

1.8.3.319 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC will not occur as a result of underwater sound from vessels and other activities. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.90 to 1.8.2.92) is discussed in Table 1.108. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.108: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC for underwater sound generated from vessels and other non-piling activities during the construction and decommissioning phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury and disturbance within range of the SAC, that harbour porpoise are likely to avoid vessels, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of the qualifying species. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the habitats processes or reduce the availability of prey.

1.8.3.320 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Lundy SAC

Grey seal

1.8.3.321 Underwater sound from vessels and other activities on grey seal features of the Lundy SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.300 to 1.8.3.304. As the Lundy SAC (334.9km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.322 Therefore, the potential impact is not predicted to result in auditory injury of grey seal and there is negligible risk of behavioural disturbance of grey seal.

Conclusions

1.8.3.323 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Lundy SAC will not occur as a result of underwater sound from vessels and other activities. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.97 and 1.8.2.98) is discussed in Table 1.109. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.109: Conclusions against the conservation objectives of the Lundy SAC for underwater sound generated from vessels and other non-piling activities during the construction and decommissioning phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of the grey seal neither on the habitats structure, function and supporting processes. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of grey seal from being maintained or restored or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the population and distribution of grey seal from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.3.324 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lundy SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Isles of Scilly Complex SAC

Grey seal

1.8.3.325 Underwater sound from vessels and other activities on grey seal features of the Isles of Scilly Complex SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.300 to 1.8.3.304. As the Isles of Scilly Complex SAC (465km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.326 Therefore, the potential impact is not predicted to result in auditory injury of grey seal and there is negligible risk of behavioural disturbance of grey seal.

Conclusions

1.8.3.327 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Isles of Scilly Complex SAC will not occur as a result of underwater sound from vessels and other activities. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.104 and 1.8.2.105) is discussed in Table 1.110. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.110: Conclusions against the conservation objectives of the Isles of Scilly Complex SAC for underwater sound generated from vessels and other non-piling activities during the construction and decommissioning phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of the grey seal neither on the habitats structure, function and supporting processes. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of grey seal from being maintained or restored or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the population and distribution of grey seal from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.3.328 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Isles of Scilly Complex SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Sites assessed in line with the iterative approach

1.8.3.329 As outlined in paragraphs 1.8.1.3 to 1.8.1.8, following the iterative approach adopted for this HRA Stage 2 ISAA Report, the closest European site to the Morgan Generation Assets within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment in the sections above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA Report, are located at a greater distance from the Morgan Generation Assets and, on this basis, it is considered that effects on the marine mammal features of these sites would be of similar if not lower magnitude than those concluded for the sites subject to a full assessment. The conclusions of the assessments presented in paragraphs 1.8.3.279 to 1.8.3.328 are, therefore, deemed to be applicable for the remaining sites presented below in paragraphs 1.8.3.330 to 1.8.3.352.

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.3.330 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Cardigan Bay/Bae Ceredigion SAC

Grey seal

1.8.3.331 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs 1.8.3.300 to 1.8.3.304), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Rockabill to Dalkey Island SAC

1.8.3.332 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Rockabill to Dalkey Island SAC as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Saltee Islands SAC

1.8.3.333 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs 1.8.3.300 to 1.8.3.304), it can be concluded that there is no risk of an adverse effect on the integrity of the Saltee Islands SAC as a result of underwater sound vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Roaringwater Bay and Islands SAC

1.8.3.334 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Roaringwater Bay and Islands SAC as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Blasket Islands SAC

1.8.3.335 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Blasket Islands SAC as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Mers Celtiques - Talus du golfe de Gascogne SCI

1.8.3.336 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Mers Celtiques - Talus du golfe de Gascogne SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Abers - Côte des legends SCI

1.8.3.337 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Abers - Côte des legends SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Ouessant-Molène SCI

1.8.3.338 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ouessant-Molène SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Côte de Granit rose-Sept-Iles SCI

1.8.3.339 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côte de Granit rose-Sept-Iles SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Anse de Goulven, dunes de Keremma SCI

1.8.3.340 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Goulven, dunes de Keremma SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Tregor Goëlo SCI

1.8.3.341 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Tregor Goëlo SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Côtes de Crozon SCI

1.8.3.342 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côtes de Crozon SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Chaussée de Sein SCI

1.8.3.343 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Chaussée de Sein SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Cap Sizun SCI

1.8.3.344 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap Sizun SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Récifs du talus du golfe de Gascogne SCI

1.8.3.345 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Récifs du talus du golfe de Gascogne SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Anse de Vauville SCI

1.8.3.346 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Vauville SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Cap d'Erquy-Cap Fréhel SCI

1.8.3.347 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap d'Erquy-Cap Fréhel SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Baie de Saint-Brieuc – Est SCI

1.8.3.348 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Saint-Brieuc – Est

SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Banc et récifs de Surtainville SCI

1.8.3.349 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Banc et récifs de Surtainville SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.8.3.350 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Estuaire de la Rance SCI

1.8.3.351 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Estuaire de la Rance SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Baie du Mont Saint-Michel SCI

1.8.3.352 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.279 to 1.8.3.287), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie du Mont Saint-Michel SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets alone.

Operations and maintenance phase

Information to support assessment

1.8.3.353 The uplift in vessel activity during the operations and maintenance is considered to be relatively small in the context of the baseline levels of vessel traffic in the Morgan marine mammal study area. Presence of the operational wind farm Morgan Generations Assets may divert some of the shipping routes and therefore, current traffic within the Morgan Array Area, which is not associated with Morgan Generation Assets, is likely to be reduced. It is likely that this reduction will be ultimately counterbalanced by presence of maintenance vessels. Vessel movements will be within the Morgan Array Area will follow the provisions for vessels and vessel movements within the EMP.

1.8.3.354 The size and sound outputs from vessels during the operations and maintenance phase will be similar to those used in the construction phase and therefore will result in a similar spatial MDS. However, the number of vessel round trips and their frequency is much lower for the operations and maintenance phase compared to the construction phase.

1.8.3.355 An overview of potential impacts for auditory injury and behavioural disturbance to marine mammals from elevated underwater sound due to vessel use and other activities is described in paragraphs 1.8.3.278 to 1.8.3.281 for the construction phase with similar impact ranges and have not been reiterated here for the operations and maintenance phase. The potential impacts are predicted to be of local spatial extent, long term duration and intermittent.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

1.8.3.356 On the basis of the rationale outlined in paragraphs 1.8.3.272 to 1.8.3.278 for the contruction phase potential impact, and the lower number of vessels and other activities associated with the operations and maintenance phase compared to the construction phase, it is considered that effects would be of similar if not of a lower magnitude than during construction phase.

1.8.3.357 Therefore, the potential impact is not predicted to result in auditory injury of harbour porpoises and there is negligible risk of behavioural disturbance of harbour porpoises.

Conclusions

1.8.3.358 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of underwater sound from vessels and other activities during operations and maintenance. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.7 to 1.8.2.8) is discussed in Table 1.111. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.111: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC for underwater sound generated from vessels and other non-piling activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury and disturbance within range of the SAC, that harbour porpoise are likely to avoid vessels, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of the qualifying species. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the condition of the habitats and their processes and the availability of prey from being maintained.

1.8.3.359 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

North Channel SAC

Harbour porpoise

1.8.3.360 Potential impacts of underwater sound from vessels and other activities on harbour porpoise features of the North Channel SAC are predicted to be similar to those associated with the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area) outlined in paragraph 1.8.3.356 to 1.8.3.359. As the North Channel SAC (63.8km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.361 Therefore, the potential impact is not predicted to result in auditory injury of harbour porpoise and there is negligible risk of behavioural disturbance of harbour porpoise.

Conclusions

1.8.3.362 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the North Channel SAC will not occur as a result of underwater sound from vessels and other activities during operations and maintenance. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.14 to 1.8.2.16) is discussed in Table 1.112. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.112: Conclusions against the conservation objectives of the North Channel SAC for underwater sound generated from vessels and other non-piling activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury and disturbance within range of the SAC, that harbour porpoise are likely to avoid vessels, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of the qualifying species. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the condition of the habitats and their processes and the availability of prey from being maintained.

1.8.3.363 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Strangford Lough SAC

Harbour seal

1.8.3.364 On the basis of the rationale outlined in paragraphs 1.8.3.288 to 1.8.3.290 for the construction phase potential impact and the lower number of vessels and other activities associated with the operations and maintenance phase compared to the construction phase, it is considered that effects would be of similar if not of a lower magnitude than during construction phase.

1.8.3.365 Therefore, the potential impact is not predicted to result in auditory injury of harbour seals and there is negligible risk of behavioural disturbance of harbour seals.

Conclusions

1.8.3.366 Adverse effects on the qualifying Annex II harbour seal features which undermine the conservation objectives of the Strangford Lough SAC will not occur as a result of underwater sound from vessels and other activities during operations and maintenance. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraph 1.8.2.21) is discussed in Table 1.113. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.113: Conclusions against the conservation objectives of the Strangford Lough SAC for underwater sound generated from vessels and other non-piling activities during the operations and maintenance phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the harbour seal population from being maintained or enhanced.
Maintain and enhance, as appropriate, the harbour seal population	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the physical features used by harbour seal within the site. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.3.367 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Strangford Lough SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Murlough SAC

Harbour seal

1.8.3.368 Potential impacts of underwater sound from vessels and other activities on harbour seal features of the Murlough SAC are predicted to be similar to those associated with the Strangford Lough SAC (94.6km from Morgan Array Area) outlined in paragraph 1.8.3.364 to 1.8.3.367. As the Murlough SAC (98.4km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Strangford Lough SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.369 Therefore, the potential impact is not predicted to result in auditory injury of harbour seals and there is negligible risk of behavioural disturbance of harbour seals.

Conclusions

1.8.3.370 Adverse effects on the qualifying Annex II harbour seal features which undermine the conservation objectives of the Murlough SAC will not occur as a result of underwater sound from vessels and other activities during operations and maintenance. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraph 1.8.2.26) is discussed in Table 1.114. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.114: Conclusions against the conservation objectives of the Murlough SAC for underwater sound generated from vessels and other non-piling activities during the operations and maintenance phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the population and distribution of harbour seal from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of harbour seal	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the physical features used by harbour seal within the site. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.3.371 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Murlough SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC

Bottlenose dolphin

1.8.3.372 On the basis of the rationale outlined in paragraphs 1.8.3.297 to 1.8.3.299 for the construction phase potential impact, and the lower number of vessels and other activities associated with the operations and maintenance phase compared to the construction phase, it is considered that effects would be of similar if not of a lower magnitude than during construction phase.

1.8.3.373 Therefore, the potential impact is not predicted to result in auditory injury of bottlenose dolphins and there is negligible risk of behavioural disturbance of bottlenose dolphins.

Grey seal

1.8.3.374 On the basis of the rationale outlined in paragraphs 1.8.3.300 to 1.8.3.302 for the construction phase potential impact, and the lower number of vessels and other activities associated with the operations and maintenance phase compared to the construction phase, it is considered that effects would be of similar if not of a lower magnitude than during construction phase.

1.8.3.375 Therefore, the potential impact is not predicted to result in auditory injury of grey seals and there is negligible risk of behavioural disturbance of grey seals.

Conclusions

1.8.3.376 Adverse effects on the qualifying Annex II bottlenose dolphin and grey seal features which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC will not occur as a result of underwater sound from vessels and other activities during operations and maintenance. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.36 to 1.8.2.47) is discussed in Table 1.115. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.115: Conclusions against the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC for underwater sound generated from vessels and other non-piling activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the populations of bottlenose dolphin and grey seal from being maintained on a long-term basis as a viable component of their natural habitats. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not reduce nor likely reduce for the foreseeable future the natural range of the populations of bottlenose dolphin and grey seal.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of bottlenose dolphin and grey seal. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of bottlenose dolphin and grey seal.

1.8.3.377 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

The Maidens SAC

Grey seal

1.8.3.378 Potential impacts of underwater sound from vessels and other activities on grey seal features of The Maidens SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.372 to 1.8.3.377. As The Maidens SAC (141.8km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.379 Therefore, the potential impact is not predicted to result in auditory injury of grey seals and there is negligible risk of behavioural disturbance of grey seals.

Conclusions

1.8.3.380 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of The Maidens SAC will not occur as a result of underwater sound from vessels and other activities during operations and maintenance. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraph 1.8.2.52) is discussed in Table 1.116. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.116: Conclusions against the conservation objectives of The Maidens SAC for underwater sound generated from vessels and other non-piling activities during the operations and maintenance phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the grey seal feature to favourable condition	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the grey seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the population and distribution of grey seal from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of grey seal	
Maintain and enhance, as appropriate, physical features used by grey seal within the site	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the physical features used by grey seal within the site. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will prevent physical features used by grey seal within the site from being maintained or enhance.

1.8.3.381 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of The Maidens SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Cardigan Bay/Bae Ceredigion SAC

Bottlenose dolphin

1.8.3.382 Potential impacts of underwater sound from vessels and other activities on bottlenose dolphin features of the Cardigan Bay/Bae Ceredigion SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.372 to 1.8.3.377. As the Cardigan Bay/Bae Ceredigion SAC (188.2km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.383 Therefore, the potential impact is not predicted to result in auditory injury of bottlenose dolphins and there is negligible risk of behavioural disturbance of bottlenose dolphins.

Conclusions

1.8.3.384 Adverse effects on the qualifying Annex II bottlenose dolphin features which undermine the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC will not occur as a result of underwater sound from vessels and other activities during operations and maintenance. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.58 to 1.8.2.69) is discussed in Table 1.117. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.117: Conclusions against the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC for underwater sound generated from vessels and other non-piling activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the population of bottlenose dolphin from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not reduce nor likely reduce for the foreseeable future the natural range of the population of bottlenose dolphin.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of bottlenose dolphin. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the population of bottlenose dolphin.

1.8.3.385 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.3.386 Potential impacts of underwater sound from vessels and other activities on grey seal features of the Pembrokeshire Marine/Sir Benfro Forol SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.372 to 1.8.3.377. As the Pembrokeshire Marine/Sir Benfro Forol SAC (237.6km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.387 Therefore, the potential impact is not predicted to result in auditory injury of grey seals and there is negligible risk of behavioural disturbance of grey seals.

Conclusions

1.8.3.388 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of underwater sound from vessels and other activities during operations and maintenance. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.75 to 1.8.2.85) is discussed in Table 1.118. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.118: Conclusions against the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC for underwater sound generated from vessels and other non-piling activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the population of grey seal from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not reduce nor likely reduce for the foreseeable future the natural range of the population of grey seal.
Important elements are population size, structure, production, and condition of the species within the site	
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of grey seal. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of grey seal.

1.8.3.389 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

1.8.3.390 Underwater sound from vessels and other activities on harbour prpoise features of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC are predicted to be similar to those associated with the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area) outlined in paragraphs 1.8.3.356 to 1.8.3.359. As the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC (300.1km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.391 Therefore, the potential impact is not predicted to result in auditory injury of harbour porpoise and there is negligible risk of behavioural disturbance of harbour porpoise.

Conclusions

1.8.3.392 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC will not occur as a result of underwater sound from vessels and other activities during operations and maintenance. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.90 to 1.8.2.92) is discussed in Table 1.119. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.119: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC for underwater sound generated from vessels and other non-piling activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury and disturbance within range of the SAC, that harbour porpoise are likely to avoid vessels, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of the qualifying species. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the condition of the habitats and their processes and the availability of prey from being maintained.

1.8.3.393 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Lundy SAC

Grey seal

1.8.3.394 Potential impacts of underwater sound from vessels and other activities on grey seal features of the Lundy SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.372 to 1.8.3.377. As the Lundy SAC (334.9km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.395 Therefore, the potential impact is not predicted to result in auditory injury of grey seals and there is negligible risk of behavioural disturbance of grey seals.

Conclusions

1.8.3.396 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Lundy SAC will not occur as a result of underwater sound from vessels and other activities during operations and maintenance. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.97 and 1.8.2.98) is discussed in Table 1.120. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.120: Conclusions against the conservation objectives of the Lundy SAC for underwater sound generated from vessels and other non-piling activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of grey seal neither on the habitats structure, function and supporting processes. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of grey seal or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the population and distribution of grey seal within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.3.397 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lundy SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Isles of Scilly Complex SAC

Grey seal

1.8.3.398 Potential impacts of underwater sound from vessels and other activities on grey seal features of the Isles of Scilly Complex SAC are predicted to be similar to those associated with the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (119.8km from Morgan Array Area) outlined in paragraphs 1.8.3.372 to 1.8.3.377. As the Isles of Scilly Complex SAC (465km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, it is considered that effects would be of similar if not of a lower magnitude.

1.8.3.399 Therefore, the potential impact is not predicted to result in auditory injury of grey seals and there is negligible risk of behavioural disturbance of grey seals.

Conclusions

1.8.3.400 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Isles of Scilly Complex SAC will not occur as a result of underwater sound from vessels and other activities during operations and maintenance. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.104 and 1.8.2.105) is discussed in Table 1.121. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.121: Conclusions against the conservation objectives of the Isles of Scilly Complex SAC for underwater sound generated from vessels and other non-piling activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound from vessels and other activities to result in adverse effects on the habitats of grey seal neither on the habitats structure, function and supporting processes. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the extent, distribution, structure and function of the habitats of grey seal or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that there is no potential for injury and disturbance within range of the SAC, the existing level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets will not prevent the population and distribution of grey seal within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.3.401 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Isles of Scilly Complex SAC as a result of underwater sound from vessels and other activities from the Morgan Generation Assets alone.

Sites assessed in line with the iterative approach

1.8.3.402 As outlined in paragraphs 1.8.1.3 to 1.8.1.8, following the iterative approach adopted for this HRA Stage 2 ISAA Report, the closest European site to the Morgan Generation Assets within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment in the sections above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA Report, are located at a greater distance from the Morgan Generation Assets and, on this basis, it is considered that effects on the marine mammal features of these sites would be of similar if not lower magnitude than those concluded for the sites subject to a full assessment. The conclusions of the assessments presented in paragraphs 1.8.3.356 to 1.8.3.401 are, therefore, deemed to be applicable for the remaining sites presented below in paragraphs 1.8.3.403 to 1.8.3.425.

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.3.403 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Cardigan Bay/Bae Ceredigion SAC

Grey seal

1.8.3.404 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs 1.8.3.372 to 1.8.3.377), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Rockabill to Dalkey Island SAC

1.8.3.405 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Rockabill to Dalkey Island SAC as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Saltee Islands SAC

1.8.3.406 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs 1.8.3.372 to 1.8.3.377), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Saltee Islands SAC as a result of underwater sound vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Roaringwater Bay and Islands SAC

1.8.3.407 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Roaringwater Bay and Islands SAC as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Blasket Islands SAC

1.8.3.408 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Blasket Islands SAC as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Mers Celtiques - Talus du golfe de Gascogne SCI

1.8.3.409 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Mers Celtiques - Talus du golfe de Gascogne SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Abers - Côte des legends SCI

1.8.3.410 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Abers - Côte des legends SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Ouessant-Molène SCI

1.8.3.411 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ouessant-Molène SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Côte de Granit rose-Sept-Iles SCI

1.8.3.412 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côte de Granit rose-Sept-Iles SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Anse de Goulven, dunes de Keremma SCI

1.8.3.413 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Goulven, dunes de Keremma SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Tregor Goëlo SCI

1.8.3.414 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Tregor Goëlo SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Côtes de Crozon SCI

1.8.3.415 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côtes de Crozon SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Chaussée de Sein SCI

1.8.3.416 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Chaussée de Sein SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Cap Sizun SCI

1.8.3.417 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap Sizun SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Récifs du talus du golfe de Gascogne SCI

1.8.3.418 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Récifs du talus du golfe de Gascogne SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Anse de Vauville SCI

1.8.3.419 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Vauville SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Cap d'Erquy-Cap Fréhel SCI

1.8.3.420 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap d'Erquy-Cap Fréhel SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Baie de Saint-Brieuc – Est SCI

1.8.3.421 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Saint-Brieuc – Est SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Banc et récifs de Surtainville SCI

1.8.3.422 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Banc et récifs de Surtainville SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.8.3.423 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Estuaire de la Rance SCI

1.8.3.424 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Estuaire de la Rance SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Baie du Mont Saint-Michel SCI

1.8.3.425 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the

North Channel SAC (paragraphs 1.8.3.356 to 1.8.3.363), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie du Mont Saint-Michel SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets alone.

Changes in prey availability

1.8.3.426 There is the potential for changes in marine mammal prey (e.g. fish species) abundance and distribution to arise as a result of construction and decommissioning activities which physically disturb the seabed, result in increased suspended sediment concentrations (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 Generation Assets. 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).

1.8.3.427 The HRA Stage 1 Screening Report concluded that any potential temporary changes to the fish community in the vicinity of the Morgan Array Area as a result of construction and decommissioning potential impacts such as underwater sound, are unlikely to result in significant effects to Annex II marine mammal features given that the majority of potential 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. As such, no LSEs were anticipated to occur as a result of changes in prey availability to Annex II marine mammal features with the exception of the North Anglesey Marine/Gogledd Môn Forol SAC and North Channel SAC which was screened in on a precautionary basis.

1.8.3.428 The potential for any adverse effects on prey were screened out for the operations and maintenance phase as effects are considered to be significantly reduced compared to the construction phase as underwater sound will be substantially lower (i.e. no piling will be required).

1.8.3.429 The MDS considered for the assessment of potential impacts on Annex marine mammal features from changes in prey availability is presented in Table 1.122.

Table 1.122: Maximum design scenario considered for the assessment of potential impacts on marine mammals from changes in prey availability during the construction phase.

Phase	Maximum design scenario	Justification
Construction phase	• As described in volume 2, chapter 8: Fish and shellfish ecology of the PEIR for: – Temporary habitat loss/disturbance – Long term habitat loss/disturbance – Increased suspended sediment concentrations and associated sediment deposition – Injury and/or disturbance to fish and shellfish from underwater sound and vibration.	As described in volume 2, chapter 8: Fish and shellfish ecology of the PEIR.
Decommissioning phase	• As described in volume 2, chapter 8: Fish and shellfish ecology of the PEIR for: – Temporary habitat loss/disturbance – Long term habitat loss/disturbance – Increased suspended sediment concentrations and associated sediment deposition • Injury and/or disturbance to fish and shellfish from underwater sound and vibration.	

Measures adopted as part of the Morgan Generation Assets

1.8.3.430 The measures adopted as part of the Morgan Generation Assets that are relevant to effects from changes in prey availablity are outlined in Table 1.123.

Table 1.123: Measures adopted as part of the project relevant to the assessment of adverse effect on European sites designated for Annex II marine mammal features from changes in prey availability.

Measure	Justification	How the measure will be secured
Tertiary measures: Measures required to meet legislative requirements, or adopted standard industry practice		
Development of, and adherence to, an EMP, including Marine Pollution Contingency Plan (MPCP).	To ensure that the potential for release of pollutants during construction, operations and maintenance, and decommissioning phases are minimised. These will likely include designated areas for refuelling where spillages can be easily contained, storage of chemicals in secure designated areas in line with appropriate regulations and guidelines, double skinning of pipes and takes containing hazardous substances, and storage of these substances in impenetrable bunds. The MPCP will ensure that in the unlikely event that a pollution even occurs, that plans are in place to respond quickly and effectively to ensure any spillage is minimised and effects on the environment are ideally avoided or minimised. Implementation of these measures will ensure that accidental release of contaminants from vessels will be avoided or minimised, thus providing protection for marine life across all phases of Morgan Generation Assets.	Proposed to be secured through a condition in the marine licence(s).
Development of, and adherence to, a Decommissioning Plan.	The aim of this plan is to adhere to the existing UK and international legislation and guidance. Overall, this will ensure the legacy of the Morgan Generation Assets will result in the minimum amount of long-term disturbance to the environment.	Requirement for a Decommissioning Plan is proposed to be secured as a requirement of the DCO.

Construction and decommissioning phases

Information to support assessment

1.8.3.431 As outlined in the volume 2, chapter 9: Marine mammals of the PEIR the key prey species for Annex II marine mammals include small shoaling fish from demersal or

pelagic habitats, particularly gadoids (e.g. cod *Gadus morhua*, haddock *Melanogrammus aeglefinus*, whiting *Merlangius merlangus*), whiting *Trispoterus* spp, clupeids (herring), European sprat, sandeels, mackerel (*Scomber scombrus*), flatfish (plaice *Pleuronectes platessa*, sole, flounder, dab) and cephalopods.

1.8.3.432 Marine mammals exploit a range of different prey items and can forage widely and change prey sources, sometimes covering extensive distances. Given that the potential impacts of construction to prey resources will be localised and largely restricted to the boundaries of the Morgan Generation Assets, only a small area will be affected when compared to available foraging habitat in the Irish and Celtic Seas. The fish and shellfish communities found around Morgan Array Area are characteristic of the fish and shellfish assemblages in the wider Irish Sea and it is therefore reasonable to assume that, due to the highly mobile nature of marine mammals, there will be similar prey resources available in the wider area. There may be an energetic cost associated with increased travelling and two species, harbour porpoise and harbour seal, may be particularly vulnerable to this effect. Harbour porpoise has a high metabolic rate and only a limited energy storage capacity, which limits their ability to buffer against diminished food (Rojano-Doñate *et al*., 2018). Conversely, harbour seal typically forage close to haul out sites, (i.e. within nearest 50km). Despite this, if animals do have to travel further to alternative foraging grounds, the potential impacts are expected to be short term in nature and reversible. It is expected that all marine mammal receptors would be able to tolerate the effect without any potential impact on reproduction and survival rates and would be able to return to previous activities once the potential impact had ceased.

1.8.3.433 Potential impacts on the marine mammal prey species outlined above during the construction and decommissioning phase have been assessed in volume 2, chapter 8: Fish and shellfish ecology of the PEIR using the appropriate MDSs for these receptors. Construction potential impacts which may have indirect effects on marine mammals include temporary and long-term habitat loss/disturbance, underwater sound impacting fish and shellfish receptors, increased SSCs and associated sediment deposition, EMFs from subsea electrical cabling and colonisation of hard structures.

1.8.3.434 The installation and removal of infrastructure within the Morgan Generation Assets may lead to temporary subtidal habitat loss/disturbance. There is the potential for temporary and habitat loss/disturbance to affect up to 87,360,220m^2 of subtidal seabed during the construction phase, which equates to 33.2% of the area within the Morgan Array Area overall, although only a small proportion of this will be impacted at any one time.

1.8.3.435 Habitat loss/disturbance could potentially affect spawning, nursery or feeding grounds of fish and shellfish receptors, which will impact those feeding higher up the food chain. However, as suggested in volume 2, chapter 8: Fish and shellfish ecology of the PEIR, only a small proportion of the maximum footprint of habitat loss/disturbance may be affected at any one time during the construction phase and areas will start to recover immediately after cessation of construction activities in the vicinity. Additionally, habitat disturbance during the construction phase will also expose benthic infaunal species from the sediment, potentially offering foraging opportunities to some fish and shellfish species (e.g. opportunistic scavenging species) immediately after completion of works.

1.8.3.436 There is also the potential for underwater sound during construction pile-driving to result in injury and/or disturbance to fish and shellfish communities. However for auditory injury for most fish, the potential impact was predicted to be of regional spatial extent, medium term duration, intermittent and high reversibility, and is unlikely to lead to significant mortality due to primary mitigation. However, volume 2, chapter 8: Fish and shellfish ecology of the PEIR concluded that for all species, the potential impact would be minor adverse, including herring due to the small overlap in spawning habitats and modelling based on peak spawning periods for herring (see volume 2, chapter 8: Fish and shellfish ecology of the PEIR).

1.8.3.437 With respect to underwater sound, marine mammals occurring within the predicted impact areas for fish and shellfish also have the potential to be directly affected as a result of potential impacts such as injury and disturbance from elevated underwater sound during piling and it is likely that the effects to prey resources (e.g. behavioural displacement) will occur over a similar, or lesser, extent and duration as those for marine mammals. There would, therefore, be no additional displacement of marine mammals as a result of any changes in prey resources during construction, as they would already be potentially disturbed as a result of underwater sound during piling. In addition, as prey resources are displaced from the areas of potential impact, marine mammals are likely to follow in order to exploit these resources.

1.8.3.438 Other potential impacts included increased SSCs and associated sediment deposition which may result in short-term avoidance of affected areas by fish and shellfish. Adult fish have high mobility and may show avoidance behaviour in areas of high sedimentation (EMU, 2004), however, there may be potential impacts on the hatching success of fish and shellfish larvae and consequential effects on the viability of spawning stocks due to limited mobility (Bisson and Bilby, 1982; Berli *et al*., 2014). However, most fish juveniles expected to occur around the Morgan Array Area will be largely unaffected by the relatively low-level temporary increases in SSC and potential impacts will be short in duration, returning to background levels relatively quickly, and the effect is predicted to be minor which will not impact marine mammals.

1.8.3.439 No adverse effects were predicted to occur to fish and shellfish species (marine mammal prey) as a result of the construction of the Morgan Generation Assets (see volume 2, chapter 8: Fish and shellfish ecology of the PEIR). Therefore, changes in prey availability on marine mammals were predicted to be of local spatial extent, medium-term duration, intermittent and high reversibility.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

1.8.3.440 The potential impacts of construction and decommissioning will be highly localised and largely restricted to the boundaries of the Morgan Generation Assets, only a small area will be affected when compared to available foraging habitat in the Irish Sea. Harbour porpoise feed on a variety of prey including gobies, sandeel, whiting, herring and sprat (Santos and Pierce, 2003; Aarfjord, 1995). There may be an energetic cost associated with increased travelling and due to harbour porpoise high metabolic rate (see paragraph 1.8.3.432), this species may be particularly vulnerable to this effect. However, harbour porpoises have a widespread distribution and individuals have been documented either switching to different prey species depending on the prey availability (Santos and Pierce, 2003) or moving relatively large distances on a daily basis (Nielsen *et al*., 2013). Based on findings of Benhemma-Le Gall *et al*. (2021), it can be anticipated that harbour porpoise can compensate for any resulting loss in

energy intake by increasing foraging activities beyond impact zone. The availability of wider suitable habitat across the CIS MU suggest that individuals may move to alternative foraging grounds without affecting animals health.

1.8.3.441 As outlined in paragraph 1.8.3.278, no adverse effects were predicted to occur to fish and shellfish species (marine mammal prey) as a result of the construction of the Morgan Generation Assets (see volume 2, chapter 8: Fish and shellfish ecology of the PEIR).

1.8.3.442 Therefore, the potential impact is not predicted to result in adverse effects (i.e. disruption to foraging) for harbour porpoise.

Conclusions

1.8.3.443 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of changes in prey availability. An assessment of the potential impact of changes in prey availability against each relevant conservation objective (as presented in paragraphs 1.8.2.7 to 1.8.2.8) is discussed in Table 1.124. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.124: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC for changes in prey availability during the construction phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Harbour porpoise may be affected in response to changes in prey availability in the vicinity of the Morgan Array Area, however potential impacts to prey species are predicted to be localised, short term and intermittent, and harbour porpoise are expected to adapt and recover quickly. As such there is a negligible risk of disruption of foraging activities of harbour porpoise. Therefore, changes in prey availability associated with the Morgan Generation Assets will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, changes in prey availability associated with the Morgan Generation Assets will not significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	There is no pathway for changes in prey availability to result in adverse effects on the habitats of harbour porpoise and there are no adverse effects expected for fish and shellfish species. Therefore, changes in prey availability associated with the Morgan Generation Assets will not prevent the condition of habitats and their processes and the availability of prey from being maintained.

1.8.3.444 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of changes in prey availability from the Morgan Generation Assets alone.

North Channel SAC

Harbour porpoise

1.8.3.445 Potential impacts of changes in prey availability on harbour porpoise features of the North Channel SAC are predicted to be similar to those associated with the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area) outlined in paragraphs 1.8.3.440 to 1.8.3.444. As the North Channel SAC (63.8km from Morgan Array Area) is located at an increased distance from the Morgan Generation Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not of a lower magnitude.

Conclusions

1.8.3.446 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the North Channel SAC will not occur as a result of changes in prey availability. An assessment of the potential impact of changes in prey availability against each relevant conservation objective (as presented in paragraphs 1.8.2.14 to 1.8.2.16) is discussed in Table 1.125. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.125: Conclusions against the conservation objectives of the North Channel SAC for changes in prey availability during the construction phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Harbour porpoise may be affected in response to changes in prey availability in the vicinity of the Morgan Array Area, however potential impacts to prey species are predicted to be localised, short term and intermittent, and harbour porpoise are expected to adapt and recover quickly. As such there is a negligible risk of disruption of foraging activities of harbour porpoise. Therefore, changes in prey availability associated with the Morgan Generation Assets will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, changes in prey availability associated with the Morgan Generation Assets will not significantly disturb harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	There is no pathway for changes in prey availability to result in adverse effects on the habitats of harbour porpoise and there are no adverse effects expected for fish and shellfish species. Therefore, changes in prey availability associated with the Morgan Generation Assets will not prevent the condition of habitats and their processes and the availability of prey from being maintained.

1.8.3.447 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result of changes in prey availability from the Morgan Generation Assets alone.

1.8.4 Assessment of adverse effects in-combination

1.8.4.1 The other developments (projects/plans) that could result in in-combination effects associated with the Morgan Generation Assets on Annex II marine mammal features of the designated sites identified have been summarised Table 1.126 and shown in Figure 1.10.

1.8.4.2 As outlined in the HRA Stage 1 Screening Report where the potential for LSE has been concluded with respect to the Morgan Generation Assets alone, the potential for LSE has also been concluded in-combination. For potential impacts where LSE has been ruled out with respect to the Morgan Generation Assets alone, there is either no pathway to effect, or the Morgan Generation Assets would result in only negligible or inconsequential effects that would not contribute (even collectively) or materially to in-combination effects and therefore, no additional in-combination issues are identified.

1.8.4.3 On this basis, the potential impacts identified for assessment as part of the volume 2, chapter 9: Marine mammals of the PEIR, and which have been brought forward for consideration in the in-combination assessment of the HRA Stage 2 ISAA Report are:

- In-combination underwater sound from piling
- In-combination underwater sound from the clearance of UXO
- In-combination underwater sound from pre-construction site investigation survey
- In-combination underwater sound from vessels and other vessel activities
- In-combination changes in prey availability.

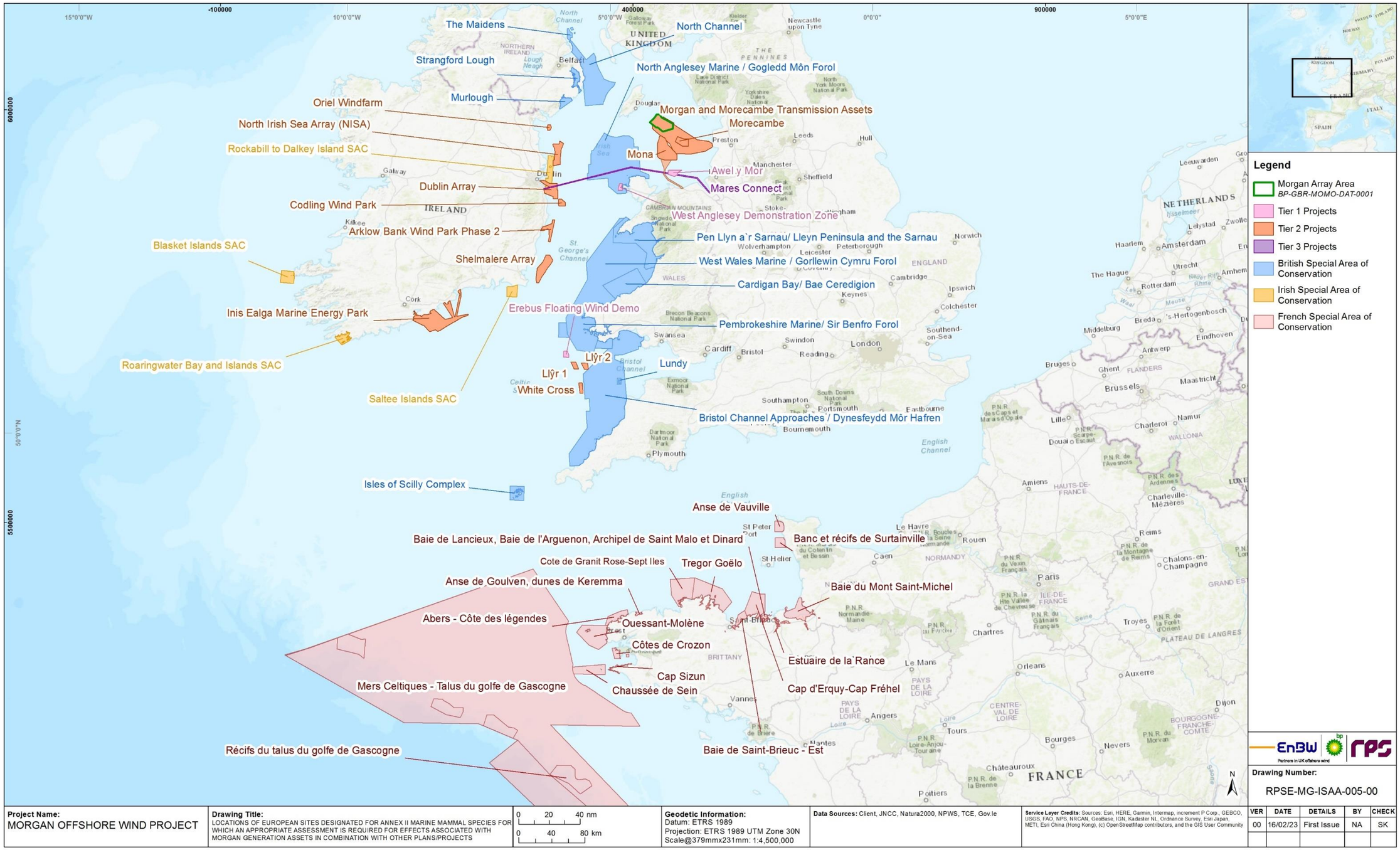


Figure 1.10: Location of other projects and plans considered for in-combination effects on SACs with Annex II marine mammal features.[38]

[38] The Awel y Môr agreement for lease area extends further to the west than the application boundary presented, however Awel y Môr Offshore Wind Farm Ltd. have decided to develop in the area presented

Table 1.126: List of other projects and plans with potential for in-combination effects on Annex II marine mammal features.

Plan/project	Status	Details	Tier	Distance from the Morgan Array Area (km)	Date of construction (C)/operation (O)	Spatial overlap	Temporal overlap	Further assessment required? (Yes/No)
Awel y Môr Offshore Wind Farm	Application submitted but not yet determined	Up to 500MW (48 to 91 wind turbines)	Tier 1	47.2	C: 2026 to 2030 O: 2030 to 2055	No	Yes	Yes
West Anglesey Demonstration Zone tidal site (Morlais)	Permitted but not yet implemented	Tidal Demonstration Zone	Tier 1	79.2	C: 2021 to 2023 O: 2024 to 2061	No	Yes	Yes
Project Erebus	Application submitted but not yet determined	Floating Demonstration Projects	Tier 1	289.8	C: 2025 O: 2026 to 2051	No	Yes	Yes
Morgan and Morecambe Transmission Assets (scoping search area)	Pre-application	Morgan and Morecambe Transmission Assets	Tier 2	0	C: 2026 to 2029 O: 2029 to 2065	Yes	Yes	Yes
Mona Offshore Wind Project	Pre-application	1.5 GW (Up to 107 wind turbines)	Tier 2	5.5	C: 2026 to 2029 O: 2030 to 2065	No	Yes	Yes
Morecombe Offshore Wind Farm Generation Assets	Pre-application	Offshore Wind Farm	Tier 2	11.2	C: 2026 to 2028 O: 2029 to 2089	No	N/A	Yes
North Irish Sea Array	Pre-application	Offshore Wind Farm	Tier 2	107.6	C: 2024 to 2026 O: 2027 to 2059	No	Yes	Yes
Oriel Offshore Wind Farm	Pre-application	Offshore Wind Farm	Tier 2	119.4	Unknown	No	Yes	Yes
Dublin Array	Pre-application	Offshore Wind Farm	Tier 2	134.4	C: 2025 to 2026 O: 2027 to 2062	No	Yes	Yes
Codling Wind Park	Pre-application	Offshore Wind Farm	Tier 2	141.2	C: 2025 to 2027 O: 2028 to 2063	No	Yes	Yes
Arklow Bank Wind Park Phase 2	Pre-application	Offshore Wind Farm	Tier 2	165.3	Unknown	No	N/A	Yes
Shelmalere Offshore Wind Farm	Pre-application	12 -24MW (Up to 40 wind turbines)	Tier 2	201.4	C: 2028 to 2029 O: 2030 to 2055	No	Yes	Yes
Llŷr 2	Pre-application	Floating Demonstration Project	Tier 2	295.0	C: 2024 to 2025 O: 2026 to 2051	No	Yes	Yes
Llŷr 1	Pre-application	Floating Demonstration Project	Tier 2	298.5	C: 2024 to 2025 O: 2026 to 2051	No	Yes	Yes
White Cross	Pre-application	Test and Demonstration Floating Wind Farm	Tier 2	319.6	C: 2025 to 2026 O: 2026 to Unknown	No	Yes	Yes
Inis Ealga Marine Energy Par	Pre-application	Offshore Wind Farm	Tier 2	327.0	C: 2028 to 2029 O 2030 to Unknown	No	Yes	Yes
MaresConnect – Wales-Ireland Interconnector Cable	Pre-application	A proposed subsea and underground electricity interconnector system linking the existing electricity grids in Ireland and Great Britain.	Tier 3	48.2	C: 2025 O: 2027 to 2037	No	N/A	Yes

In-combination injury and disturbance from underwater sound generated during piling

1.8.4.4 There is potential for injury and/or disturbance from underwater sound as a result of activities associated with the Morgan Generation Assets during construction, in-combination with activities associated with the projects/plans outlined in Figure 1.10 and Table 1.126.

1.8.4.5 As for the assessment of the Morgan Generation Assets alone, the risk of injury in terms of PTS to most of the marine mammal receptors, as a result of underwater sound due to piling, would be expected to be localised to within the boundaries of the respective projects. It is also anticipated that standard offshore wind industry construction methods (which include soft starts and visual and acoustic monitoring of marine mammals as standard) will be applied for all projects, thereby reducing the magnitude of the potential impact with respect to auditory injury occurring in marine mammals. Therefore, there is very low potential for significant in-combination effects for injury from elevated underwater sound during pilling and the in-combination assessment presented below focuses on disturbance only.

Construction phase

Tier 1

1.8.4.6 The construction of Morgan Generation Assets, together with construction of tier 1 projects identified in Figure 1.10 and Table 1.126 may lead to disturbance to marine mammals during piling. Tier 1 projects screened into the in-combination assessment include Awel y Môr Offshore Wind Farm and Project Erebus.

1.8.4.7 The assessments provided in the Environmental Statements for Awel y Môr Offshore Wind Farm and Project Erebus did not consider effects on harbour seal, as this species was scoped out. Given, that the cumulative assessment for piling is provided on species-by-species basis, harbour seal will not be considered further for tier 1 projects.

1.8.4.8 There is potential for a cumulative effect of piling at Awel y Môr Offshore Wind Farm with piling at the Morgan Generation Assets. The maximum duration of piling at Morgan Generation Assets is 70 days over the piling phase between 2027 and 2028. For Awel y Môr, there will be up to 201 days of piling over the piling phase of 12 months in 2028, within the four year construction phase (RWE, 2022). The potential for temporal overlap of piling activities between Morgan Generation Assets and Awel y Môr is considered likely. Subsequently, simultaneous piling may take place, generating high levels of underwater sound.

1.8.4.9 Project Erebus is a demonstration scale floating offshore wind farm, comprising six to ten wind turbines and a range of foundation options, including pile driven anchors. The construction is planned to take place in 2025 with only 18 days over which piling may occur. The number of harbour porpoise predicted to be affected by disturbance is based on densities from site-specific surveys (Blue Gem Wind, 2020). Since the construction phase at Morgan Generation Assets and Awel y Môr commences in 2026, there is no potential for piling activity at Project Erebus to coincide with piling at Morgan Generation Assets and therefore, spatially, there would be no larger cumulative area of disturbance. It is, however, important to note that Project Erebus is located in close proximity to the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC designated for harbour porpoise. The construction of Project Erebus is planned to take place in 2025 with only 18 days over which piling may occur and therefore there is no potential for piling activity to coincide with piling at Morgan Generation Assets or Awel y Môr. Temporally, Project Erebus would make a slight contribution to the overall duration of piling.

Harbour porpoise

1.8.4.10 As outlined in paragraph 1.8.2.38, the EDR approach has also been used for the assessment of disturbance associated with pile driving during the construction phase for harbour porpoise features in-combination with other plans and projects. As outlined in section 1.8.3, the use of a 26km EDR rules out potential disturbance from in-combination effects to harbour porpoise features of all SACs screened into the HRA Stage 2 ISAA Report, including the North Anglesey Marine/Gogledd Môn Forol SAC (which is located 28.2km from the Morgan Array Area). All SACs are located in excess of 26km from the Morgan Generation Assets and therefore it can be concluded that the Morgan Generation Assets cannot contribute to an in-combination effect on these SACs.

1.8.4.11 As outlined in paragraph 1.8.3.26, there is no potential overlap between the 26km EDR for the Morgan Generation Assets and the North Anglesey Marine/Gogledd Môn Forol SAC. The assessment considered piling at the closest location within the Morgan Array Area to the North Anglesey Marine/Gogledd Môn Forol SAC and showed no overlap in disturbance, and therefore does not give a significant sound disturbance within a harbour porpoise SAC.

1.8.4.12 Figure 1.11 shows the potential overlap between the 26km EDR for the relevant projects considered in the in-combination assessment. Awel y Môr Offshore Wind Farm array is located 21km from the North Anglesey Marine/Gogledd Môn Forol SAC at its nearest point and is the only project therefore considered further. All other projects screened into the in-combination assessment are located out with the 26km EDR used for the assessment and therefore will not contribute to an in-combination effect on Annex II harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC.

1.8.4.13 At the Awel y Môr Offshore Wind Farm, the Report to Inform Appropriate Assessment (RIAA) concluded that the footprint of disturbance (based on an EDR of 26km and a single piling activity at the worst-case location) would at most be 0.84% of the total area of the SAC (based on a footprint of disturbance of 27.3 km^2 within the total North Anglesey Marine/Gogledd Môn Forol SAC area of 3,249 km^2) and therefore well within the daily 20% disturbance threshold (other piling locations within the array would have a reduced level of impact). Should such activity occur every day of the season in sufficient proximity to the site (which would not be possible, as only a limited proportion of the array area falls within 26km), the contribution to the 10% seasonal threshold would be at most 0.84% and therefore well within the 10% threshold of the relevant area of the site over the season.

Considering there is a potential for temporal overlap of piling activities between Morgan Generation Assets and Awel y Môr, the footprints of disturbance from the Morgan Generation Assets and the Awel y Môr Offshore Wind Farm have been added together to assess the potential for in-combination effects. As outlined in paragraph 1.8.4.13, the disturbance footprints associated with both projects would result in potential disturbance across an area equating to 0.84% of total area of the SAC. This,

therefore, would not exceed the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season.

Bottlenose dolphin

1.8.4.14 It is anticipated that there will be a temporal overlap with piling at Awel y Môr Offshore Wind Farm and the Morgan Generation Assets. The consequences of potential simultaneous piling in 2028, (i.e. larger area of strong disturbance compared to the Morgan Generation Assets alone and longer duration of the effect), are described in more detail in Volume 2, chapter 9: Marine mammals of the PEIR.

1.8.4.15 The construction of Project Erebus is planned to take place in 2025 with only 18 days over which piling may occur and therefore there is no potential for piling activity to coincide with piling at Morgan Generation Assets or Awel y Môr. Temporally, Project Erebus would make a slight contribution to the overall duration of piling.

1.8.4.16 As outlined in volume 2, chapter 9: Marine mammals of the PEIR, the in-combination assessment therefore assumes there would be piling at Project Erebus in 2025 affecting 310 bottlenose dolphin (noting that the project is located within the Offshore Channel, Celtic Sea and South West England MU), followed by piling at Morgan Generation Assets in 2027 affecting up to 16 bottlenose dolphin, and subsequently piling at Awel y Môr and Morgan Generation Assets in 2028 (affecting 17 and 23 bottlenose dolphin respectively) which may coincide and affect up to 39 bottlenose dolphin (13.18% of the Irish Sea MU in total) (see Table 1.127). However, this is likely to be an overestimate given highly precautionary densities were used for the respective assessments and that, due to the proximity of the sites, the sound contours are likely to overlap.

Table 1.127: Number of bottlenose dolphin predicted to be disturbed as a result of underwater sound during piling for tier 1 Projects.

Project	Reference	Max number of piles	Scenario	Piling Duration	Piling phase	Density (animals per km^2)	Max No Animals Disturbed	% of Reference Population
Bottlenose dolphin								
Morgan Generation Assets	Volume 2, chapter 9: Marine mammals of the PEIR	70	Monopile 5,500kJ Concurrent	35 days	24 months	0.035 within 6km coastal zone 0.008 offshore	16	5.28 (Irish Sea MU)
Awel y Môr Offshore Wind Farm	RWE (2022)	50	Monopile, 5,000kJ	201 days	12 months	0.035 for the 20m depth contour 0.008 offshore	23	7.9 (Irish Sea MU)
Project Erebus	Blue Gem Wind (2020)	35	Pin-pile, 800kJ	18 days	8 months	0.063 (array area) 0.3743	310	2.8 (Offshore Channel and Southwest England MU)

Grey seal

1.8.4.17 Table 1.128 provides information detailing the duration of piling associated with tier 1 projects considered in the in-combination assessment for grey seal.

1.8.4.18 As outlined in volume 2, chapter 9: Marine mammals of the PEIR, the in-combination assessment therefore assumes there would be piling at Project Erebus in 2025 affecting 18 grey seal, followed by piling at Morgan Generation Assets in 2027 affecting 48 grey seal, and subsequently piling at Awel y Môr and Morgan Generation Assets in 2028 which may coincide and affect up to 129 grey seal (i.e. 81 individuals from Awel y Môr and 48 from the Morgan Generation Assets)(see Table 1.128).

Table 1.128: Number of grey seal predicted to be disturbed as a result of underwater sound during piling for tier 1 projects.

Project	Reference	Max number of piles	Scenario	Piling Duration	Piling phase	Density (animals per km^2)	Max No Animals Disturbed	% of Reference Population
Grey Seal								
Morgan Generation Assets	Volume 2, chapter 9: Marine mammals of the PEIR	70	Monopile 5,500kJ Concurrent	35 days	24 months	N/A – Grid cell specific	48	0.35% of the grey seal reference population 0.08% of the OSPAR Region III population
Awel y Môr Offshore Wind Farm	RWE (2022)	50	Monopile, 5,000kJ	201 days	12 months	0.43	81	1.6 (Wales and NW England MUs)
Project Erebus	Blue Gem Wind (2020)	35	Pin-pile, 800kJ	18 days	8 months	N/A – Grid cell specific	18	0.3 (Wales and SW England MUs)

Tier 2

1.8.4.19 There may be a temporal overlap between the construction of the Morgan Generation Assets and the construction of tier 1 projects and the following tier 2 projects: Shelmalere Offshore Wind Farm, Mona Offshore Wind Project, North Irish Sea Array, Codling Wind Park, Dublin Array, Inis Ealga Marine Energy Park, Llŷr Projects (Llŷr 1/Llŷr 2), White Cross, Arklow Bank Wind Park Phase 2, Morecambe Offshore Wind Farm Generation Assets and the Morgan and Morecambe Transmission Assets. This may lead to in-combination disturbance to Annex II marine mammal features from piling.

1.8.4.20 The indicative timelines suggest that there will be a temporal overlap of construction phase of Morgan Generation Assets with the construction phases of all listed tier 2 projects, except Llŷr 1/Llŷr 2. The construction phase of the Llŷr projects finishes in 2025 but both projects are screened into cumulative assessment due to the potential for sequential piling. The construction dates are unknown for Arklow Bank Wind park

Phase 2 and Oriel Offshore Wind Farm, however, conservatively these projects were screened into the cumulative assessment in the event that a temporal overlap occurs. It is noted that the description of the projects provided in the respective EIA Scoping Reports is indicative and may be further refined.

1.8.4.21 Based on the 26km EDR approach undertaken for harbour porpoise at Mona Offshore Wind Project, the HRA Stage 2 ISAA Report concluded that the footprint of disturbance (based on an EDR of 26km and a single piling activity at the worst-case location) would be at most 85.03km^2 which equates to 2.6% of the North Anglesey Marine/Gogledd Môn Forol SAC (for a single piling activity on any given day) and therefore well within the daily 20% disturbance threshold (other piling locations within the array would have a reduced level of impact). As this is the closest piling location, disturbance associated with all other piling locations within the Mona Array Area would be reduced. In terms of disturbance across the site over the season (summer, 183 days) a daily footprint of up to 85.03km^2 over 74 days of piling across the construction phase would result in an average of 1.06% of the North Anglesey Marine/Gogledd Môn Forol SAC being affected over the season. This would therefore fall well within the 10% threshold of the relevant area of the site over the season. Considering there is a potential for temporal overlap of piling activities between Morgan Generation Assets, Awel y Môr and Mona Offshore Wind Project, the footprints of disturbance from each development have been added together to assess the potential for in-combination effects. The disturbance footprints associated with both projects would result in potential disturbance within 3.44% of the SAC (Figure 1.11), which would not surpass the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season.

1.8.4.22 The number of animals (harbour porpoise excluded) potentially disturbed during piling at Mona Offshore Wind Project is presented in Table 1.129. Cumulatively, during piling at Morgan Generation Assets and Mona Offshore Wind Project, 33 bottlenose dolphin (10.97% of the MU population), 147 grey seal (1.03% of the grey seal reference population/0.23% of the OSPAR III region) and up to two harbour seal may be disturbed (0.15% of the reference population) (see paragraphs 1.8.3.16 to 1.8.3.22 for numbers of animals disturbed during piling at the Morgan Generation Assets).

Table 1.129: The maximum number of animals predicted to be disturbed during concurrent piling of monopiles at Mona Offshore Wind Project (Mona Offshore Wind Ltd, 2023).

Species	Number of Animals	% Reference Population (MU)
Bottlenose dolphin	17	5.69%
Grey seal	93	0.68% (grey seal reference population)/0.15% (OSPAR Region iii)
Harbour seal	<1	0.03%

1.8.4.23 In temporal terms, the first construction phases are anticipated to start in 2024, for the North Irish Sea Array and Llŷr projects. The construction of some of the cumulative projects will last until 2029, including the Mona Offshore Wind Project, Shelmalere Offshore Wind Farm, Morgan and Morecambe Transmission Assets and Inis Ealga Marine Energy Park. This timescale constitutes a total of six years where construction activities, including piling, may occur across the Irish and Celtic Seas. Piling activities will occur intermittently over the construction phase of respective projects, therefore, whilst this will not result in a continuous risk of disturbance to marine mammals, it may affect multiple breeding seasons for marine mammal species. In the context of the life cycle of respective species (see volume 6, annex 9.1: Marine mammal technical report of the PEIR for more details), the duration of the impact is classified as medium term, as the exposure to elevated sound levels could occur over a meaningful proportion of their lifespan.

1.8.4.24 Additionally, in spatial terms, depending on the type of foundation, installation technique, piling at each wind farm is likely to affect marine mammals behaviourally over different spatial scales. Due to the proximity of Mona Offshore Wind Project, Morecambe Offshore Wind Farm Generation Assets, Morgan and Morecambe Transmission Assets, North Irish Sea Array and Oriel Wind Farm to the Morgan Generation Assets, there is a potential for overlap of sound disturbance contours during piling. Animals may be displaced from an area comparable to piling contours at the Morgan Generation Assets alone (see Volume 2, chapter 9: Marine mammals of the PEIR). However, where there is a potential for simultaneous piling to take place, it may potentially result in a larger area of strong disturbance (160dB re 1µPa) compared to piling at the Morgan Generation Assets alone.

1.8.4.25 In the context of the wider habitat available within the Irish Sea and wider Celtic Sea regional marine mammal study area, it is anticipated that it will not result in a long-term population-level effect on harbour porpoise, grey seal or harbour seal. The cumulative piling at tier 2 projects could however lead to a long-term population-level effect on bottlenose dolphin due to further contribution to the potential impacts on the declining population of bottlenose dolphins within the Irish Sea MU (see paragraph 1.8.2.33 for tier 1 projects). It must however be noted there was no noticeable difference in the iPCoD model with the addition of the tier 2 project (Mona Offshore Wind Project) to the tier 1 cumulative scenario for Morgan Generation Assets (further described in volume 2, chapter 9: Marine mammals of the PEIR). Nevertheless, no measurable change in the context of the wider combined bottlenose dolphin population of the Offshore Channel and Southwest England MU plus the Irish Sea MU is anticipated.

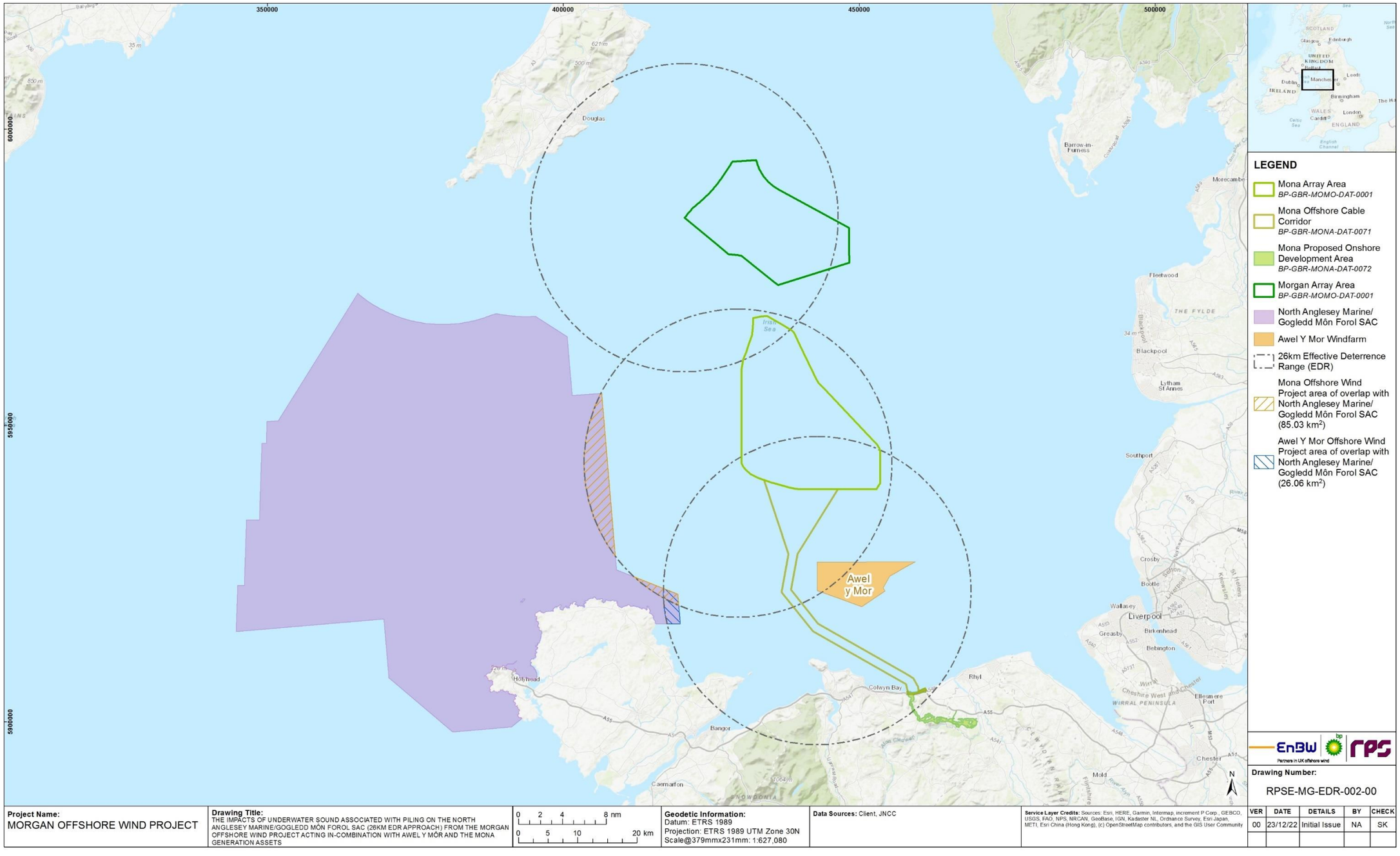


Figure 1.11: Maximum spatial overlap of underwater sound potential impacts associated with piling at the Morgan Generation Assets and other relevant projects on the North Anglesey Marine/Gogledd Môn Forol SAC based on the 26km EDR approach.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

Conclusions

1.8.4.26 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of underwater sound generated from piling during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from piling against each relevant conservation objective (see paragraphs 1.8.2.7 to 1.8.2.9) are discussed in Table 1.130. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.130: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC for in-combination underwater sound from piling during the construction phase.

Conservation Objective	Conclusion
The species is a viable component of the site	As outlined in paragraph 1.8.4.21, the maximum area of disturbance within the North Anglesey Marine/Gogledd Môn Forol SAC resulting from the projects considered within the in-combination assessment (Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr) would be 2.84% (on any given day) which does not exceed either of the thresholds for significant disturbance. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the SAC and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not cause significant disturbance of harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets (see section volume 2, chapter 9: Fish and shellfish ecology of the PEIR), effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term.

1.8.4.27 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result underwater sound from piling with respect to the Morgan Generation Assets i in-combination with other plans/projects.

North Channel SAC

Harbour porpoise

Conclusions

1.8.4.28 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the North Channel SAC will not occur as a result of underwater sound generated from piling during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from piling against each relevant conservation objective (see paragraphs 1.8.2.14 to 1.8.2.16) are discussed in Table 1.131. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.131: Conclusions against the conservation objectives of the North Channel SAC for in-combination underwater sound from piling during the construction phase.

Conservation Objective	Conclusion
The species is a viable component of the site	As outlined in paragraph 1.8.4.21, the 26km EDR for the Morgan Generation Assets does not overlap with the North Channel SAC (located 63.8km from the Morgan Array Area). Therefore, underwater sound from piling associated with the Mona Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the SAC and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not cause significant disturbance of harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets (see section volume 2, chapter 9: Fish and shellfish ecology of the PEIR), effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term.

1.8.4.29 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects.

Strangford Lough SAC

Harbour seal

1.8.4.30 The assessments provided in the Environmental Statements for Awel y Môr Offshore Wind Farm and Project Erebus did not consider effects on harbour seal, as this species was scoped out due to a lack of presence within the site specific digital aerial surveys. There is therefore no quantitative information for which to base an in-combination assessment on for tier 1 projects.

1.8.4.31 For tier 2 projects, during piling at Morgan Generation Assets and Mona Offshore Wind Project, up to two harbour seal may be disturbed which equates to 0.15% of the reference population. Harbour seal also have a large foraging range (up 273km reported in Carter *et al*. (2022)) and could therefore move to alternative foraging grounds during piling associated with the Morgan Generation Assets and other projects considered in the in-combination assessment.

1.8.4.32 Recovery is also anticipated to occur between piling events, which will be intermittent for in-combination projects. In particular, baseline levels of activity are anticipated to resume where there are long gaps between piling of respective projects, such as between the end of piling at Project Erebus in 2025 and commencement of piling phase at Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr in 2028.

Conclusions

1.8.4.33 Adverse effects on the qualifying harbour seal features which undermine the conservation objectives of the Strangford Lough SAC will not occur as a result of underwater sound generated from piling during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from piling against each relevant conservation objective (see paragraph 1.8.2.21) are discussed in Table 1.132. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.132: Conclusions against the conservation objectives of the Strangford Lough SAC for in-combination underwater sound from piling during the construction phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	As outlined in paragraphs 1.8.4.30 to 1.8.4.32, piling at other projects may result in disturbance of Annex II harbour seal features of the SAC, however the numbers presented above are inconsequential in the context of the harbour seal reference population. Harbour seal also have a large foraging range (up 273km reported in Carter *et al*. (2022)) and could therefore move to alternative foraging grounds during piling associated with the Morgan Generation Assets and other projects considered in the in-combination assessment. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal population from being maintained at or restored to favourable condition. Similarly, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal population from being maintained or enhanced.
Maintain and enhance, as appropriate, the harbour seal population	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound in-combination effects from piling associated with Morgan Generation Assets in-combination with other projects to result in adverse effects on the physical features used by the harbour seal features within the site.

1.8.4.34 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of Strangford Lough SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects.

Murlough SAC

Harbour seal

1.8.4.35 The Murlough SAC is located at an increased distance to the Morgan Generation Assets (98.4km from the Morgan Array Area) than the Strangford Lough SAC (94.6km from the Morgan Array Area), assessed in paragraphs 1.8.4.30 to 1.8.4.34. As the Murlough SAC is located at an increased distance from the Morgan Generation Assets than the Strangford Lough SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.36 Adverse effects on the qualifying harbour seal features which undermine the conservation objectives of the Murlough SAC will not occur as a result of underwater sound generated from piling during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from piling against each relevant conservation objective (see paragraph 1.8.2.26) are discussed in Table 1.133. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.133: Conclusions against the conservation objectives of the Murlough SAC for in-combination underwater sound from piling during the construction phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	As outlined in paragraphs 1.8.4.30 to 1.8.4.32, piling at other projects may result in disturbance of Annex II harbour seal features of the SAC, however the numbers presented above are inconsequential in the context of the harbour seal reference population. Harbour seal also have a large foraging range (up 273km reported in Carter *et al*. (2022)) and could therefore move to alternative foraging grounds during piling associated with the Morgan Generation Assets and other projects considered in the in-combination assessment. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal population from being maintained at or restored to favourable condition. Similarly, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the population and distribution of harbour seal from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of harbour seal	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound in-combination effects from piling associated with Morgan Generation Assets in-combination with other projects to result in adverse effects on the physical features used by the harbour seal features within the site.

1.8.4.37 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of Murlough SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects.

Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC

Bottlenose dolphin

1.8.4.38 Given that bottlenose dolphin can travel over large distances, there is a possibility that a small number of individuals from the SAC may be occasionally present within the disturbance contours.

1.8.4.39 As outlined in paragraphs 1.8.4.14 to 1.8.4.16, although likely to be an overestimate given the highly precautionary densities used, piling at Project Erebus in 2025 could affect 310 bottlenose dolphin, followed by piling at Morgan Generation Assets in 2027 which could affect 16 bottlenose dolphin, and subsequently piling at Awel y Môr and Morgan Generation Assets in 2028 which may coincide and affect up to 39 bottlenose dolphin for both projects (13.18% of the Irish Sea MU in total). During piling at Morgan Generation Assets and Mona Offshore Wind Project, up to 22 bottlenose dolphin (10.97% of the MU population) could be disturbed as a result of both projects.

1.8.4.40 Volume 2, chapter 9: Marine mammals of the PEIR states that piling at projects in the Liverpool Bay area (the Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr) could result in potential reductions to lifetime reproductive success to some individuals in the Irish Sea MU population as disturbance in offshore areas during piling could lead to a longer duration over which individuals may be displaced

from key areas (in offshore areas between the mainland coast and the Isle of Man including Marine Nature Reserves (MNRs)). It should however be noted that recovery is anticipated to occur between piling events, which will be intermittent for in-combination projects. In particular, baseline levels of activity are anticipated to resume where there are long gaps between piling of respective projects, such as between the end of piling at Project Erebus in 2025 and commencement of piling phase at the Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr.

1.8.4.41 Based on the iPCoD modelling, these changes are not sufficient to significantly affect the population trajectory over a generational scale (i.e. the trajectory falls within natural variation), however, there may be a small reduction in population size for the impacted population.

1.8.4.42 As reported in Lohrengel *et al.* (2018), there has been an overall increase in the population size between 2001-2007 and a decline since then to 2001 levels but there is considerable variability between years and low confidence in some estimates (and the apparent trends are not significant). The decline in recent years may be related to animals moving away from the study area and spending the majority of their time in other parts of Wales or beyond. The population is said to be declining in the short term (10 years), but stable in the medium term (since 2001).

1.8.4.43 It should also be highlighted that the number of bottlenose dolphin predicted to be exposed to sound levels that could result in behavioural disturbance during piling at Awel y Môr Offshore Wind Farm was 23 animals (7.9% of the Irish Sea MU). The iPCoD modelling carried out for Awel y Môr Offshore Wind Farm demonstrated that, whilst there were likely to be some measurable changes in the population during piling, the trajectory of the population is expected to be stable in the long term. As outlined in paragraph 1.8.4.8, the Awel y Môr assessment considers 201 days of piling across the 12 month piling phase, in comparison with 35 days across a 24 month piling phase for the Morgan Generation Assets. The numbers of animals potentially disturbed during piling at Awel y Môr Offshore Wind Farm was 23 whilst piling at the Morgan Generation Assets could potentially disturb 16 animals.

Grey seal

1.8.4.44 The in-combination assessment considers that there would be piling at Project Erebus in 2025 affecting 18 grey seal, followed by piling at Morgan Generation Assets in 2027 affecting 48 grey seal, and subsequently piling at Awel y Môr and Morgan Generation Assets in 2028 which may coincide and affect up to 147 grey seal in total from the three projects. During piling at the Morgan Generation Assets and Mona Offshore Wind Project, up to 141 grey seal (1.03% of the grey seal reference population/0.23% of the OSPAR III region) could be disturbed as a result of both projects. Recovery is anticipated to occur between piling events, which will be intermittent for in-combination projects. In particular, baseline levels of activity are anticipated to resume where there are long gaps between piling of respective projects, such as between the end of piling at Project Erebus in 2025 and commencement of piling phase at Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr.

1.8.4.45 Volume 2, chapter 9: Marine mammals of the PEIR presents population modelling which was carried out to explore the potential of disturbance during piling to affect the population trajectory over time and provide additional certainty in the predictions of the potential impact assessment. Results of the cumulative iPCoD modelling for grey seal showed that the median of the ratio of the impacted population to the unimpacted population (when using both the grey seal reference population and OSPAR region III) was 1 at 25 years, and simulated grey seal population sizes for both baseline and impacted populations showed no difference. Therefore, it was considered that there is no potential for a long-term effects on this species.

Conclusions

1.8.4.46 Adverse effects on the qualifying bottlenose dolphin and grey seal features which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC will not occur for grey seal as a result of underwater sound generated from piling during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from piling against each relevant conservation objective (see paragraphs 1.8.2.36 to 1.8.2.47) are discussed in Table 1.134.

Table 1.134: Conclusions against the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC for in-combination underwater sound from piling during the construction phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	As outlined in paragraph 1.8.4.44, piling at other projects may result in disturbance of Annex II grey seal features of the SAC, however the numbers presented above are inconsequential in the context of the grey seal reference population and OSPAR III region. Furthermore, grey seal have a large foraging range (up 448km reported in Carter *et al*. (2022)) and could therefore move to alternative foraging grounds during piling associated with the Morgan Generation Assets and other projects considered in the in-combination assessment. The iPCoD modelling for grey seal also concluded that there is no potential for a long-term effects on this species. Piling at other projects may result in disturbance of Annex II bottlenose dolphin features of the SAC, however although the population is said to be declining in the short term (10 years), it is deemed stable in the medium term. The decline in recent years is also likely to be related to animals moving away from the study area and spending the majority of their time in other parts of Wales or beyond. On this basis, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the populations of grey seal and bottlenose dolphin from maintaining themselves on a long-term basis as a viable component of their natural habitats.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	As outlined in paragraph 1.8.4.44, piling at other projects will result in disturbance of Annex II grey seal features of the SAC, however the numbers presented above are inconsequential in the context of the grey seal reference population and OSPAR III region. Piling at other projects will also result in disturbance of Annex II bottlenose dolphin features of the SAC, however, recovery is also anticipated to occur between piling events, which will be intermittent for in-combination projects. In particular, baseline levels of activity are anticipated to resume where there are long gaps between piling of respective projects, such as between the end of piling at Project Erebus in 2025 and commencement of piling phase at Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr in 2028. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the bottlenose dolphin and grey seal populations within the site and the natural ranges of the populations from being reduced or likely reduced for the foreseeable future.
The presence, abundance, condition and diversity of habitats and species required to support this	The presence, abundance, condition and diversity of habitats will not be affected by underwater sound. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets (see section volume 2, chapter 9: Fish and shellfish ecology of the

Conservation Objective	Conclusion
species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	PEIR), effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term. The distribution, abundance and populations dynamics of bottlenose dolphin and grey seal within the site and populations beyond the site will not be prevented from remaining stable or increasing.

1.8.4.47 On the basis of the preliminary assessments undertaken to date it is considered unlikely that there will be an adverse effect on the integrity of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects. It is not, however, possible to conclude this definitely at this stage (i.e. beyond reasonable scientific doubt) until further assessment work, on the population level effects, is complete. The final conclusion of potential adverse effect on integrity is, therefore, deferred to the assessments which will be presented in the HRA Stage 2 ISAA Report submitted with the application for consent.

The Maidens SAC

Grey seal

1.8.4.48 The Maidens SAC is located at an increased distance to the Morgan Generation Assets (141.8km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from the Morgan Array Area), assessed in paragraphs 1.8.4.44 to 1.8.4.48. As The Maidens SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.49 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of The Maidens SAC will not occur as a result of underwater sound generated from piling during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from piling against each relevant conservation objective (see paragraph 1.8.2.52) are discussed in Table 1.135.

Table 1.135: Conclusions against the conservation objectives of The Maidens SAC for in-combination underwater sound from piling during the construction phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the grey seal feature to favourable condition	As outlined in paragraph 1.8.4.44, piling at other projects will result in disturbance of Annex II grey seal features of the SAC, however the numbers presented above are inconsequential in the context of the grey seal reference population and OSPAR III region. Furthermore, grey seal have a large foraging range (up 448km reported in Carter *et al*. (2022)) and could therefore move to alternative foraging grounds during piling associated with the Morgan Generation Assets and other projects considered in the in-combination assessment. The iPCoD modelling for grey seal also concluded that there is no potential for a long-term effects on this species. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the grey seal feature from being maintained at or restored to favourable condition.
To maintain (and if feasible enhance) population numbers and distribution of grey seal	As outlined in paragraph 1.8.4.44, piling at other projects will result in disturbance of Annex II grey seal features of the SAC, however the numbers presented above are inconsequential in the context of the grey seal reference population and OSPAR III region. Recovery is also anticipated to occur between piling events, which will be intermittent for in-combination projects. In particular, baseline levels of activity are anticipated to resume where there are long gaps between piling of respective projects, such as between the end of piling at Project Erebus in 2025 and commencement of piling phase at Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent population numbers and distribution of grey seal from being maintained.
Maintain and enhance, as appropriate, physical features used by grey seal within the site	There is no pathway for underwater sound in-combination effects from piling associated with Morgan Generation Assets in-combination with other projects to result in adverse effects on the physical features used by the grey seal features within the site.

1.8.4.50 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of The Maidens SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects.

Cardigan Bay/Bae Ceredigion SAC

Bottlenose dolphin

1.8.4.51 The Cardigan Bay/Bae Ceredigion SAC is located at an increased distance to the Morgan Generation Assets (188.2km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from the Morgan Array Area), assessed in paragraphs 1.8.4.38 to 1.8.4.47. As the Cardigan Bay/Bae Ceredigion SAC is located at an increased distance from the Morgan Generations Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.52 Adverse effects on the qualifying bottlenose dolphin features which undermine the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC will not occur as a result of underwater sound generated from piling during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from piling against each relevant conservation objective (see paragraphs 1.8.2.58 to 1.8.2.69) are discussed in Table 1.136.

Table 1.136: Conclusions against the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC for in-combination underwater sound from piling during the construction phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Piling at other projects may result in disturbance of Annex II bottlenose dolphin features of the SAC. Whilst the population may be declining in the short term (10 years), it is deemed stable in the medium term. The decline in recent years is also likely to be related to animals moving away from the study area and spending the majority of their time in other parts of Wales or beyond. On this basis, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of bottlenose dolphin from maintaining itself on a long-term basis as a viable component of its natural habitat.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	Piling at other projects will also result in disturbance of Annex II bottlenose dolphin features of the SAC, however, recovery is also anticipated to occur between piling events, which will be intermittent for in-combination projects. In particular, baseline levels of activity are anticipated to resume where there are long gaps between piling of respective projects, such as between the end of piling at Project Erebus in 2025 and commencement of piling phase at Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr in 2028. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of bottlenose dolphin within the site and the natural range of the population from being reduced or likely reduced for the foreseeable future.
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	The presence, abundance, condition and diversity of habitats will not be affected by underwater sound from pilling associated with the Morgan Generation Assets in-combination with other projects. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets (see section volume 2, chapter 9: Fish and shellfish ecology of the PEIR), effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term. The distribution, abundance and populations dynamics of bottlenose dolphin within the site and population beyond the site will not be prevented from remaining stable or increasing.

1.8.4.53 On the basis of the preliminary assessments undertaken to date it is considered unlikely that there will be an adverse effect on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects. It is not, however, possible to conclude this definitely at this stage (i.e. beyond reasonable scientific doubt) until further assessment work, on the population level effects, is complete. The final conclusion of potential adverse effect on integrity is, therefore, deferred to the assessments which will be presented in the HRA Stage 2 ISAA Report submitted with the application for consent.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.4.54 The Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance to the Morgan Generation Assets (237.6km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.44 to 1.8.4.47. As the Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.55 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of underwater sound generated from piling during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from piling against each relevant conservation objective (see paragraphs 1.8.2.75 to 1.8.2.85) are discussed in Table 1.137.

Table 1.137: Conclusions against the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC for in-combination underwater sound from piling during the construction phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	As outlined in paragraph 1.8.4.44, piling at other projects will result in disturbance of Annex II grey seal features of the SAC, however the numbers presented above are inconsequential in the context of the grey seal reference population and OSPAR III region. Furthermore, grey seal have a large foraging range (up 448km reported in Carter *et al*. (2022)) and could therefore move to alternative foraging grounds during piling associated with the Morgan Generation Assets and other projects considered in the in-combination assessment. The iPCoD modelling for grey seal also concluded that there is no potential for long-term effects on this species. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of grey seal from maintaining itself on a long-term basis as a viable component of its natural habitat.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	As outlined in paragraph 1.8.4.44, piling at other projects will result in disturbance of Annex II grey seal features of the SAC, however the numbers presented above are inconsequential in the context of the grey seal reference population and OSPAR III region. Recovery is also anticipated to occur between piling events, which will be intermittent for in-combination projects. In particular, baseline levels of activity are anticipated to resume where there are long gaps between piling of respective projects, such as between the end of piling at Project Erebus in 2025 and commencement of piling phase at Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr in 2028. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of grey seal within the site and the natural range of the population of grey seal from being reduced or likely reduced for the foreseeable future.
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	The presence, abundance, condition and diversity of habitats will not be affected by underwater sound associated with the Morgan Generation Assets in-combination with other projects. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets (see section volume 2, chapter 9: Fish and shellfish ecology of the PEIR), effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term. The distribution, abundance and populations dynamics of grey seal within the site and population beyond the site will not be prevented from remaining stable or increasing.

1.8.4.56 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of Pembrokeshire Marine/Sir Benfro Forol SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

Conclusions

1.8.4.57 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC will not occur as a result of underwater sound generated from piling during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from piling against each relevant conservation objective (see paragraphs 1.8.2.90 to 1.8.2.92) are discussed in Table 1.138. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.138: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC for in-combination underwater sound from piling during the construction phase.

Conservation Objective	Conclusion
The species is a viable component of the site	As outlined in paragraph 1.8.4.21, the 26km EDR for the Morgan Generation Assets does not overlap with Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC (located 300.1km from the Morgan Array Area). Therefore, underwater sound from piling associated with the Mona Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the SAC and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not cause significant disturbance of harbour porpoise.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound. With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets (see section volume 2, chapter 9: Fish and shellfish ecology of the PEIR), effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term.

1.8.4.58 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects.

Lundy SAC

Grey seal

1.8.4.59 The Lundy SAC is located at an increased distance to the Morgan Generation Assets (334.9km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.44 to 1.8.4.47. As The Lundy SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.60 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Lundy SAC will not occur as a result of underwater sound generated from piling during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from piling against each relevant conservation objective (see paragraphs 1.8.2.97 to 1.8.2.99) are discussed in Table 1.139. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.139: Conclusions against the conservation objectives of the Lundy SAC for in-combination underwater sound from piling during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound in-combination effects from piling to result in adverse effects on the habitats of the grey seal. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the extent and distribution, the structure and function or supporting processes of the habitats of grey seal from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	As outlined in paragraph 1.8.4.44, piling at other projects will result in disturbance of Annex II grey seal features of the SAC, however the numbers presented above are inconsequential in the context of the grey seal reference population and OSPAR III region. Furthermore, grey seal have a large foraging range (up 448km reported in Carter *et al*. (2022)) and could therefore move to alternative foraging grounds during piling associated with the Morgan Generation Assets and other projects considered in the in-combination assessment. The iPCoD modelling for grey seal also concluded that there is no potential for a long-term effects on this species. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of grey seal from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	As outlined in paragraph 1.8.4.44, piling at other projects will result in disturbance of Annex II grey seal features of the SAC, however the numbers presented above are inconsequential in the context of the grey seal reference population and OSPAR III region. Recovery is also anticipated to occur between piling events, which will be intermittent for in-combination projects. In particular, baseline levels of activity are anticipated to resume where there are long gaps between piling of respective projects, such as between the end of piling at Project Erebus in 2025 and commencement of piling phase at Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr in 2028. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the distribution of grey seal from being maintained or restored.

1.8.4.61 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of Lundy SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects.

Isles of Scilly Complex SAC

Grey seal

1.8.4.62 The Isles of Scilly Complex SAC is located at an increased distance to the Morgan Generation Assets (465km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.44 to 1.8.4.47. As Isles of Scilly Complex SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.63 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Isles of Scilly Complex SAC will not occur as a result of underwater sound generated from piling during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from piling against each relevant conservation objective (see paragraphs 1.8.2.104 to 1.8.2.106) are discussed in Table 1.140. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.140: Conclusions against the conservation objectives of the Isles of Scilly Complex SAC for in-combination underwater sound from piling during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound in-combination effects from piling to result in adverse effects on the habitats of the grey seal. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the extent and distribution, the structure and function or supporting processes of the habitats of grey seal from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	As outlined in paragraph 1.8.4.44, piling at other projects will result in disturbance of Annex II grey seal features of the SAC, however the numbers presented above are inconsequential in the context of the grey seal reference population and OSPAR III region. Furthermore, grey seal have a large foraging range (up 448km reported in Carter *et al*. (2022)) and could therefore move to alternative foraging grounds during piling associated with the Morgan Generation Assets and other projects considered in the in-combination assessment. The iPCoD modelling for grey seal also concluded that there is no potential for a long-term effects on this species. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of grey seal from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	As outlined in paragraph 1.8.4.44, piling at other projects will result in disturbance of Annex II grey seal features of the SAC, however the numbers presented above are inconsequential in the context of the grey seal reference population and OSPAR III region. Recovery is also anticipated to occur between piling events, which will be intermittent for in-combination projects. In particular, baseline levels of activity are anticipated to resume where there are long gaps between piling of respective projects, such as between the end of piling at Project Erebus in 2025 and commencement of piling phase at Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr in 2028. Therefore, underwater sound from piling associated with the Morgan Generation Assets in-combination with other projects will not prevent the distribution of grey seal from being maintained or restored.

1.8.4.64 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of Isles of Scilly Complex SAC as a result underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects.

Sites assessed in line with the iterative approach

1.8.4.65 As outlined in paragraphs 1.8.1.3 to 1.8.1.8, following the iterative approach adopted for this HRA Stage 2 ISAA Report, the closest European site to the Morgan Generation Assets within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment in the sections above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA Report, are located at a greater distance from the Morgan Generation Assets and, on this basis, it is considered that effects on the marine mammal features of these sites would be of similar if not lower magnitude than those concluded for the sites subject to a full assessment. The conclusions of the assessments presented in paragraphs 1.8.4.26 to 1.8.4.64 are, therefore, deemed to be applicable for the remaining sites presented below in paragraphs 1.8.4.66 to 1.8.4.88.

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.4.66 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cardigan Bay/Bae Ceredigion SAC

Grey seal

1.8.4.67 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs 1.8.4.44 to 1.8.4.47), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Rockabill to Dalkey Island SAC

1.8.4.68 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Rockabill to Dalkey Island SAC as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Saltee Islands SAC

1.8.4.69 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs 1.8.4.44 to 1.8.4.47), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Saltee Islands SAC as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Roaringwater Bay and Islands SAC

1.8.4.70 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Roaringwater Bay and Islands SAC as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Blasket Islands SAC

1.8.4.71 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Blasket Islands SAC as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Mers Celtiques – Talus du golfe de Gascogne SCI

1.8.4.72 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Mers Celtiques – Talus du golfe de Gascogne SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Abers – Côte des legends SCI

1.8.4.73 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Abers – Côte des legends SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Ouessant-Molène SCI

1.8.4.74 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ouessant-Molène SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Côte de Granit rose-Sept-Iles SCI

1.8.4.75 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côte de Granit rose-Sept-Iles SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Anse de Goulven, dunes de Keremma SCI

1.8.4.76 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Goulven, dunes de Keremma SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Tregor Goëlo SCI

1.8.4.77 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Tregor Goëlo SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Côtes de Crozon SCI

1.8.4.78 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côtes de Crozon SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Chaussée de Sein SCI

1.8.4.79 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Chaussée de Sein SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cap Sizun SCI

1.8.4.80 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the

North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap Sizun SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Récifs du talus du golfe de Gascogne SCI

1.8.4.81 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Récifs du talus du golfe de Gascogne SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Anse de Vauville SCI

1.8.4.82 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Vauville SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cap d'Erquy-Cap Fréhel SCI

1.8.4.83 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap d'Erquy-Cap Fréhel SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie de Saint-Brieuc – Est SCI

1.8.4.84 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Saint-Brieuc – Est SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Banc et récifs de Surtainville SCI

1.8.4.85 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Banc et récifs de Surtainville SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.8.4.86 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Estuaire de la Rance SCI

1.8.4.87 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Estuaire de la Rance SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie du Mont Saint-Michel SCI

1.8.4.88 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.26 to 1.8.4.29), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie du Mont Saint-Michel SCI as a result of underwater sound from piling with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

In-combination injury and disturbance from underwater sound generation from UXO detonation

1.8.4.89 There is potential for injury and/or disturbance (presented as TTS/moving away response) from underwater sound from UXO clearance as a result of activities associated with the Morgan Generation Assets during construction, in-combination with activities associated with the projects/plans outlined in Figure 1.10 and Table 1.126

1.8.4.90 As presented in volume 2, chapter 9: Marine mammals of the PEIR, the duration of effect for each UXO detonation is less than one second. Behavioural effects are therefore considered to be negligible in this context. TTS is presented as a temporary auditory injury but also represents a threshold for the onset of the moving away response in line with recommendation from Southall *et al.* (2007).

1.8.4.91 The assessments provided in the Environmental Statements for Awel y Môr Offshore Wind Farm and Project Erebus did not consider effects on harbour seal, as this was not included as a key species in these assessments. Therefore, harbour seal has not been considered further in this in-combination effects section.

Construction phase

Tier 1

1.8.4.92 There is a temporal overlap of Awel y Môr, located 47.2km from the Morgan Array Area, with Morgan Generation Assets. The MDS for Awel y Môr anticipated 10 expected UXOs requiring clearance, with two clearance events every 24 hours but up to 10 detonations in 10 days. The assessed clearance method was high-order detonation, though low-order is more likely. The Environmental Statement assessed both PTS, disturbance as well as TTS as a result of UXO clearance, additional information on the assessment method is detailed in volume 2, chapter 9: Marine mammals of the PEIR.

1.8.4.93 Maximum impact ranges from UXO and numbers of animals predicted to be injured as a result of underwater sound from UXO clearance for tier 1 projects including Awel y Môr is presented in volume 2, chapter 9: Marine mammals of the PEIR and in

1.8.4.94 Table 1.141. The exact mitigation measures contained with the UXO MMMP for Awel y Môr are yet to be determined and agreed with NRW. Residual potential impacts for PTS from UXO were therefore considered unlikely for harbour porpoise, grey seal and minor adverse significance for bottlenose dolphin (RWE, 2022).

1.8.4.95 The Awel y Môr assessment presented results for various disturbance thresholds, including a 26km EDR for high order detonations, 5km EDR for low order and TTS-onset thresholds for high-order detonations.

1.8.4.96 Awel y Môr used TTS-onset as a proxy for disturbance but caveated this is likely to over-estimate true behavioural response due to UXO comprising a single pulse source sound and not lasting a full diel cycle. Large TTS-onset impact ranges were predicted for harbour porpoise (16km using SPL_{pk}). As highlighted in the Awel y Môr Environmental Statement, these ranges may be highly over-precautionary as these do not account for the impulsive sound losing harmful impulsive characteristics and becoming non-impulsive as it propagates from the source (RWE, 2022). Based on the predicted impact ranges and numbers of animals affected, Awel y Môr concluded that the magnitude of the effects of TTS would be low for all species.

1.8.4.97 Project Erebus anticipated one UXO detonation via low-order deflagration but included assessment for high-order detonations for completeness, highlighting this is not realistic. Additional information on the method of assessment and densities used is provided in volume 2, chapter 9: Marine mammals of the PEIR.

1.8.4.98 The number of marine mammals expected to experience PTS-onset as a result of UXO detonation for project Erebus is less than one for all species and charge sizes, apart from 2kg NEQ, which could result in PTS in up to five harbour porpoise. For high-order detonation, which is not in the project design for Project Erebus up to 212 harbour porpoise could be affected by PTS (Blue Gem Wind, 2020) (Table 1.141). The Environmental Statement for Project Erebus used a EDR of 5km for low order clearance and 26km for high-order clearance. Project Erebus used TTS-onset as a proxy for disturbance, and maximum predicted TTS-onset impact range was 20km for grey seal. The Project Erebus Environmental Statement highlighted that TTS-onset as a proxy for disturbance is expected to over-estimate the actual biological consequences (Blue Gem Wind, 2020). For disturbance from both low-order or high-order UXO detonation, Project Erebus concluded that the potential impact was unlikely to significantly affect marine mammal receptors (Blue Gem Wind, 2020).

1.8.4.99 UXO clearance activities coinciding at the respective projects is considered highly unlikely, as due to safety reasons, the UXO clearance activities takes place before other construction activities commence. Temporally, sequential UXO clearance at respective projects could lead to a longer duration potential impact on marine mammals. Awel y Môr construction dates are from 2026 therefore there may be some overlap in pre-construction activities with Morgan Generation Assets. These timelines are, however, indicative and subject to change. UXO clearance at each of these projects will occur as a discrete stage within the overall construction phase and therefore will not coincide continuously over the duration of temporal overlap. Furthermore each clearance event results in very short duration of sound emission (seconds) (as outlined in volume 2, chapter 9: Marine mammals of the PEIR) so the impact will be short in temporal duration and therefore the overlap is unlikely. Construction of Project Erebus is likely to be completed a year before the commencement of construction activities at Morgan Generation Assets and therefore will not overlap with Morgan Generation Assets UXO clearance. Given the project design for use of low-order UXO clearance techniques only for Project Erebus, in-combination effects are considered unlikely.

1.8.4.100 The maximum number of animals potentially affected by PTS (harbour porpoise) resulting from the tier 1 projects is 426 animals (Table 1.141). However, as outlined in paragraph 1.8.4.97, this is using modelled high-order UXO clearance for Project Erebus which is very unlikely to occur in practice. Therefore, with the implementation of mitigation measures applied at other projects (i.e. use of low order clearance only for Project Erebus and MMMPs for Awel y Môr) the residual risk of injury is likely to be very small.

Table 1.141: Number of animals with the potential to experience PTS during UXO clearance at tier 1 projects.

Project	Species	Maximum charge size leading to highest impact (kg)	Metric	Maximum impact range (m)	Estimated number of animals in impact area
Morgan Generation Assets	Harbour porpoise	907	PTS-ONSET SPL_{pk} (dB RE 1µPA)	15,370	184
	Bottlenose dolphin			890	<1
	Grey seal			3,015	2
Awel y Môr	Harbour porpoise	164	PTS-ONSET SPL_{pk} (dB RE 1µPA)	8,600	30
	Bottlenose dolphin			500	<1
	Grey seal			1,600	3
Project Erebus	Harbour porpoise	525	PTS-ONSET SPL_{pk} (dB RE 1µPA)	13,000	212
	Bottlenose dolphin			730	<1
	Grey seal			2,500	1

1.8.4.101 Production of underwater sound during detonation of UXOs from the tier 1 projects have the potential to cause TTS (moving away response) in marine mammal receptors in-combination with the Morgan Generation Assets, however, this effect will be short-lived and reversible. The maximum potential impact ranges and estimated number of Annex II marine mammals estimated in the potential impact area associated with tier 1 projects are listed in Table 1.142. Since TTS is a recoverable injury with a temporary loss in hearing, the potential for in-combination impact is considered to be very limited, even for multiple tier 1 projects within the regional marine mammal study area. It is assumed whilst some ecological functions could be inhibited in the short-term due to TTS (e.g. cessation of feeding), these are reversible on recovery of the animal's

hearing and therefore not considered likely to lead to any long-term effects on the individual.

Table 1.142: Number of animals with the potential to experience TTS during UXO clearance at tier 1 projects

Project	Species	Maximum charge size (kg)	Metric	Maximum impact range (m)	Estimated number of animals in impact area
Morgan Generation Assets	Harbour porpoise	907	TTS SPL_{pk}	28,230	623
	Bottlenose dolphin			1,635	<1
	Grey seal		SEL	6,470	4
Awel y Môr	Harbour porpoise	164	TTS onset impact ranges SPL_{pk}	1,600	804
	Bottlenose dolphin			920	<1
	Grey seal			310	13
Project Erebus	Harbour porpoise	525	TTS SEL	4,000	20
	Bottlenose dolphin			530	0
	Grey seal			20,000	52

Tier 2

1.8.4.102 For tier 2 projects, except Mona Offshore Wind Project, beyond EIA scoping report there was not enough information to do a quantitative assessment. The EIA Scoping Reports do not provide detailed information about the potential impact of sound from UXO clearance. These projects are likely to have effects similar to the Morgan Generation Assets and will likely have similar measures (e.g. MMMPs or separate marine licences) to avoid injury; but at this stage a more detailed assessment cannot be presented.

1.8.4.103 The EIA Scoping Report for the Mona Offshore Wind Project (Mona Offshore Wind Ltd, 2022) identified PTS and disturbance (TTS/moving away response) to marine mammals resulting from underwater sound during UXO clearance as a potential impact during the construction phase of the project. A range of UXO sizes were assessed from 25kg up to 907kg with 130kg the most likely maximum. Subsequently, the PEIR (Mona Offshore Wind Ltd, 2023) predicted the largest potential impact ranges as a result of high order detonation of 908kg UXO size for harbour porpoise of up to 15km and 28km for PTS and TTS, respectively. Numbers of animals potentially impacted are presented in Table 1.143. Construction is expected to be from 2026 to 2030 and therefore may have four years of overlap with Morgan Generation Assets. Potential impacts including PTS and TTS injury and disturbance ranges are similar to those from Morgan Generation Assets and given the local proximity there is potential for in-combination effects to occur with the Mona Offshore Wind Project.

Table 1.143: Number of animals with the potential to experience onset PTS/TTS during UXO clearance at Mona Offshore Wind Project (Mona Offshore Wind Ltd., 2023).

Species	Maximum charge size leading to highest impact (kg)	Metric	Maximum impact range (m)	Estimated number of animals in impact area
PTS				
Harbour porpoise	907	SPL_{pk}	15,370	184
Bottlenose dolphin			890	<1
Grey seal and harbour seal			3,015	6 (grey seal) <1 (harbour seal)
TTS				
Harbour porpoise	907	SPL_{pk}	28,230	245
Bottlenose dolphin			1,635	<1
Grey seal and harbour seal		SPL_{pk}	5,550	19 (grey seal) <1 (harbour seal)

1.8.4.104 The EIA Scoping Report for Shelmalere Offshore Wind Farm (Shelmalere Offshore Wind Farm Ltd., 2022) concluded that a detailed UXO survey would be undertaken post-consent. No further information on UXO clearance method was given. Construction activities are planned from 2028, therefore it is unlikely there will be overlap in UXO clearance with the Morgan Generation Assets. This, in addition to the distance from the Morgan Generation Assets (201.4km) means minimal spatial overlap in UXO PTS and TTS ranges and limited potential for in-combination effects.

1.8.4.105 The Llŷr Projects (Llŷr 1/Llŷr 2) EIA Scoping Report confirms UXO surveys will be undertaken before construction and suggested the potential for UXO clearance will be high due to proximity of the inshore part of the study area to Castlemartin Range (Floventis Energy Ltd., 2022). Llŷr 1 and Llŷr 2 construction period is planned from 2024 to 2025 and therefore it is unlikely there will be overlap in UXO clearance with the Morgan Generation Assets. This, in addition to the distances from the Morgan Generation Assets (298.5km and 295km) mean minimal spatial overlap in UXO PTS and TTS ranges, and limited potential for in-combination effects.

1.8.4.106 The EIA Scoping Report for Inis Ealga Marine Energy Park proposed that UXO is scoped into the EIA (Inis Ealga Marine Energy Park Ltd., 2022). Construction is planned in 2028, therefore it is unlikely there will be overlap in UXO clearance with the Morgan Generation Assets as it will be carried out after Morgan Generation Assets construction period. This, in addition to the distance from the Morgan Generation Assets (327km) means likely minimal spatial overlap in UXO PTS and TTS ranges and limited potential for in-combination effects.

1.8.4.107 White Cross EIA Scoping Report includes clearance of unexploded ordnance at the wind project site and along the cable route to be scoped into the EIA (White Cross. 2020). Potential mitigation measures are to be considered such as Noise Abatement

Systems (NAS) and low-order detonations for UXO. White Cross construction is planned for mid-year 2024 and it is unlikely to overlap with UXO clearance for Morgan Generation Assets. Therefore, there is limited potential for in-combination effects with this project.

1.8.4.108 Codling Wind Park does not explicitly scope in or out sound from UXO clearance but does mention it will consider a MMMP for any potential UXO work (Codling Wind Park Limited, 2020). The construction phase is planned to be complete by 2027 and therefore some temporal overlap with Morgan Generation Assets construction is possible. Despite the lack of information, the smaller proposed extent (less UXOs within the area) and location on the east of Ireland (141.2km from Morgan Generation Assets) means there is limited potential for in-combination effects with Codling Wind Park.

1.8.4.109 Morgan and Morecambe Transmission Assets EIA Scoping Report details that UXO clearance will be assessed further in the EIA. Potential impacts including PTS and TTS ranges are expected to be similar to those from Morgan Generation Assets given the local proximity (11.2km), and assuming construction timeframes overlap the potential for an in-combination effect with Morgan and Morecambe Transmission Assets is possible.

1.8.4.110 For Morecambe Offshore Wind Farm Generation Assets, the EIA Scoping Report states underwater sound modelling will also be undertaken for the clearance of UXO. No publicly available information was available, at the time of writing, which quantifies the UXO clearance activities for the Morecambe Offshore Wind Farm Generation Assets. UXO potential impacts are likely to be similar to those from Morgan Generation Assets and given the local proximity (11.2km) and potential for overlap in construction timeframes the potential for an in-combination effect with Morecombe Offshore Wind Farm Generation Assets is possible.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

1.8.4.111 Volume 2, chapter 9: Marine mammals of the PEIR identified that the magnitude of the potential impact for all projects in terms of PTS is predicted to be of local to regional spatial extent, very short-term duration and intermittent. In line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. TTS was predicted to be of regional spatial extent, very short-term duration, intermittent and both the potential impact itself (i.e. risk of injury during the detonation event) and effect of TTS is reversible. In addition, injury ranges identified are also likely to be highly over-precautionary and in the case of Project Erebus the assessment used modelled high-order UXO clearance which is very unlikely to occur in practice, therefore potential impact ranges and number of animals within the impact range in reality is likely to be much lower.

Conclusions

1.8.4.112 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of underwater sound generated from UXO detonation during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from UXO detonation against each relevant conservation objective (see paragraphs 1.8.2.7 to 1.8.2.9) are discussed in Table 1.144.

Table 1.144: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC for in-combination underwater sound from UXO detonation during the construction phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Assuming standard industry measures (e.g. the measures adopted a part of the Morgan Generation Assets, as outlined in Table 1.60) are applied for each project, it is anticipated that for harbour porpoise would be deterred from the injury zone and therefore the risk of PTS would be low. Whilst some ecological functions could be inhibited in the short-term due to TTS, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the SAC and harbour porpoise will remain a viable component of the site.
There is no significant disturbance of the species	Given the distance of Morgan Generation Assets from the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km), the PTS and/or TTS range of the potential impact associated with the Morgan Generation Assets will not surpass 20% of relevant area disturbed in any given day or 10% of the relevant area of the site over a season with projects located in closer vicinity to the SAC and therefore disturbance as a result of UXO clearance in-combination with other projects is unlikely to be significant. Underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb harbour porpoise.
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO detonation to result in adverse effects on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets in-combination with other plans and projects, effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term. (see paragraphs 1.8.3.426 to 1.8.3.447). Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.113 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of underwater sound from UXO detonations with respect to the Morgan Generation Assets in-combination with other plans/projects.

North Channel SAC

Harbour porpoise

Conclusions

1.8.4.114 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the North Channel SAC will not occur as a result of underwater sound generated from UXO detonation during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound

generated from UXO detonation against each relevant conservation objective (see paragraphs 1.8.2.14 to 1.8.2.16) are discussed in Table 1.145.

Table 1.145: Conclusions against the conservation objectives of the North Channel SAC for in-combination underwater sound from UXO detonation during the construction phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Assuming standard industry measures (e.g. the measures adopted a part of the Morgan Generation Assets, as outlined in Table 1.60) are applied for each project, it is anticipated that for harbour porpoise would be deterred from the injury zone and therefore the risk of PTS would be low. Whilst some ecological functions could be inhibited in the short-term due to TTS, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the SAC and harbour porpoise will remain a viable component of the site.
There is no significant disturbance of the species	Given the distance of Morgan Generation Assets from the North Channel SAC (63.8km), the PTS and/or TTS range of the potential impact associated with the Morgan Generation Assets will not surpass 20% of relevant area disturbed in any given day or 10% of the relevant area of the site over a season with projects located in closer vicinity to the SAC and therefore disturbance as a result of UXO clearance in-combination with other projects is unlikely to be significant. Underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb harbour porpoise.
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO detonation to result in adverse effects on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets in-combination with other plans and projects, effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term. (see paragraphs 1.8.3.426 to 1.8.3.447). Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.115 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result underwater sound from UXO detonation with respect to the Morgan Generation Assets in-combination with other plans/projects.

Strangford Lough SAC

Harbour seal

1.8.4.116 For the tier 1 projects Awel y Môr and Project Erebus, harbour seal were scoped out of the EIA on the basis that this species was not reported in digital aerial surveys within the respective study areas. Therefore, a quantitative assessment cannot be undertaken however, due to a lack of presence of harbour seal within the tier 1 project study areas it is concluded that these projects cannot act in-combination with Morgan Generation Assets and therefore in-combination effects associated with Awel y Môr and Project Erebus will not lead to in-combination effects on harbour seal features of the SAC. There may be the potential for in-combination effects on harbour seal with the Mona Offshore Wind Project, however assuming standard industry measures applied for each project, it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be low. Whilst the implementation of mitigation such as ADDs may exacerbate the number of animals at risk of TTS, this potential impact is considered to be short-term with and full recovery of the animal's hearing is anticipated therefore no long-term effects on the individual are not expected to occur.

1.8.4.117 As outlined in paragraphs 1.8.4.92 to 1.8.4.116, UXO clearance associated with all other projects is considered either unlikely to overlap with UXO clearance at the Morgan Generation Assets or is located at a sufficient distance for in-combination effects to be highly unlikely. The only exception is for the Morecambe Generation assets. Although information was not available for this project to inform a quantitative assessment, it is considered that standard industry measures (such as a MMOs/PAM and ADDs) measures will also be employed for this project which will reduce the risk of injury to harbour porpoise.

Conclusions

1.8.4.118 Adverse effects on the qualifying harbour seal features which undermine the conservation objectives of the Strangford Lough SAC will not occur as a result of underwater sound generated from UXO detonation during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from UXO detonation against each relevant conservation objective (see paragraph 1.8.2.21) are discussed in Table 1.146. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.146: Conclusions against the conservation objectives of the Strangford Lough SAC for in-combination underwater sound from UXO detonation during the construction phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	The other projects and plans which are considered to have the potential to contribute to an in-combination effect with the Morgan Generation Assets are the Mona Offshore Wind Project, Morgan and Morecambe Transmission Assets and Morecombe Offshore Wind Farm Generation Assets. However, it is assumed that standard industry mitigation measures such as those outlined for the Morgan Generation Assets (Table 1.60) will also be applied for each project outlined above. It is anticipated that mitigation such as ADDs will deter animals from the injury zone and therefore the risk of PTS would be low for the projects considered. Whilst the implementation of mitigation such as ADDs may exacerbate the number of animals at risk of TTS, this potential impact is considered to be short-term with and full recovery of the animal's hearing is anticipated therefore no long-term effects on the individual are expected to occur. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal feature from being maintained or restored at favourable condition. Similarly, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of harbour seal from being maintained or enhanced.
Maintain and enhance, as appropriate, the harbour seal population	
Maintain and enhance, as appropriate, physical	There is no pathway for underwater sound in-combination effects from UXO detonation associated with Morgan Generation Assets in-combination with other projects (i.e. there will be no habitat loss/disturbance from underwater sound

Conservation Objective	Conclusion
features used by harbour seal within the site	associated with UXO detonation) to result in adverse effects on the physical features used by the harbour seal features within the site.

1.8.4.119 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Strangford Lough SAC as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Murlough SAC

Harbour seal

1.8.4.120 The Murlough SAC is located at an increased distance to the Morgan Generation Assets (98.4km from the Morgan Array Area) than the Strangford Lough SAC (94.6km from the Morgan Array Area), assessed in paragraphs 1.8.4.116 to 1.8.4.119. As the Murlough SAC is located at an increased distance from the Morgan Generations Assets than the Strangford Lough SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.121 Adverse effects on the qualifying harbour seal features which undermine the conservation objectives of the Murlough SAC will not occur as a result of underwater sound generated from UXO detonation during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from UXO detonation against each relevant conservation objective (see paragraph 1.8.2.26) are discussed in Table 1.147. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.147: Conclusions against the conservation objectives of the Murlough SAC for in-combination underwater sound from UXO detonation during the construction phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	The other projects and plans which are considered to have the potential to contribute to an in-combination effect with the Morgan Generation Assets are the Mona Offshore Wind Project, Morgan and Morecambe Transmission Assets and Morecombe Offshore Wind Farm Generation Assets. However, it is assumed that standard industry mitigation measures such as those outlined for the Morgan Generation Assets (Table 1.60) will also be applied for each project outlined above. It is anticipated that mitigation such as ADDs will deter animals from the injury zone and therefore the risk of PTS would be low for the projects considered. Whilst the implementation of mitigation such as ADDs may exacerbate the number of animals at risk of TTS, this potential impact is considered to be short-term with and full recovery of the animal's hearing is anticipated therefore no long-term effects on the individual are expected to occur. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal feature from being maintained or restored at favourable condition. Similarly, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not prevent the population and distribution of harbour seal from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of harbour seal	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound in-combination effects from UXO detonation associated with Morgan Generation Assets in-combination with other projects (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation) to result in adverse effects on the physical features used by the harbour seal features within the site.

1.8.4.122 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Murlough SAC as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC

Bottlenose dolphin and grey seal

Conclusions

1.8.4.123 Adverse effects on the qualifying bottlenose dolphin and grey seal features which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC will not occur as a result of underwater sound generated from UXO detonation during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from UXO detonation against each relevant conservation objective (see paragraphs 1.8.2.36 to 1.8.2.47) are discussed in Table 1.148.

Table 1.148: Conclusions against the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC for in-combination underwater sound from UXO detonation during the construction phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Assuming standard industry measures applied for each project (e.g. the measures adopted a part of the Morgan Generation Assets, as outlined in Table 1.60), it is anticipated that for bottlenose dolphin and grey seal would be deterred from the injury zone and therefore the risk of PTS would be low. Whilst some ecological functions could be inhibited in the short-term due to TTS, these are reversible on recovery of the animal's hearing and therefore not considered likely to lead to any long-term effects on the individual. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of bottlenose dolphin or grey seal using the SAC and bottlenose dolphin and grey seal will remain a viable component of their natural habitats.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	Given the distance of Morgan Generation Assets from the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km), the PTS and/or TTS ranges of the potential impact associated with the Morgan Generation Assets is unlikely to extend to the SAC. The Morgan Generation Assets will, therefore, not contribute to an in-combination impact. Therefore, the populations of bottlenose dolphin and grey seal within the site are such that the natural ranges of the population is not being reduced or likely to be reduced for the foreseeable future as a result of the Morgan Generation Assets in-combination with other projects.

Conservation Objective	Conclusion
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from UXO detonation to result in adverse effects on the habitats of bottlenose dolphin and grey seal (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets in-combination with other plans and projects, effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term (see paragraphs 1.8.3.426 to 1.8.3.447). Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of bottlenose dolphin and grey seal.

1.8.4.124 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC as a result underwater sound from UXO detonation with respect to the Morgan Generation Assets in-combination with other plans/projects.

The Maidens SAC

Grey seal

1.8.4.125 The Maidens SAC is located at an increased distance to the Morgan Generation Assets (141.8km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from the Morgan Array Area), assessed in paragraphs 1.8.4.123 to 1.8.4.124. As The Maidens SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.126 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of The Maidens SAC will not occur as a result of underwater sound generated from UXO detonation during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from UXO detonation against each relevant conservation objective (see paragraph 1.8.2.52) are discussed in Table 1.149. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.149: Conclusions against the conservation objectives of The Maidens SAC for in-combination underwater sound from UXO detonation during the construction phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the grey seal feature to favourable condition	Assuming standard industry measures applied for each project (e.g. the measures adopted a part of the Morgan Generation Assets, as outlined in Table 1.60), it is anticipated that for most species animals would be deterred from the injury zone and therefore the risk of PTS would be low. With the Morgan Generation Assets in-combination with other projects Whilst some ecological functions could be inhibited in the short-term due to TTS, these are reversible on recovery of the animal's hearing and therefore not considered likely to lead to any long-term effects on the individual. Underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other plans/projects will not prevent the grey seal population from being maintained or restored at/to favourable condition. Similarly, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not prevent the population numbers and distribution of grey seal from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of grey seal	
Maintain and enhance, as appropriate, physical features used by grey seal within the site	There is no pathway for underwater sound in-combination effects from UXO detonation associated with Morgan Generation Assets in-combination with other projects (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation) to result in adverse effects on the physical features used by the grey seal features within the site.

1.8.4.127 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of The Maidens SAC as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cardigan Bay/Bae Ceredigion SAC

Bottlenose dolphin

1.8.4.128 The Cardigan Bay/Bae Ceredigion SAC is located at an increased distance to the Morgan Generation Assets (188.2km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from the Morgan Array Area), assessed in paragraphs 1.8.4.123 to 1.8.4.124. As the Cardigan Bay/Bae Ceredigion SAC is located at an increased distance from the Morgan Generations Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.129 Adverse effects on the qualifying bottlenose dolphin features which undermine the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC will not occur as a result of underwater sound generated from UXO detonation during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from UXO detonation against each relevant conservation objective (see paragraphs 1.8.2.58 to 1.8.2.69) are discussed in Table 1.150.

Table 1.150: Conclusions against the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC for in-combination underwater sound from UXO detonation during the construction phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Assuming standard industry measures applied for each project (e.g. the measures adopted a part of the Morgan Generation Assets, as outlined in Table 1.60), it is anticipated that for bottlenose dolphin would be deterred from the injury zone and therefore the risk of PTS would be low. Whilst some ecological functions could be inhibited in the short-term due to TTS, these are reversible on recovery of the animal's hearing and therefore not considered likely to lead to any long-term effects on the individual. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of bottlenose dolphin using the SAC and bottlenose dolphin will remain a viable component of its natural habitat.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	Given the distance of Morgan Generation Assets from the Cardigan Bay/Bae Ceredigion SAC (188.2km), the PTS and/or TTS ranges of the potential impact associated with the Morgan Generation Assets is unlikely to extend to the SAC. The Morgan Generation Assets will, therefore, not contribute to an in-combination impact. Therefore, the population of bottlenose dolphin within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future as a result of the Morgan Generation Assets in-combination with other projects.
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from UXO detonation to result in adverse effects on the habitats of bottlenose dolphin (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets in-combination with other plans and projects, effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term (see paragraphs 1.8.3.426 to 1.8.3.447). Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the population of bottlenose dolphin.

1.8.4.130 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from UXO detonation with respect to the Morgan Generations Assets in-combination with other plans/projects.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.4.131 The Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance to the Morgan Generation Assets (237.6km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.123 to 1.8.4.124. As the Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.132 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of underwater sound generated from UXO detonation during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from UXO detonation against each relevant conservation objective (see paragraphs 1.8.2.75 to 1.8.2.85) are discussed in Table 1.151.

Table 1.151: Conclusions against the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC for in-combination underwater sound from UXO detonation during the construction phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Assuming standard industry measures applied for each project (e.g. the measures adopted a part of the Morgan Generation Assets, as outlined in Table 1.60), it is anticipated that for grey seal would be deterred from the injury zone and therefore the risk of PTS would be low. Whilst some ecological functions could be inhibited in the short-term due to TTS, these are reversible on recovery of the animal's hearing and therefore not considered likely to lead to any long-term effects on the individual. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of grey seal using the SAC and grey seal will remain a viable component of its natural habitat.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	Given the distance of Morgan Generation Assets from the Lleyn Peninsula and the Pembrokeshire Marine/Sir Benfro Forol SAC (237.6km), the PTS and/or TTS range of the potential impact associated with the Morgan Generation Assets is unlikely to extend to the SAC. The Morgan Generation Assets will, therefore, not contribute to an in-combination impact. Therefore, the population of grey seal within the site is such that the natural range of the population is not being reduced or likely to be Reduced for the foreseeable future as a result of the Morgan Generation Assets in-combination with other projects.
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from UXO detonation to result in adverse effects on the habitats of grey seal (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets in-combination with other plans and projects, effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term (see paragraphs 1.8.3.426 to 1.8.3.447). Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the population of grey seal.

1.8.4.133 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result underwater sound from UXO detonation with respect to the Morgan Generation Assets in-combination with other plans/projects.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

Conclusions

1.8.4.134 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC will not occur as a result of underwater sound generated from UXO detonation during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from UXO detonation against each relevant conservation objective (see paragraphs 1.8.2.90 to 1.8.2.92) are discussed in Table 1.152.

Table 1.152: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC for in-combination underwater sound from UXO detonation during the construction phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Assuming standard industry measures (e.g. the measures adopted a part of the Morgan Generation Assets, as outlined in Table 1.60) are applied for each project, it is anticipated that for harbour porpoise would be deterred from the injury zone and therefore the risk of PTS would be low. Whilst some ecological functions could be inhibited in the short-term due to TTS, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the SAC and harbour porpoise will remain a viable component of the site.
There is no significant disturbance of the species	There is no spatial overlap of the injury ranges associated with UXO detonation and the SAC and therefore harbour porpoise will not be excluded from any part of the SAC and the disturbance thresholds will not be exceeded. Underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb harbour porpoise.
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO detonation to result in adverse effects on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Morgan Generation Assets in-combination with other plans and projects, effects are not considered to be significant or long-term ensuring that the project will not affect prey species populations being maintained in the long term. (see paragraphs 1.8.3.426 to 1.8.3.447). Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.135 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result underwater sound from UXO detonation with respect to the Morgan Generation Assets in-combination with other plans/projects.

Lundy SAC

Grey seal

1.8.4.136 The Lundy SAC is located at an increased distance to the Morgan Generation Assets (334.9km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.123 to 1.8.4.124. As The Lundy SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.137 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Lundy SAC will not occur as a result of underwater sound generated from UXO detonation during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from UXO detonation against each relevant conservation objective (see paragraphs 1.8.2.97 to 1.8.2.99) are discussed in Table 1.153. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.153: Conclusions against the conservation objectives of the Lundy SAC for in-combination underwater sound from UXO detonation during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound in-combination effects from UXO detonation to result in adverse effects on the habitats of grey seal (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not prevent the extent and distribution, structure and function or the supporting processes of the habitats of grey seal from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Assuming standard industry measures applied for each project, it is anticipated that for grey seal would be deterred from the injury zone and therefore the risk of PTS would be low. Whilst some ecological functions could be inhibited in the short-term due to TTS, these are reversible on recovery of the animal's hearing and therefore not considered likely to lead to any long-term effects on the individual. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of grey seal from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	Given the distance of Morgan Generation Assets from the Lundy SAC (334.9km), the PTS and/or TTS range of the potential impact associated with the Morgan Generation Assets will not overlap with the SAC. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not prevent the distribution of grey seal from being maintained or restored.

1.8.4.138 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lundy SAC as a result underwater sound from UXO detonation with respect to the Morgan Generation Assets in-combination with other plans/projects.

Isles of Scilly Complex SAC

Grey seal

1.8.4.139 The Isles of Scilly Complex SAC is located at an increased distance to the Morgan Generation Assets (465km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.123 to 1.8.4.124. As Isles of Scilly Complex SAC is located at an increased distance from the Morgan Generation Assets than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.140 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Isles of Scilly Complex SAC will not occur as a result of underwater sound generated from UXO detonation during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from UXO detonation against each relevant conservation objective (see paragraphs 1.8.2.104 to 1.8.2.106) are discussed in Table 1.154. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.154: Conclusions against the conservation objectives of the Isles of Scilly Complex SAC for in-combination underwater sound from UXO detonation during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound in-combination effects from UXO detonation to result in adverse effects on the habitats of grey seal (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO detonation). Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not prevent the extent and distribution, structure and function or the supporting processes of the habitats of grey seal from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Assuming standard industry measures applied for each project, it is anticipated that for grey seal would be deterred from the injury zone and therefore the risk of PTS would be low. Whilst some ecological functions could be inhibited in the short-term due to TTS, these are reversible on recovery of the animal's hearing and therefore not considered likely to lead to any long-term effects on the individual. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of grey seal from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	Given the distance of Morgan Generation Assets from the Isles of Scilly Complex SAC (465km), the PTS and/or TTS range of the potential impact associated with the Morgan Generation Assets will not overlap with the SAC. Therefore, underwater sound from UXO detonation associated with the Morgan Generation Assets in-combination with other projects will not prevent the distribution of grey seal from being maintained or restored.

1.8.4.141 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Isles of Scilly Complex SAC as a result underwater sound from UXO detonation with respect to the Morgan Generation Assets in-combination with other plans/projects.

Sites assessed in line with the iterative approach

1.8.4.142 As outlined in paragraphs 1.8.1.3 to 1.8.1.8, following the iterative approach adopted for this HRA Stage 2 ISAA Report, the closest European site to the Morgan Generation Assets within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment in the sections above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA Report, are located at a greater distance from the Morgan Generation Assets and, on this basis, it is considered that effects on the marine mammal features of these sites would be of similar if not lower magnitude than those concluded for the sites subject to a full assessment. The conclusions of the assessments presented in paragraphs 1.8.4.111 to 1.8.4.141 are, therefore, deemed to be applicable for the remaining sites presented below in paragraphs 1.8.4.143 to 1.8.4.165.

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.4.143 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cardigan Bay/Bae Ceredigion SAC

Grey seal

1.8.4.144 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs 1.8.4.123 to 1.8.4.124), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Rockabill to Dalkey Island SAC

1.8.4.145 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Rockabill to Dalkey Island SAC as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Saltee Islands SAC

1.8.4.146 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs 1.8.4.123 to 1.8.4.124), it can be concluded that there is **no risk of an adverse effect**

on the integrity of the Saltee Islands SAC as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Roaringwater Bay and Islands SAC

1.8.4.147 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Roaringwater Bay and Islands SAC as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Blasket Islands SAC

1.8.4.148 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Blasket Islands SAC as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Mers Celtiques – Talus du golfe de Gascogne SCI

1.8.4.149 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Mers Celtiques – Talus du golfe de Gascogne SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Abers – Côte des legends SCI

1.8.4.150 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Abers – Côte des legends SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Ouessant-Molène SCI

1.8.4.151 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ouessant-Molène SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Côte de Granit rose-Sept-Iles SCI

1.8.4.152 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côte de Granit rose-Sept-Iles SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Anse de Goulven, dunes de Keremma SCI

1.8.4.153 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Goulven, dunes de Keremma SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Tregor Goëlo SCI

1.8.4.154 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Tregor Goëlo SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Côtes de Crozon SCI

1.8.4.155 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côtes de Crozon SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Chaussée de Sein SCI

1.8.4.156 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Chaussée de Sein SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cap Sizun SCI

1.8.4.157 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap Sizun SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Récifs du talus du golfe de Gascogne SCI

1.8.4.158 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Récifs du talus du golfe

de Gascogne SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Anse de Vauville SCI

1.8.4.159 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Vauville SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cap d'Erquy-Cap Fréhel SCI

1.8.4.160 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap d'Erquy-Cap Fréhel SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie de Saint-Brieuc – Est SCI

1.8.4.161 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Saint-Brieuc – Est SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Banc et récifs de Surtainville SCI

1.8.4.162 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Banc et récifs de Surtainville SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.8.4.163 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Estuaire de la Rance SCI

1.8.4.164 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Estuaire de la Rance SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie du Mont Saint-Michel SCI

1.8.4.165 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.111 to 1.8.4.115), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie du Mont Saint-Michel SCI as a result of underwater sound from UXO detonation with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

In-combination injury and disturbance from underwater sound from pre-construction site investigation surveys

1.8.4.166 There is potential for injury and disturbance from underwater sound from pre-construction site investigation surveys as a result of activities associated with the Morgan Generation Assets during construction, in-combination with activities associated with the following tier 2 projects/plans (see Figure 1.10): Morecambe Offshore Wind Farm and Mona Offshore Wind Project). No tier 1 or tier 3 project in Table 1.126have assessed pre-construction site investigation surveys as an effect pathway and are therefore scoped out of the in-combination effects assessment.

1.8.4.167 The risk of injury to marine mammal receptors in terms of PTS as a result of underwater sound due to site investigation surveys would be expected to be localised to within the boundaries of the respective projects. The assessment for the Morgan Generation Assets found that the ranges of effect are expected to be relatively small and the magnitude of the potential impact with respect to auditory injury occurring in marine mammals has been conservatively assessed to be low (see paragraphs 1.8.3.177 to 1.8.3.190 and volume 2, chapter 9: Marine mammals of the PEIR). Therefore, there is very low potential for in-combination effects for injury from elevated underwater sound due to site investigation surveys and the in-combination assessment provided here focuses on disturbance only.

Construction phase

Tier 2

1.8.4.168 The construction phases of the Mona Offshore Wind Project and the Morecambe Offshore Wind Farm will temporally and spatially overlap with the Morgan Generation Assets in terms of construction sound from pre-construction site investigation surveys.

1.8.4.169 Given that EIA Scoping Reports do not provide detailed information about site investigation surveys involved, it is not possible to undertake full, quantitative assessment for this impact and therefore a qualitative assessment is provided below. However, for Mona Offshore Wind Project both the Scoping Report (Mona Offshore Wind Ltd, 2022) and the PEIR (Mona Offshore Wind Ltd, 2023) are available. The PEIR predicted most of the potential impact ranges to be within 100s of meters, with the greatest distance over which the disturbance can occur out to approximately 31km, during vibro-coring (Mona Offshore Wind Ltd, 2023).

1.8.4.170 Based on the distance from the Morgan Generation Assets to the Mona Offshore Wind Project and Morecambe Offshore Wind Project, if pre-construction site investigation

surveys were to temporally overlap with the construction phase of the Morgan Generation Assets, it is likely that spatial overlap of disturbance ranges would occur, especially for site investigation surveys taking place in the north part of the Mona Array Area and north-west part of the Morecambe Array Area, nearest to the Morgan Array Area. Due to the small distance between projects, animals are likely to be displaced from an area comparable to piling contours at the Morgan Generation Assets alone.

Although the duration of site-investigation surveys is considered to be short term and localised for each project, it should be noted that these will occur intermittently over a number of years with isolated surveys occurring at different points in time throughout the Irish Sea.

1.8.4.171 Therefore, the in-combination potential impact of site investigation surveys leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after surveys have ceased. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets are likely to also have measures including a MMMP which will further reduce the potential for in-combination sound effects from pre-construction site investigation surveys.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

Conclusions

1.8.4.172 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of underwater sound generated from pre-construction site investigation surveys during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from pre-construction site investigation surveys against each relevant conservation objective (see paragraphs 1.8.2.7 to 1.8.2.9) are discussed in Table 1.155. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.155: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC from in-combination underwater sound from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that underwater sound from pre-construction site investigation surveys will be intermittent, that there is no potential for injury within range of the SAC, that the sound of vessels is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb the harbour porpoise designated feature.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from pre-construction site investigation surveys to result in adverse effects on the habitats of harbour porpoise. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.173 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

North Channel SAC

Harbour porpoise

1.8.4.174 The North Channel SAC is located at an increased distance to the Morgan Generation Assets (63.8km from the Morgan Array Area) than the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area), assessed in paragraphs 1.8.4.172 to 1.8.4.173. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.175 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the North Channel SAC will not occur as a result of underwater sound generated from pre-construction site investigation surveys during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from pre-construction site investigation surveys against each relevant conservation objective (see paragraphs 1.8.2.14 to 1.8.2.16) are discussed in Table 1.156. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.156: Conclusions against the conservation objectives of the North Channel SAC from in-combination underwater sound from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that underwater sound from pre-construction site investigation surveys will be intermittent, that there is no potential for injury within range of the SAC, that the sound of vessels is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb the harbour porpoise designated feature.
There is no significant disturbance of the species	

Conservation Objective	Conclusion
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from pre-construction site investigation surveys to result in adverse effects on the habitats of harbour porpoise. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.176 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Strangford Lough SAC

Harbour seal

Conclusions

1.8.4.177 Adverse effects on the qualifying harbour seal features which undermine the conservation objectives of the Strangford Lough SAC will not occur as a result of underwater sound generated from pre-construction site investigation surveys during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from pre-construction site investigation surveys against each relevant conservation objective (see paragraph 1.8.2.21) are discussed in Table 1.157. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.157: Conclusions against the conservation objectives of the Strangford Lough SAC from in-combination underwater sound from pre-construction site investigation surveys.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that underwater sound from pre-construction site investigation surveys will be intermittent, that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal population from being maintained or enhanced.
Maintain and enhance, as appropriate, the harbour seal population	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound in-combination effects from pre-construction site investigation surveys to result in adverse effects on the physical features used by harbour seal within the site. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.4.178 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Strangford Lough SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Murlough SAC

Harbour seal

1.8.4.179 The Murlough SAC is located at an increased distance to the Morgan Generation Assets (98.4km from the Morgan Array Area) than the Strangford Lough SAC (94.6km from the Morgan Array Area), assessed in paragraphs 1.8.4.177 to 1.8.4.178. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.180 Adverse effects on the qualifying harbour seal features which undermine the conservation objectives of the Murlough SAC will not occur as a result of underwater sound generated from pre-construction site investigation surveys during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from pre-construction site investigation surveys against each relevant conservation objective (see paragraph 1.8.2.26) are discussed in Table 1.158. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.158: Conclusions against the conservation objectives of the Murlough SAC from in-combination underwater sound from pre-construction site investigation surveys.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that underwater sound from pre-construction site investigation surveys will be intermittent, that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with Morgan Generation Assets in-combination with other projects will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal population numbers and distribution from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of harbour seal	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound in-combination effects from pre-construction site investigation surveys to result in adverse effects on the physical features used by harbour seal within the site. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.4.181 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Murlough SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC

Bottlenose dolphin and grey seal

Conclusions

1.8.4.182 Adverse effects on the qualifying bottlenose dolphin and grey seal features which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC will not occur as a result of underwater sound generated from pre-construction site investigation surveys during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from pre-construction site investigation surveys against each relevant conservation objective (see paragraphs 1.8.2.36 to 1.8.2.47) are discussed in Table 1.159. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.159: Conclusions against the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC from in-combination underwater sound from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that underwater sound from pre-construction site investigation surveys will be intermittent, that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent populations of bottlenose dolphin and grey seal from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not reduce nor likely reduce for the foreseeable future the natural range of the populations of bottlenose dolphin and grey seal.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from pre-construction site investigation surveys to result in adverse effects on the habitats of bottlenose dolphin and grey seal. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of bottlenose dolphin and grey seal.

1.8.4.183 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

The Maidens SAC

Grey seal

1.8.4.184 The Maidens SAC is located at an increased distance to the Morgan Generation Assets (141.8km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from the Morgan Array Area), assessed in paragraphs 1.8.4.182 to 1.8.4.183. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.185 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of The Maidens SAC will not occur as a result of underwater sound generated from pre-construction site investigation surveys during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from pre-construction site investigation surveys against each relevant conservation objective (see paragraph 1.8.2.52) are discussed in Table 1.160. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.160: Conclusions against the conservation objectives of The Maidens SAC from in-combination underwater sound from pre-construction site investigation surveys.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the grey seal feature to favourable condition	Given that underwater sound from pre-construction site investigation surveys will be intermittent, that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with Morgan Generation Assets in-combination with other projects will not prevent the grey seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent the grey seal population numbers and distribution from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of grey seal	
Maintain and enhance, as appropriate, physical features used by grey seal within the site	There is no pathway for underwater sound in-combination effects from pre-construction site investigation surveys to result in adverse effects on the physical features used by grey seal within the site. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent physical features used by grey seal within the site from being maintained or enhance.

1.8.4.186 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of The Maidens SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cardigan Bay/Bae Ceredigion SAC

Bottlenose dolphin

1.8.4.187 The Cardigan Bay/Bae Ceredigion SAC is located at an increased distance to the Morgan Generation Assets (188.2km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from the Morgan Array Area), assessed in paragraphs 1.8.4.182 to 1.8.4.183. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.188 Adverse effects on the qualifying bottlenose dolphin features which undermine the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC will not occur as a result of underwater sound generated from pre-construction site investigation surveys during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from pre-construction site investigation surveys against each relevant conservation objective (see paragraphs 1.8.2.58 to 1.8.2.69) are discussed in Table 1.161. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.161: Conclusions against the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC from in-combination underwater sound from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that underwater sound from pre-construction site investigation surveys will be intermittent, that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent populations of bottlenose dolphin from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not reduce nor likely reduce for the foreseeable future the natural range of the populations of bottlenose dolphin.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from pre-construction site investigation surveys to result in adverse effects on the habitats of bottlenose dolphin. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of bottlenose dolphin.

1.8.4.189 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.4.190 The Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance to the Morgan Generation Assets (237.6km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.182 to 1.8.4.183. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.191 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of underwater sound generated from pre-construction site investigation surveys during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from pre-construction site investigation surveys against each relevant conservation objective (see paragraphs 1.8.2.75 to 1.8.2.85) are discussed in Table 1.162. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.162: Conclusions against the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC from in-combination underwater sound from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that underwater sound from pre-construction site investigation surveys will be intermittent, that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent populations of grey seal from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not reduce nor likely reduce for the foreseeable future the natural range of the populations of grey seal.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from pre-construction site investigation surveys to result in adverse effects on the habitats of grey seal. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of grey seal.

1.8.4.192 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

1.8.4.193 The Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located at an increased distance to the Morgan Generation Assets (300.1km from the Morgan Array Area) than the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area), assessed in paragraphs 1.8.4.172 to 1.8.4.173. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.194 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren

SAC will not occur as a result of underwater sound generated from pre-construction site investigation surveys during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from pre-construction site investigation surveys against each relevant conservation objective (see paragraphs 1.8.2.90 to 1.8.2.92) are discussed in Table 1.163. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.163: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC from in-combination underwater sound from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that underwater sound from pre-construction site investigation surveys will be intermittent, that there is no potential for injury within range of the SAC, that the sound of vessels is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb the harbour porpoise designated feature.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from pre-construction site investigation surveys to result in adverse effects on the habitats of harbour porpoise. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.195 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Lundy SAC

Grey seal

1.8.4.196 The Lundy SAC is located at an increased distance to the Morgan Generation Assets (334.9km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.182 to 1.8.4.183. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.197 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Lundy SAC will not occur as a result of underwater sound generated from pre-construction site investigation surveys during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from pre-construction site investigation surveys against each relevant conservation objective (see paragraphs 1.8.2.97 to 1.8.2.99) are discussed in Table 1.164. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.164: Conclusions against the conservation objectives of the Lundy SAC from in-combination underwater sound from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound in-combination effects from pre-construction site investigation surveys to result in adverse effects on the habitats of the qualifying species neither on the habitats structure, function and supporting processes. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent the extent and distribution of the habitats of grey seal from being maintained or restored. Similarly, underwater sound in-combination effects as a result of pre-construction site investigation surveys associated with Morgan Generation Assets in-combination with other projects will not prevent the structure and function of the habitats of grey seal from being maintained or restored nor prevent the supporting processes of the habitats of grey seal from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that underwater sound from pre-construction site investigation surveys will be intermittent, that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent the population and distribution of grey seal from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.4.198 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lundy SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Isles of Scilly Complex SAC

Grey seal

1.8.4.199 The Isles of Scilly Complex SAC is located at an increased distance to the Morgan Generation Assets (465km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.182 to 1.8.4.183. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.200 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Isles of Scilly Complex SAC will not occur as a result of underwater sound generated from pre-construction site investigation surveys during the construction and decommissioning phase of the Morgan Generation Assets in-

combination with other projects and plans. An assessment of the potential impact of underwater sound generated from pre-construction site investigation surveys against each relevant conservation objective (see paragraphs 1.8.2.104 to 1.8.2.106) are discussed in Table 1.165. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.165: Conclusions against the conservation objectives of the Isles of Scilly Complex SAC from in-combination underwater sound from pre-construction site investigation surveys.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound in-combination effects from pre-construction site investigation surveys to result in adverse effects on the habitats of the qualifying species neither on the habitats structure, function and supporting processes. Therefore, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent the extent, distribution, structure and function of the habitats of grey seal or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that underwater sound from pre-construction site investigation surveys will be intermittent, that there is no potential for injury within range of the SAC, that sound of vessel is likely to deter animals and that there is likely recovery from disturbance, underwater sound from pre-construction site investigation surveys associated with the Morgan Generation Assets in-combination with other projects will not prevent the population and distribution of grey seal from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.4.201 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Isles of Scilly Complex SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Sites assessed in line with the iterative approach

1.8.4.202 As outlined in paragraphs 1.8.1.3 to 1.8.1.8, following the iterative approach adopted for this HRA Stage 2 ISAA Report, the closest European site to the Morgan Generation Assets within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment in the sections above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA Report, are located at a greater distance from the Morgan Generation Assets and, on this basis, it is considered that effects on the marine mammal features of these sites would be of similar if not lower magnitude than those concluded for the sites subject to a full assessment. The conclusions of the assessments presented in paragraphs 1.8.4.172 to 1.8.4.201 are, therefore, deemed to be applicable for the remaining sites presented below in paragraphs 1.8.4.203 to 1.8.4.225.

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.4.203 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cardigan Bay/Bae Ceredigion SAC

Grey seal

1.8.4.204 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (paragraphs 1.8.4.182 to 1.8.4.183), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Rockabill to Dalkey Island SAC

1.8.4.205 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Rockabill to Dalkey Island SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Saltee Islands SAC

1.8.4.206 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (paragraphs 1.8.4.182 to 1.8.4.183), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Saltee Islands SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Roaringwater Bay and Islands SAC

1.8.4.207 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Roaringwater Bay and Islands SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Blasket Islands SAC

1.8.4.208 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Blasket Islands SAC as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Mers Celtiques – Talus du golfe de Gascogne SCI

1.8.4.209 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Mers Celtiques – Talus du golfe de Gascogne SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Abers – Côte des legends SCI

1.8.4.210 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Abers – Côte des legends SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Ouessant-Molène SCI

1.8.4.211 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ouessant-Molène SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Côte de Granit rose-Sept-Iles SCI

1.8.4.212 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côte de Granit rose-Sept-Iles SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Anse de Goulven, dunes de Keremma SCI

1.8.4.213 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Goulven, dunes de Keremma SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Tregor Goëlo SCI

1.8.4.214 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Tregor Goëlo SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Côtes de Crozon SCI

1.8.4.215 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côtes de Crozon SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Chaussée de Sein SCI

1.8.4.216 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Chaussée de Sein SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cap Sizun SCI

1.8.4.217 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC(paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap Sizun SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Récifs du talus du golfe de Gascogne SCI

1.8.4.218 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Récifs du talus du golfe de Gascogne SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Anse de Vauville SCI

1.8.4.219 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Vauville SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cap d'Erquy-Cap Fréhel SCI

1.8.4.220 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap d'Erquy-Cap Fréhel SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie de Saint-Brieuc – Est SCI

1.8.4.221 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Saint-Brieuc – Est SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Banc et récifs de Surtainville SCI

1.8.4.222 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Banc et récifs de Surtainville SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.8.4.223 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Estuaire de la Rance SCI

1.8.4.224 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Estuaire de la Rance SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie du Mont Saint-Michel SCI

1.8.4.225 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.172 to 1.8.4.176), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie du Mont Saint-Michel SCI as a result of underwater sound from pre-construction site investigation surveys with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

In-combination injury and disturbance from underwater sound from vessels and other (non-piling) sound producing activities

1.8.4.226 There is potential for injury and disturbance from underwater sound from vessels and other (non-piling) sound producing activities associated with the Morgan Generation Assets during construction, to act in-combination with activities associated with all the projects/plans in Table 1.126 and Figure 1.10.

1.8.4.227 As for the assessment of the Morgan Generation Assets alone, the risk of injury in terms of PTS to marine mammal receptors as a result of underwater sound due to vessel use and other non-piling sound producing activities would be expected to be very low. PTS thresholds would not be exceeded or would be very localised (<10m) from the source. The assessment for Morgan Generation Assets alone (paragraphs 1.8.3.265 to 1.8.3.278) found relatively small ranges of effects and low potential impact with respect to auditory injury occurring in marine mammal qualifying features. Given the above, there is very low potential for in-combination effects for injury from elevated underwater sound due to vessel use and other (non-piling) sound producing activities. Instead, the in-combination assessment provided below focuses on disturbance only for this potential impact.

Construction and decommissioning phases

Tier 1

1.8.4.228 The construction and operations and maintenance phases of Awel y Môr Offshore Wind Farm, the operations and maintenance phase of the West Anglesey Demonstration Zone tidal site and Project Erebus will temporally and spatially overlap with the Morgan Generation Assets in terms of construction underwater sound from vessels and other (non-piling) sound producing activities and may lead to cumulative disturbance to marine mammals.

1.8.4.229 Awel y Môr Offshore Wind Farm is located approximately 47.2km from the Morgan Generation Assets. The MDS for Awel y Môr anticipated up to 101 construction vessels in total, of which 35 may be on site during peak period (RWE, 2022) and two jack-up vessels and two SOVs would be present at any one time during operations. The assessment is based on desktop study assuming that, based on Benhemma-Le Gall *et al*. (2021), harbour porpoise and other cetaceans may be displaced up to 4km from construction vessels. The assessment also identified localised potential impacts in terms of behavioural disturbance with harbour porpoise and grey seal with avoidance reported up to 5km from the site during dredging activities. For bottlenose dolphin, dredging was predicted to cause a reduction in presence and avoidance of the area for five weeks.

1.8.4.230 West Anglesey Demonstration Zone tidal site, which is located 79.2km from the Morgan Array Area, provided a quantitative assessment of potential impacts based on a MDS of up to 16 vessels on site at any one time during the operations and maintenance phase of the project (Morlais, 2019).

1.8.4.231 The Project Erebus site is located 289.8km from the Morgan Array Area and comprises up to 10 floating wind turbines over a maximum area of 32km^2. The MDS anticipated a maximum of two CTVs on site per day during the operations and maintenance phase of the project (Blue Gem Wind, 2020). These vessels would be expected to be stationary or slow moving and would not be a novel impact pathway for marine mammals in the area (Blue Gem Wind, 2020).

1.8.4.232 It is a standard practice that estimated ranges over which behavioural disturbance may occur are presented for different vessel types in isolation. For Morgan Generation Assets, disturbance ranges of up to 21km were predicted for survey vessel, support vessels, CTV, scour/cable protection/seabed preparation and installation vessels. It is likely that several activities could be potentially occurring at the same time across several offshore wind projects and therefore ranges of effects may extend from several vessels/locations where the activity is carried out.

1.8.4.233 Therefore, cumulatively across the sites there will be an increase in vessel activity within the Celtic and Irish Seas regional area. This represents an uplift from the current baseline, although noting that the assessments are based on the MDS, the number of vessels present at respective projects at any given time will be in reality lower. Additionally, vessel movements will be confined to the array areas and/or offshore cable corridor routes and will follow existing shipping routes to/from port. Therefore, the number of vessels present at each project at any given time is not additive. Introduction of vessels during construction and operations and maintenance phases of the projects will not be a novel impact for marine mammals present in the area and therefore marine mammals are anticipated to demonstrate some degree of habituation to vessel sounds.

1.8.4.234 Although the duration of vessel activity is considered to be medium term (throughout the construction phase of Morgan Generation Assets) and localised for each project, it should be noted that vessel movements will occur intermittently over a number of years. Vessels such as boulder clearance, jack-up rigs, tug/anchor handlers and guard vessels will have smaller disturbance ranges (between 0.01 to 6km) and therefore the extent of effect will be local. However, where vessels may disturb animals over ranges of 21km, it represents a larger proportion of the Irish and Celtic Seas and may potentially affect animals over regional scales. Nevertheless, most of the vessels will be associated with construction phases of Awel y Môr and Morgan Generation Assets and both projects are located within the area of relatively low marine mammals densities (except bottlenose dolphins, see volume 6, annex 9.1: Marine mammal technical report of the PEIR).

1.8.4.235 The cumulative effect is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility.

Tier 2

1.8.4.236 The construction of the Morgan Generation Assets, together with construction and/or operations and maintenance phases of tier 1 projects and the construction phase of the Mona Offshore Wind Project, Morgan and Morecambe Transmission Assets, Shelmalere Offshore Wind Farm and Inis Ealga Marine Energy Park, the operations and maintenance phase of the Llŷr Projects (Llŷr 1 and Llŷr 2), and both the construction and operations and maintenance phases of the North Irish Sea Array, Codling Wind Park, Dublin Array and White Cross, Oriel Offshore Wind Farm, Morecambe Offshore Wind Farm Generation Assets, Arklow Bank Wind Park Phase 2 (Table 1.126) may lead to disturbance to marine mammals from vessel use and other (non-piling) sound producing activities. Timelines of the construction as well as operations and maintenance phases of Oriel Offshore Wind Farm, Morecambe Offshore Wind Farm Generation Assets, Arklow Bank Wind Park Phase 2 are unknown. However, it has been conservatively assumed that there will be a temporal overlap with the construction phase of the Morgan Generation Assets.

1.8.4.237 Cable laying activities assessed for the Mona Offshore Wind Project alone have the potential to disturb marine mammals out to 19km. The maximum range over which potential disturbance may occur for the Mona Offshore Wind Project alone was predicted out to 22km as a result of sandwave clearance vessel, installation vessel, construction vessel, rock placement vessel and cable installation vessels. The Mona Offshore Wind Project PEIR predicted up to 80 vessels to be present on site at any given time during the construction phase (Mona Offshore Wind Ltd., 2023).

1.8.4.238 The range of effects for remaining tier 2 project is predicted to be localised to within each project boundary. Given that EIA Scoping Reports do not provide detailed information about numbers of vessels involved, it is not possible to undertake full, quantitative assessment including the other projects for this potential impact. For some of the tier 2 projects (including Shelmalere Offshore Wind Farm, Oriel Offshore Wind Farm, North Irish Sea Array, Codling Wind Park, Dublin Array, the Llŷr projects and Inis Ealga Marine Energy Park), the distances from the Morgan Generation Assets are greater than 100km and there is no potential for overlap in the behavioural ZOI. Other projects, including Mona Offshore Wind Project, Morgan and Morecambe Transmission Assets, Morecambe Offshore Wind Farm Generation Asset are located in proximity to the Morgan Generation Assets and therefore this could lead to higher levels of traffic within the Liverpool Bay region. Vessel movements and other activities will be largely confined to the array areas and/or offshore cable corridor and vessel routes will follow existing shipping routes to/from port.

1.8.4.239 The duration of vessel activity is considered to be medium term, however, it should be noted that vessel movements will occur intermittently over a number of years. The cumulative number of vessels for tier 1 projects represents an increase compared to the average vessel traffic (see paragraph 1.8.4.233). Although the exact number of vessels associated with most tier 2 projects is unknown, if construction phase at all tier 2 projects will occur simultaneously, vessels associated with each project will contribute further to the increase over a number of years.

1.8.4.240 Cumulatively, construction activities could lead to a larger area of disturbance to marine mammals at any one time across the Irish and Celtic seas compared to the Morgan Generation Assets alone assuming that projects were to conduct construction activities over similar time periods. Vessels such as boulder clearance, jack-up rigs, tug/anchor handlers and guard vessels will have smaller disturbance ranges (between ≤6km) and therefore the extent of effect will be local. However, where vessels may disturb animals over ranges of 21 to 22km, it represents a larger proportion of the Irish and Celtic Seas and may potentially affect animals over regional scales (noting that these ranges are highly conservative and that in reality these ranges are expected to be much lower). Although animals may be disturbed from isolated project areas at different points in time, in the context of the wider habitat available within the Celtic and Irish Seas regional study area, the scale of the disturbance effects (which would be localised) is considered to be small.

1.8.4.241 Therefore, the potential in-combination impact of underwater sound from vessel use and other activities leading to behavioural effects is predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility.

1.8.4.242 Any in-combination effects are predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after vessel use and other activities have ceased. Despite the known sensitivity of harbour porpoise to vessel sound, Culloch *et al*. (2016) found no detectable decrease in the numbers of harbour porpoise associated with an increase in vessel activity during pipeline construction. Given the existing levels of vessel activity within the Irish Sea, it is expected that marine mammals could tolerate the effects of vessel presence to some extent. The potential impacts of construction will be highly localised, largely restricted to the boundaries of the respective projects, vessels will follow existing shipping routes to/from port and only a small area will be affected when compared to available foraging habitat. Therefore, it is anticipated that the connectivity with suitable foraging grounds and supporting habitats will not be impaired. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets are likely to have measures including a MMMP which will further reduce the potential for in-combination sound effects from vessel use and other activities.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

Conclusions

1.8.4.243 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of underwater sound generated from vessels and other (non-piling) sound producing activities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from vessels and other (non-piling) sound producing activities against each relevant conservation objective (see paragraphs 1.8.2.7 to 1.8.2.9) are discussed in Table 1.166. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.166: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the construction phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury within range of the SAC, limited disturbance within the SAC when compared with available foraging habitat, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb the harbour porpoise designated feature.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of harbour porpoise. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.244 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of underwater sound from vessel use and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

North Channel SAC

Harbour porpoise

1.8.4.245 The North Channel SAC is located at an increased distance to the Morgan Generation Assets (63.8km from the Morgan Array Area) than the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area), assessed in paragraphs 1.8.4.243 to 1.8.4.244. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.246 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the North Channel SAC will not occur as a result of underwater sound generated from vessels and other (non-piling) sound producing activities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from vessels and other (non-piling) sound producing activities against each relevant conservation objective (see paragraphs 1.8.2.14 to 1.8.2.16) are discussed in Table 1.167. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.167: Conclusions against the conservation objectives of the North Channel SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the construction phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury within range of the SAC, limited disturbance within the SAC when compared with available foraging habitat, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated

Conservation Objective	Conclusion
There is no significant disturbance of the species	with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb the harbour porpoise designated feature.
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of harbour porpoise. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.247 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result of underwater sound from vessel use and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Strangford Lough SAC

Harbour seal

Conclusions

1.8.4.248 Adverse effects on the qualifying harbour seal features which undermine the conservation objectives of the Strangford Lough SAC will not occur as a result of underwater sound generated from vessels and other (non-piling) sound producing activities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from vessels and other (non-piling) sound producing activities against each relevant conservation objective (see paragraph 1.8.2.21) are discussed in Table 1.168. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.168: Conclusions against the conservation objectives of the Strangford Lough SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the construction phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of harbour seal from being maintained or enhanced.
Maintain and enhance, as appropriate, the harbour seal population	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of the qualifying species. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.4.249 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Strangford Lough SAC as a result of underwater sound from vessel use and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Murlough SAC

Harbour seal

1.8.4.250 The Murlough SAC is located at an increased distance to the Morgan Generation Assets (98.4km from the Morgan Array Area) than the Strangford Lough SAC (94.6km from the Morgan Array Area), assessed in paragraphs 1.8.4.248 to1.8.4.249. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.251 Adverse effects on the qualifying harbour seal features which undermine the conservation objectives of the Murlough SAC will not occur as a result of underwater sound generated from vessels and other (non-piling) sound producing activities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from vessels and other (non-piling) sound producing activities against each relevant conservation objective (see paragraph 1.8.2.26) are discussed in Table 1.169. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.169: Conclusions against the conservation objectives of the Murlough SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the construction phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal population numbers and distribution from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of harbour seal	
Maintain and enhance, as appropriate, physical features used by	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of the qualifying species. Therefore, underwater sound from vessels and other activities associated with the Morgan

Conservation Objective	Conclusion
harbour seal within the site	Generation Assets in-combination with other projects will not prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.4.252 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Murlough SAC as a result of underwater sound from vessel use and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC

Bottlenose dolphin and grey seal

Conclusions

1.8.4.253 Adverse effects on the qualifying bottlenose dolphin and grey seal features which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC will not occur as a result of underwater sound generated from vessels and other (non-piling) sound producing activities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from vessels and other (non-piling) sound producing activities against each relevant conservation objective (see paragraphs 1.8.2.36 to 1.8.2.47) are discussed in Table 1.170. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.170: Conclusions against the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the construction phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the populations of bottlenose dolphin and grey seal from being maintained on a long-term basis as a viable component of their natural habitats. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not reduce nor likely reduce natural ranges of the populations of bottlenose dolphin and grey seal for the foreseeable future.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of the qualifying species. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of bottlenose dolphin and grey seal.

1.8.4.254 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC as a result of underwater sound from vessel use and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

The Maidens SAC

Grey seal

1.8.4.255 The Maidens SAC is located at an increased distance to the Morgan Generation Assets (141.8km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from the Morgan Array Area), assessed in paragraphs 1.8.4.253 to1.8.4.254. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.256 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of The Maidens SAC will not occur as a result of underwater sound generated from vessels and other (non-piling) sound producing activities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from vessels and other (non-piling) sound producing activities against each relevant conservation objective (see paragraph 1.8.2.52) are discussed in Table 1.171. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.171: Conclusions against the conservation objectives of The Maidens SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the construction phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the grey seal feature to favourable condition	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the grey seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the grey seal population numbers and distribution from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of grey seal	
Maintain and enhance, as appropriate, physical features used by grey seal within the site	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of grey seal. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent physical features used by grey seal within the site from being maintained or enhance.

1.8.4.257 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of The Maidens SAC as a result of underwater sound from vessel use and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cardigan Bay/Bae Ceredigion SAC

Bottlenose dolphin

1.8.4.258 The Cardigan Bay/Bae Ceredigion SAC is located at an increased distance to the Morgan Generation Assets (188.2km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from the Morgan Array Area), assessed in paragraphs 1.8.4.253 to 1.8.4.254. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.259 Adverse effects on the qualifying bottlenose dolphin and grey seal features which undermine the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC will not occur as a result of underwater sound generated from vessels and other (non-piling) sound producing activities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from vessels and other (non-piling) sound producing activities against each relevant conservation objective (see paragraphs 1.8.2.58 to 1.8.2.69) are discussed in Table 1.172. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.172: Conclusions against the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the construction phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of bottlenose dolphin from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not reduce nor likely reduce the natural range of the population of bottlenose dolphin for the foreseeable future.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of bottlenose dolphin. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the population of bottlenose dolphin.

1.8.4.260 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from vessel use and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.4.261 The Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance to the Morgan Generation Assets (237.6km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.253 to 1.8.4.254. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.262 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of underwater sound generated from vessels and other (non-piling) sound producing activities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from vessels and other (non-piling) sound producing activities against each relevant conservation objective (see paragraphs 1.8.2.75 to 1.8.2.85) are discussed in Table 1.173. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.173: Conclusions against the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the construction phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of grey seal from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not reduce nor likely reduce the natural range of the population of grey seal for the foreseeable future.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of grey seal. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the population of grey seal.

1.8.4.263 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result of underwater sound from vessel use and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

1.8.4.264 The Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located at an increased distance to the Morgan Generation Assets (300.1km from the Morgan Array Area) than the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area), assessed in paragraphs 1.8.4.243 to 1.8.4.244. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.265 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC will not occur as a result of underwater sound generated from vessels and other (non-piling) sound producing activities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from vessels and other (non-piling) sound producing activities against each relevant conservation objective (see paragraphs 1.8.2.90 to 1.8.2.92) are discussed in Table 1.174. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.174: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the construction phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury within range of the SAC, limited disturbance within the SAC when compared with available foraging habitat, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb the harbour porpoise designated feature.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of harbour porpoise. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.266 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of underwater sound from vessel use and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Lundy SAC

Grey seal

1.8.4.267 The Lundy SAC is located at an increased distance to the Morgan Generation Assets (334.9km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.253 to 1.8.4.254. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.268 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Lundy SAC will not occur as a result of underwater sound generated from vessels and other (non-piling) sound producing activities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from vessels and other (non-piling) sound producing activities against each relevant conservation objective (see paragraphs 1.8.2.97 to 1.8.2.99) are discussed in Table 1.175. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.175: Conclusions against the conservation objectives of the Lundy SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of the qualifying species neither on the habitats structure, function and supporting processes. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the extent, distribution, structure and function of the habitats of grey seal or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population and distribution of the grey seal within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.4.269 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lundy SAC as a result of underwater sound from vessel use and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Isles of Scilly Complex SAC

Grey seal

1.8.4.270 The Isles of Scilly Complex SAC is located at an increased distance to the Morgan Generation Assets (465km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed in paragraphs 1.8.4.253 to 1.8.4.254. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.271 Adverse effects on the qualifying grey seal features which undermine the conservation objectives of the Isles of Scilly Complex SAC will not occur as a result of underwater sound generated from vessels and other (non-piling) sound producing activities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of underwater sound generated from vessels and other (non-piling) sound producing activities against each relevant conservation objective (see paragraphs 1.8.2.104 to 1.8.2.106) are discussed in Table 1.176. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.176: Conclusions against the conservation objectives of the Isles of Scilly Complex SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the construction phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of the qualifying species neither on the habitats structure, function and supporting processes. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the extent, distribution, structure and function of the habitats of grey seal or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population and distribution of the grey seal within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.4.272 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Isles of Scilly Complex SAC as a result of underwater sound from vessel use and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Sites assessed in line with the iterative approach

1.8.4.273 As outlined in paragraphs 1.8.1.3 to 1.8.1.8, following the iterative approach adopted for this HRA Stage 2 ISAA Report, the closest European site to the Morgan Generation Assets within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment in the sections above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA Report, are located at a greater distance from the Morgan Generation Assets and, on this basis, it is considered that effects on the marine mammal features of these sites would be of similar if not lower magnitude than those concluded for the sites subject to a full assessment. The conclusions of the assessments presented in paragraphs 1.8.4.243 to 1.8.4.272 are, therefore, deemed to be applicable for the remaining sites presented below in paragraphs 1.8.4.274 to 1.8.4.296.

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.4.274 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cardigan Bay/Bae Ceredigion SAC

Grey seal

1.8.4.275 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (paragraphs 1.8.4.253 to 1.8.4.254), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Rockabill to Dalkey Island SAC

1.8.4.276 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Rockabill to Dalkey Island SAC as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Saltee Islands SAC

1.8.4.277 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC (paragraphs 1.8.4.253 to 1.8.4.254), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Saltee Islands SAC as a result of underwater sound vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Roaringwater Bay and Islands SAC

1.8.4.278 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Roaringwater Bay and Islands SAC as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Blasket Islands SAC

1.8.4.279 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Blasket Islands SAC as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Mers Celtiques – Talus du golfe de Gascogne SCI

1.8.4.280 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Mers Celtiques – Talus du golfe de Gascogne SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Abers – Côte des legends SCI

1.8.4.281 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Abers – Côte des legends SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Ouessant-Molène SCI

1.8.4.282 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ouessant-Molène SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Côte de Granit rose-Sept-Iles SCI

1.8.4.283 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côte de Granit rose-Sept-Iles SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Anse de Goulven, dunes de Keremma SCI

1.8.4.284 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Goulven, dunes de Keremma SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Tregor Goëlo SCI

1.8.4.285 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Tregor Goëlo SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Côtes de Crozon SCI

1.8.4.286 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côtes de Crozon SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Chaussée de Sein SCI

1.8.4.287 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Chaussée de Sein SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cap Sizun SCI

1.8.4.288 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap Sizun SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Récifs du talus du golfe de Gascogne SCI

1.8.4.289 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that

there is **no risk of an adverse effect** on the integrity of the Récifs du talus du golfe de Gascogne SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Anse de Vauville SCI

1.8.4.290 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Vauville SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Cap d'Erquy-Cap Fréhel SCI

1.8.4.291 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap d'Erquy-Cap Fréhel SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie de Saint-Brieuc – Est SCI

1.8.4.292 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Saint-Brieuc – Est SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Banc et récifs de Surtainville SCI

1.8.4.293 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Banc et récifs de Surtainville SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.8.4.294 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Estuaire de la Rance SCI

1.8.4.295 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Estuaire de la Rance SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Baie du Mont Saint-Michel SCI

1.8.4.296 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.243 to 1.8.4.247), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie du Mont Saint-Michel SCI as a result of underwater sound from vessels and other activities with respect to construction of the Morgan Generation Assets in-combination with other plans/projects.

Operations and maintenance phase

1.8.4.297 There is potential for injury and disturbance from underwater sound from vessels and other (non-piling) sound producing activities associated with the Morgan Generation Assets during the operations and maintenance phase, to act in-combination with activities associated with other projects/plans listed in Table 1.126.

1.8.4.298 As for the assessment of the Morgan Generation Assets alone, the risk of injury in terms of PTS to marine mammal receptors as a result of underwater due to vessel use and other non-piling sound producing activities would be expected to be very low. PTS thresholds would not be exceeded or would be very localised (<10m) from the source. The assessment for Morgan Generation Assets alone (paragraphs 1.8.3.265 to 1.8.3.278) found relatively small ranges of effects and therefore the magnitude of the potential impact with respect to auditory injury occurring in marine mammals has been assessed as low. Given the above, there is very low potential for potential in-combination impacts for injury from elevated underwater sound due to vessel use and other (non-piling) sound producing activities. Instead, the in-combination assessment provided below focuses on disturbance only for this potential impact.

Tier 1

1.8.4.299 Given the temporal overlap of the operations and maintenance of the Morgan Generation Assets, together with operations and maintenance phase of Awel y Môr Offshore Wind Farm, West Anglesey Demonstration Zone tidal site and Project Erebus Floating Wind Farm Demonstration Projects may lead to cumulative disturbance to marine mammals from vessel use and other (non-piling) sound producing activities.

1.8.4.300 The range of vessel used in operations and maintenance activities will be similar to those employed during the construction phases of in-combination projects although fewer vessels are likely to be involved but over a longer duration. During the operation of Awel y Môr Offshore Wind Farm, it was anticipated that numerous different vessel types would be conducting round trips to and from port and the array area, but only two jack-up vessels and two SOVs would be present at any one time.

1.8.4.301 West Anglesey Demonstration Zone tidal site is located 79.2km from the Morgan Array Area. The MDS for the project anticipated up to two drilling activities, two cable installation activities, two cable protection activities and 16 vessels on site (Morlais, 2019). The maximum predicated impact range for behavioural response across all species was predicted in harbour porpoise for two percussive drilling rigs and cutter-suction dredging as up to 530m and 580m, respectively.

1.8.4.302 The MDS for Project Erebus anticipated a maximum of two CTVs on site per day, which would be expected to be stationary or slow moving and were not expected to be a novel impact pathway for marine mammals in the area (Blue Gem Wind, 2020). The maximum predicted impact range for disturbance for large vessels was assessed as 480m for harbour porpoise.

1.8.4.303 The MDS for the operations and maintenance phase of the Morgan Generation Assets is presented in Table 1.98 and assumes up to 21operations and maintenance vessels on site at any one time. Vessels involved in the operations and maintenance of Awel y Môr Offshore Wind Farm and West Anglesey Demonstration Zone tidal site will include a similar suite of vessels as those described for the Morgan Generation Assets alone, such as CTVs/workboats, jack-up vessels, cable repair vessels, SOVs and excavators/backhoe dredgers.

1.8.4.304 Therefore, cumulatively across the projects there will be an increase in vessel activity within the Celtic and Irish Seas regional area. This represents an uplift from the current baseline, although noting that the assessments are based on the MDS, the number of vessels present at respective projects at any given time will in reality be lower. Additionally, vessel movements will be confined to the array areas and/or offshore cable corridor routes and are likely to follow existing shipping routes to/from port. As such, it would not be realistic to present a simplistic sum of all vessels anticipated within each offshore wind farm as per respective MDS. Introduction of vessels during construction and operations and maintenance phases of the projects will not be a novel impact for marine mammals present in the area and therefore marine mammals are anticipated to demonstrate some degree of habituation to vessel sounds.

1.8.4.305 The duration of vessel activity is considered to be long term (throughout the operations and maintenance phase of Morgan Generation Assets) and localised for each project with vessel movements occurring intermittently over the life time of the Morgan Generation Assets. The cumulative number of vessels presented in paragraphs 1.8.4.300 to 1.8.4.303 will be lower for the operations and maintenance phase compared to construction phase (see paragraphs 1.8.4.229 to 1.8.4.233) of Morgan Generation Assets. Therefore, the magnitude of the potential impact for disturbance as a result of elevated underwater sound due to vessel use and other activities, for all marine mammal receptors, is expected to be less than that assessed for the construction phase. However, considering that the duration of the effect will be longer, over the decadal operating lifetime of the project, a precautionary approach has been taken to include the operations and maintenance phase in the assessment.

Tier 2

1.8.4.306 Given the temporal overlap of the operations and maintenance phase of the Morgan Generation Assets, together with operations and maintenance phases of tier 1 projects and maintenance phases of the tier 2 projects (i.e. Morgan Generation Assets, Shelmalere Offshore Wind Farm, North Irish Sea Array, Codling Wind Park, Dublin Array, Llŷr Projects, Inis Ealga Marine Energy Park and White Cross) may lead to disturbance to marine mammals from vessel use and other (non-piling) sound producing activities. Timelines of the construction as well as operations and maintenance phases of Oriel Offshore Wind Farm, Morecambe Offshore Wind Farm Generation Assets, Arklow Bank Wind Park Phase 2 and Morgan and Morecambe Transmission Assets are unknown. However, it has been conservatively assumed that there will be a temporal overlap with the operations and maintenance phase of the Morgan Generation Assets and therefore there is a potential for in-combination effects.

1.8.4.307 Given that EIA Scoping Reports for the projects outlined in paragraph 1.8.4.306 do not provide detailed information about numbers of vessels involved, it is not possible to undertake full, quantitative assessment for this potential impact. For Mona Offshore Wind Project, the PEIR is available and it predicted up to 21 vessels to be present on site at any given time during the operations and maintenance phase.

1.8.4.308 The range of vessels used in operations and maintenance activities will be similar to those employed during the construction phases of in-combination projects. The duration of vessel activity is considered to be long term (throughout the operations and maintenance phase of Morgan Generation Assets) and localised for each project; however, it should be noted that vessel movements will occur intermittently over the life time of the Morgan Generation Assets. The number of vessels present during the operations and maintenance phases of respective projects in isolation is considered to be smaller than for construction phase. Nevertheless, cumulatively it could be expected that the total number of vessel movements will exceed the average traffic levels.

1.8.4.309 Qualitatively, the potential impact would lead to a larger area of disturbance within the regional marine mammals study area compared to Morgan Generation Assets alone. Although animals may be disturbed from isolated project areas at different points in time, in the context of the wider habitat available within the Celtic and Irish Seas regional area, the scale of the disturbance effects (which would be localised) is considered to be small.

1.8.4.310 Therefore, the potential in-combination impact of underwater sound from vessel use and other activities leading to behavioural effects during the operations and maintenance phase is predicted to be of local to regional spatial extent, intermittent, long term duration and the effect of behavioural disturbance is of high reversibility with animals returning to baseline levels soon after vessel use and other activities have ceased.

1.8.4.311 Given the existing levels of vessel activity within the Irish Sea, it is expected that harbour porpoise could tolerate the effects of vessel presence to some extent. The potential impacts of construction will be highly localised, largely restricted to the boundaries of the respective projects, vessels will follow existing shipping routes to/from port and only a small area will be affected when compared to available foraging habitat. Therefore, it is anticipated that the connectivity with suitable foraging grounds and supporting habitats will not be impaired. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets are likely to have measures including aMMMP which will further reduce the potential for in-combination sound effects from vessel use and other activities.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

Conclusions

1.8.4.312 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of in-combination underwater sound from vessels and other activities during the operations and maintenance of the Morgan Generation Assets. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.7 to 1.8.2.9) is discussed in Table 1.177. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.177: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury within range of the SAC and limited disturbance within the SAC when compared with available foraging habitat, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb the harbour porpoise designated feature
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of the harbour porpoise. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.313 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of underwater sound from vessel use and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

North Channel SAC

Harbour porpoise

1.8.4.314 The North Channel SAC is located at an increased distance to the Morgan Generation Assets (63.8km from the Morgan Array Area) than the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area), assessed in paragraphs 1.8.4.312 to 1.8.4.313. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.315 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the North Channel SAC will not occur as a result of in-combination underwater sound from vessels and other activities during the operations and maintenance of the Morgan Generation Assets. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.14 to 1.8.2.16) is discussed in Table 1.178. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.178: Conclusions against the conservation objectives of the North Channel SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury within range of the SAC and limited disturbance within the SAC when compared with available foraging habitat, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb the harbour porpoise designated feature.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of the harbour porpoise. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.316 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result of underwater sound from vessel use and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Strangford Lough SAC

Harbour seal

Conclusions

1.8.4.317 Adverse effects on the qualifying Annex II harbour seal features which undermine the conservation objectives of the Strangford Lough SAC will not occur as a result of in-combination underwater sound from vessels and other activities during the operations and maintenance of the Morgan Generation Assets. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraph 1.8.2.21) is discussed in Table 1.179. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.179: Conclusions against the conservation objectives of the Strangford Lough SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the operations and maintenance phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of harbour seal from being maintained or enhanced.
Maintain and enhance, as appropriate, the harbour seal population	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of harbour seal. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.4.318 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Strangford Lough SAC as a result of underwater sound from vessel use and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Murlough SAC

Harbour seal

1.8.4.319 The Murlough SAC is located at an increased distance to the Morgan Generation Assets (98.4km from the Morgan Array Area) than the Strangford Lough SAC (94.6km from the Morgan Array Area), assessed in paragraphs 1.8.4.317 to 1.8.4.318. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.320 Adverse effects on the qualifying Annex II harbour seal features which undermine the conservation objectives of the Murlough SAC will not occur as a result of in-combination underwater sound from vessels and other activities during the operations and maintenance of the Morgan Generation Assets. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraph 1.8.2.26) is discussed in Table 1.180. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.180: Conclusions against the conservation objectives of the Murlough SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the operations and maintenance phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the harbour seal feature to favourable condition	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the harbour seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population numbers and distribution of harbour seal from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of harbour seal	
Maintain and enhance, as appropriate, physical features used by harbour seal within the site	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of harbour seal. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent physical features used by harbour seal within the site from being maintained or enhance.

1.8.4.321 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Murlough SAC as a result of underwater sound from vessel use and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC

Bottlenose dolphin and grey seal

Conclusions

1.8.4.322 Adverse effects on the qualifying Annex II bottlenose dolphin and grey seal features which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC will not occur as a result of in-combination underwater sound from vessels and other activities during the operations and maintenance of the Morgan Generation Assets. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.36 to 1.8.2.47) is discussed in Table 1.181. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.181: Conclusions against the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the populations of the bottlenose dolphin and grey seal from being maintained on a long-term basis as a viable component of their natural habitats. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not reduce nor likely reduce the natural ranges of the populations of the bottlenose dolphin and grey seal for the foreseeable future.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of bottlenose dolphin and grey seal. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the populations of the bottlenose dolphin and grey seal.

1.8.4.323 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC as a result of underwater sound from vessel use and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

The Maidens SAC

Grey seal

1.8.4.324 The Maidens SAC is located at an increased distance to the Morgan Generation Assets (141.8km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from the Morgan Array Area), assessed paragraphs in 1.8.4.322 to 1.8.4.323. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.325 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of The Maidens SAC will not occur as a result of in-combination underwater sound from vessels and other activities during the operations and maintenance of the Morgan Generation Assets. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraph 1.8.2.52) is discussed in Table 1.182. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.182: Conclusions against the conservation objectives of The Maidens SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the operations and maintenance phase.

Conservation Objective	Conclusion
To maintain (or restore where appropriate) the grey seal feature to favourable condition	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the grey seal feature from being maintained or restored to favourable condition. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population numbers and distribution of grey seal from being maintained or enhanced.
To maintain (and if feasible enhance) population numbers and distribution of grey seal	
Maintain and enhance, as appropriate, physical features used by grey seal within the site	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of grey seal. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent physical features used by grey seal within the site from being maintained or enhance.

1.8.4.326 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of The Maidens SAC as a result of underwater sound from vessel use and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Cardigan Bay/Bae Ceredigion SAC

Bottlenose dolphin

1.8.4.327 The Cardigan Bay/Bae Ceredigion SAC is located at an increased distance to the Morgan Generation Assets (188.2km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from the Morgan Array Area), assessed paragraphs in 1.8.4.322 to 1.8.4.323. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.328 Adverse effects on the qualifying Annex II bottlenose dolphin features which undermine the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC will not occur as a result of in-combination underwater sound from vessels and other activities during the operations and maintenance of the Morgan Generation Assets. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.58 to 1.8.2.69) is discussed in Table 1.183. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.183: Conclusions against the conservation objectives of the Cardigan Bay/Bae Ceredigion SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of the bottlenose dolphin from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not reduce nor likely reduce the natural ranges of the population of the bottlenose dolphin for the foreseeable future.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of bottlenose dolphin. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the population of the bottlenose dolphin.

1.8.4.329 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from vessel use and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.4.330 The Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance to the Morgan Generation Assets (237.6km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed paragraphs in 1.8.4.322 to 1.8.4.323. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.331 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of in-combination underwater sound from vessels and other activities during the operations and maintenance of the Morgan Generation Assets. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.75 to 1.8.2.85) is discussed in Table 1.184. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.184: Conclusions against the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The population is maintaining itself on a long-term basis as a viable component of its natural habitat	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population of the grey seal from being maintained on a long-term basis as a viable component of its natural habitat. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not reduce nor likely reduce the natural ranges of the population of the grey seal for the foreseeable future.
The species population within the site is such that the natural range of the population is not being reduced or likely to be reduced for the foreseeable future	
The presence, abundance, condition and diversity of habitats and species required to support this species is such that the distribution, abundance and populations dynamics of the species within the site and population beyond the site is stable or increasing	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of grey seal. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not affect the presence, abundance, condition and diversity of habitats and species required to support the distribution, abundance and populations dynamics of the population of the grey seal.

1.8.4.332 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Pembrokeshire Marine/Sir Benfro Forol SAC as a result of underwater sound from vessel use and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

1.8.4.333 The Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located at an increased distance to the Morgan Generation Assets (300.1km from the Morgan Array Area) than the North Anglesey Marine/Gogledd Môn Forol SAC (28.2km from Morgan Array Area), assessed in paragraphs 1.8.4.312 to 1.8.4.313. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.334 Adverse effects on the qualifying Annex II harbour porpoise features which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC will not occur as a result of in-combination underwater sound from vessels and other activities during the operations and maintenance of the Morgan Generation Assets. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.90 to 1.8.2.92) is discussed in Table 1.185. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.185: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The species is a viable component of the site	Given that there is no potential for injury within range of the SAC and limited disturbance within the SAC when compared with available foraging habitat, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site. Similarly, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not significantly disturb the harbour porpoise designated feature.
There is no significant disturbance of the species	
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of the harbour porpoise. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.4.335 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC as a result of underwater sound from vessel use and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Lundy SAC

Grey seal

1.8.4.336 The Lundy SAC is located at an increased distance to the Morgan Generation Assets (334.9km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed paragraphs in 1.8.4.322 to 1.8.4.323. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.337 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Lundy SAC will not occur as a result of in-combination underwater sound from vessels and other activities during the operations and maintenance of the Morgan Generation Assets. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.97 to 1.8.2.99) is discussed in Table 1.186. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.186: Conclusions against the conservation objectives of the Lundy SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of the qualifying species neither on the habitats structure, function and supporting processes. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the extent, distribution, structure and function of the habitats of grey seal or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population and distribution of the grey seal within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.4.338 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lundy SAC as a result of underwater sound from vessel use and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Isles of Scilly Complex SAC

Grey seal

1.8.4.339 The Isles of Scilly Complex SAC is located at an increased distance to the Morgan Generation Assets (465km from the Morgan Array Area) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (119.8km from Morgan Array Area), assessed paragraphs in 1.8.4.322 to 1.8.4.323. Therefore, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.340 Adverse effects on the qualifying Annex II grey seal features which undermine the conservation objectives of the Isles of Scilly Complex SAC will not occur as a result of in-combination underwater sound from vessels and other activities during the operations and maintenance of the Morgan Generation Assets. An assessment of the potential impact of underwater sound from vessels and other activities against each relevant conservation objective (as presented in paragraphs 1.8.2.104 to 1.8.2.106) is discussed in Table 1.187. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.187: Conclusions against the conservation objectives of the Isles of Scilly Complex SAC from in-combination underwater sound from vessels and other (non-piling) sound producing activities during the operations and maintenance phase.

Conservation Objective	Conclusion
The extent and distribution of habitats of qualifying species [are maintained or restored]	There is no pathway for underwater sound in-combination effects from vessels and other activities to result in adverse effects on the habitats of the qualifying species neither on the habitats structure, function and supporting processes. Therefore, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the extent, distribution, structure and function of the habitats of grey seal or the supporting processes on which the habitats of grey seal rely from being maintained or restored.
The structure and function of the habitats of qualifying species [are maintained or restored]	
The supporting processes on which the habitats of qualifying species rely[are maintained or restored]	
The populations of qualifying species [are maintained or restored]	Given that there is no potential for injury or disturbance within range of the SAC, the existing high level of vessel traffic and that there is likely recovery from disturbance, underwater sound from vessels and other activities associated with the Morgan Generation Assets in-combination with other projects will not prevent the population and distribution of the grey seal within the site from being maintained or restored.
The distributions of qualifying species within the site [are maintained or restored]	

1.8.4.341 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Isles of Scilly Complex SAC as a result of underwater sound from vessel use and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Sites assessed in line with the iterative approach

1.8.4.342 As outlined in paragraphs 1.8.1.3 to 1.8.1.8, following the iterative approach adopted for this HRA Stage 2 ISAA Report, the closest European site to the Morgan Generation Assets within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment in the sections above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA Report, are located at a greater distance from the Morgan Generation Assets and, on this basis, it is considered that effects on the marine mammal features of these sites would be of similar if not lower magnitude than those concluded for the sites subject to a full assessment. The conclusions of the assessments presented in paragraphs 1.8.4.312 to 1.8.3.366 are, therefore, deemed to be applicable for the remaining sites presented below in paragraphs 1.8.4.343 to 1.8.4.365.

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.4.343 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the West Wales Marine/Gorllewin Cymru Forol SAC as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Cardigan Bay/Bae Ceredigion SAC

Grey seal

1.8.4.344 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs in 1.8.4.322 to 1.8.4.323), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Rockabill to Dalkey Island SAC

1.8.4.345 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Rockabill to Dalkey Island SAC as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Saltee Islands SAC

1.8.4.346 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (paragraphs in 1.8.4.322 to 1.8.4.323), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Saltee Islands SAC as a result of underwater sound vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Roaringwater Bay and Islands SAC

1.8.4.347 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Roaringwater Bay and Islands SAC as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Blasket Islands SAC

1.8.4.348 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Blasket Islands SAC as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Mers Celtiques – Talus du golfe de Gascogne SCI

1.8.4.349 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Mers Celtiques – Talus du golfe de Gascogne SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Abers – Côte des legends SCI

1.8.4.350 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Abers – Côte des legends SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Ouessant-Molène SCI

1.8.4.351 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ouessant-Molène SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Côte de Granit rose-Sept-Iles SCI

1.8.4.352 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côte de Granit rose-Sept-Iles SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Anse de Goulven, dunes de Keremma SCI

1.8.4.353 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Goulven, dunes de Keremma SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Tregor Goëlo SCI

1.8.4.354 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Tregor Goëlo SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Côtes de Crozon SCI

1.8.4.355 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Côtes de Crozon SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Chaussée de Sein SCI

1.8.4.356 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Chaussée de Sein SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Cap Sizun SCI

1.8.4.357 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap Sizun SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Récifs du talus du golfe de Gascogne SCI

1.8.4.358 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Récifs du talus du golfe de Gascogne SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Anse de Vauville SCI

1.8.4.359 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Anse de Vauville SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Cap d'Erquy-Cap Fréhel SCI

1.8.4.360 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Cap d'Erquy-Cap Fréhel SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Baie de Saint-Brieuc – Est SCI

1.8.4.361 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Saint-Brieuc – Est SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Banc et récifs de Surtainville SCI

1.8.4.362 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Banc et récifs de Surtainville SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.8.4.363 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Estuaire de la Rance SCI

1.8.4.364 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Estuaire de la Rance SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

Baie du Mont Saint-Michel SCI

1.8.4.365 On the basis of the conclusions of the assessments presented for the harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC and the North Channel SAC (paragraphs 1.8.4.312 to 1.8.4.316), it can be concluded that there is **no risk of an adverse effect** on the integrity of the Baie du Mont Saint-Michel SCI as a result of underwater sound from vessels and other activities with respect to the operations and maintenance of the Morgan Generation Assets in-combination with other plans/projects.

In-combination changes in prey availability

1.8.4.366 There is the potential for changes in marine mammal prey (e.g. fish species) abundance and distribution to arise as a result of construction activities Morgan Generation Assets in association with the activities of the projects/plans in Table 1.126.

1.8.4.367 These activities may physically disturb the seabed, result in increased SSC or 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 Generation Assets and other project areas. 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). Potential impacts on fish species has been assessed in Volume 2, chapter 8: Fish and shellfish of the PEIR.

1.8.4.368 Information regarding foraging behaviour of Annex II marine mammal species and their responses to changes of prey availabilities is discussed in paragraphs 1.8.3.426 to 1.8.3.439. Whilst there may be some potential for in-combination effects to fish and shellfish communities, these effects will be highly localised and short term and therefore marine mammals are likely to be able to compensate and move to alternative foraging grounds.

Construction phase

Tier 1

1.8.4.369 Given the temporal overlap of the construction of the Morgan Generation Assets, together with tier 1 projects activities at other offshore wind farms, dredging activities, aggregate extraction activities and cables and pipelines may lead to potential in-combination impacts on marine mammals from changes in prey availability as a result of changes to the fish and shellfish communities. The only tier 1 project considered is Awel y Môr Offshore Wind Farm due to the temporal and spatial overlap with the Morgan Generation Assets.

1.8.4.370 Potential in-combination impacts from tier 1 projects on marine mammal prey species during the construction phase of the Morgan Generation Assets include temporary subtidal habitat loss, long term subtidal habitat loss, injury and disturbance from underwater sound, increased SSC and associated sediment deposition and colonisation of hard structures.

1.8.4.371 The combined temporary habitat loss and disturbance across all tier 1 plans, projects, and activities assessed in the fish and shellfish study area (for more details see volume 2, chapter 8: Fish and shellfish of the PEIR) including the Morgan Generation Assets, was estimated at a maximum of 71.78km^2. The temporary habitat loss on fish and shellfish has been assessed to be unlikely to result in changes in prey availability in marine mammals.

1.8.4.372 The planned construction of the Awel y Môr Offshore Wind Farm alongside Morgan Generation Assets will introduce up to 1.6km^2 of permanent hard structures which will act to represent a potential combined long term habitat loss impact of approximately

3.1km^2. Given that the construction phase will take place over four years, colonisation of hard structures may commence within that period and continue throughout the operations and maintenance phase. The long-term habitat loss for fish and shellfish has been assessed as minimal for potential impacts to prey availability on marine mammals.

1.8.4.373 The construction phase of the Awel y Môr Offshore Wind Farm will have temporal and spatial overlap with the Morgan Generation Assets in terms of construction sound and may impact fish and shellfish. During piling at the Awel y Môr Offshore Wind Farm mortality for group 2 (salmonids and some Scombridae) and 3 (gadoids and eels) fish may occur out to 100m and 8,000m, from the array area respectively. However, sound modelling with inclusion of moving away response, significantly reduced mortality distances to less than 100m for all groups. The Awel y Môr Offshore Wind Farm indicated behavioural effects to similar ranges as those predicted for Morgan Generation Assets, at a range of approximately up to tens of kilometres from the piling location at the maximum hammer energies. Given that the potential in-combination impact will be taking place at distance from herring spawning grounds and due to the short term, intermittent nature of the potential impact, significant in-combination effects are not predicted to any of fish and shellfish species. Since in-combination effects of underwater sound from piling may also lead to changes in the distribution of marine mammals, it is likely that marine mammal will be displaced from the same or greater area as for their prey species.

1.8.4.374 Seabed preparation and installation of foundations and cables for the Morgan Generation Assets alongside tier 1 projects may increase SSC and associated sediment deposition. As discussed in detail volume 2, chapter 8: Fish and shellfish of the PEIR, resultant plumes from aggregate extraction or dredging would be advected on the tidal currents, travel in parallel, and not towards one another, and are unlikely to interact. Temporarily overlapping construction activities at Awel y Môr array area may result in increased SSC; however, these activities would be of limited spatial extent and frequency and are unlikely to interact with sediment plumes from the Morgan Generation Assets. The in-combination effect on fish and shellfish receptors as a result of SSC was assessed as unlikely to impact marine mammals.

1.8.4.375 The temporal overlap between tier 1 projects will result in a combined increase in the introduction of similar new hard structures. Potential adverse/beneficial effects on fish and shellfish would be localised due to the relatively small area of new hard structures introduced during this phase. Marine mammals are likely to benefit from locally increased food availability and/or shelter and therefore have the potential to be attracted to forage within tier 1 offshore wind project array areas. Some increased foraging activities could benefit prey availability for marine mammals although this is unlikely to be at a scale that is measurable in terms of the populations within the wider region.

Tier 2

1.8.4.376 Given the temporal overlap of the construction of the Morgan Generation Assets, together with tier 1 and tier 2 projects (i.e. activities at Mona Offshore Wind Project, Morecombe Offshore Wind Farm Generation Assets and Morgan and Morecambe Transmission Assets) may lead to potential in-combination impacts on marine mammals from changes in prey availability as a result of changes to the fish and shellfish communities.

1.8.4.377 Potential cumulative effects from tier 2 projects on marine mammal prey species during the construction phase of the Morgan Generation Assets include temporary subtidal habitat loss, long term subtidal habitat loss, injury and disturbance from underwater sound, increased SSC and associated sediment deposition and colonisation of hard structures.

1.8.4.378 The temporary habitat disturbance and long term habitat loss predicted to result from the Mona Offshore Wind Project during construction phase is up to 130.15km^2 and 2.36km^2, respectively (Mona Offshore Wind Ltd, 2023). The area available for colonisation for Mona Offshore Wind Project was estimated up to 2.85km^2 (Mona Offshore Wind Ltd, 2023). The increases in SSC and sediment deposition predicted to result from the Mona Offshore Wind Project similar to those reported for Morgan Generation Assets with the displacement of up to 33,072,196m^3 of total spoil volume.

1.8.4.379 No detailed information was available for the extent of temporary or long-term habitat loss, underwater sound, increased SSC and colonisation of hard structures associated with the Morecambe Offshore Windfarm Generation Assets and Morgan and Morecambe Transmission Assets. Therefore, it is not possible to undertake full, quantitative assessment for these potential impacts and a summary of qualitative assessment is provided below.

1.8.4.380 For Morecambe Offshore Windfarm Generation Assets and Morgan and Morecambe Transmission Assets projects, temporary habitat loss is likely to result from site preparation activities in advance of installation activities, cable installation activities and placement of spud-can legs from jack-up operations. Installation of foundation structures, associated scour protection and cable protection is likely to result in long term habitat loss and provide a hard substrate for colonisation. Increased SSC and sediment deposition is likely to occur from site preparation activities including sandwave clearance, drilling for foundation installation, and cable installation and burial activities.

1.8.4.381 As assessed for tier 1 project in paragraphs 1.8.4.370, with respect to indirect effects on marine mammals, no additional in-combination effects other than those assessed for injury and disturbance to marine mammals as a result of elevated underwater sound during piling are predicted. This is because if prey are disturbed from an area as a result of underwater sound, it is assumed that marine mammals are likely to be disturbed from the same or greater area, and so any changes to the distribution of prey resources would not affect marine mammals as they would already be disturbed from the same (or larger) area.

Tier 3

1.8.4.382 Given the temporal overlap of the construction of the Morgan Generation Assets, together with tier 1 and tier 2 projects as well as the tier 3 project, MaresConnect Wales-Ireland Interconnector Cable activities may lead to potential in-combination impacts on marine mammals from changes in prey availability as a result of changes to the fish and shellfish communities.

1.8.4.383 Potential cumulative effects from tier 3 project on marine mammal prey species during the construction phase of the Morgan Generation Assets include temporary subtidal habitat loss, long term subtidal habitat loss, increased SSC and associated sediment deposition and colonisation of hard structures.

1.8.4.384 The laying and burying of the MaresConnect Interconnector cable may involve introduction of cable protection (assumed as MDS) which will represent long term habitat loss and will likely follow standard jet trenching and cable protection installation, causing temporary habitat disturbance, although technical specifications will only be released at later development stages. Although no exact specifications are publicly available for the area for potential colonisation, it is expected that the cable protection will only represent a small increase of introduced hard structures and so will have only a minor cumulative impact. The likely jet trenching activities for the laying and burying of the cables for both projects will run concurrently and interaction of SSC plumes on spring tide events may occur. However, given the project is predicted to be operational in 2026, there is unlikely to be any overlap with Morgan Generation Assets construction phase and therefore there is a no potential for cumulative effects on marine mammal prey species.

1.8.4.385 These localised and temporary changes in prey availability are considered in the context of the wider foraging habitat available for marine mammals. Therefore, the potential in-combination impact of changes in prey availabilities on marine mammals is predicted to be of local spatial extent, medium term duration, intermittent and the effect on marine mammals is of high reversibility.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

Conclusions

1.8.4.386 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of changes in prey availabilities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of changes in prey availabilities against each relevant conservation objective (see paragraphs 1.8.2.5 to 1.8.2.7) are discussed in Table 1.188.

Table 1.188: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC for in-combination changes in prey availability.

Conservation Objective	Conclusion
The species is a viable component of the site	Any in-combination effects are predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility. The harbour porpoise of the SAC prey on a wide variety of fish species and therefore are likely to be able to adapt to a minor shift in availability of some prey items and are known to forage over wide areas and exploit a range of prey species. Therefore, whilst there may be some potential in-combination effects to fish and shellfish communities, these effects will be highly localised and short term and therefore marine mammals are likely to be able to compensate and move to alternative foraging grounds. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also have measures which will further reduce the potential for in-combination effects on prey availability. Therefore, changes in prey availability associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site.
There is no significant disturbance of the species	Harbour porpoise may experience behavioural effects in response to change in prey availability in the vicinity of the Morgan Generation Assets, however potential impacts to prey species are predicted to be localised, short term and intermittent, and harbour porpoise are expected to adapt and recover quickly. As such there is a negligible risk of disruption of foraging activities of harbour porpoise. Therefore, changes in prey availability associated with the Morgan Generation Assets will not significantly disturb the harbour porpoise designated feature.
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	There is no pathway for changes in prey availability to result in adverse effects on the habitats of harbour porpoise and there are no adverse effects expected for fish and shellfish species. Therefore, changes in prey availability associated with the Morgan Generation Assets will not prevent the condition of habitats and their processes and the availability of prey from being maintained.

1.8.4.387 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Anglesey Marine/Gogledd Môn Forol SAC as a result of changes in prey availability from the Morgan Generation Assets in-combination with other plans/projects.

North Channel SAC

Harbour porpoise

Conclusions

1.8.4.388 Adverse effects on the qualifying harbour porpoise features which undermine the conservation objectives of the North Channel SAC will not occur as a result of changes in prey availabilities during the construction and decommissioning phase of the Morgan Generation Assets in-combination with other projects and plans. An assessment of the potential impact of changes in prey availabilities against each relevant conservation objective (see paragraphs 1.8.2.12 to 1.8.2.14) are discussed in Table 1.189.

Table 1.189: Conclusions against the conservation objectives of the North Channel SAC for in-combination changes in prey availability.

Conservation Objective	Conclusion
The species is a viable component of the site	Any in-combination effects are predicted to be of local to regional spatial extent, medium term duration, intermittent and the effect of behavioural disturbance is of high reversibility. The harbour porpoise of the SAC prey on a wide variety of fish species and therefore are likely to be able to adapt to a minor shift in availability of some prey items and are known to forage over wide areas and exploit a range of prey species. Therefore, whilst there may be some potential in-combination effects to fish and shellfish communities, these effects will be highly localised and short term and therefore marine mammals are likely to be able to compensate and move to alternative foraging grounds. In addition, any projects/plans which may act in-combination with the Morgan Generation Assets will also have measures which will further reduce the potential for in-combination effects on prey availability. Therefore, changes in prey availability associated with the Morgan Generation Assets in-combination with other projects will not affect the survivability and reproductive potential of harbour porpoise using the designated site and harbour porpoise will remain a viable component of the site.

Conservation Objective	Conclusion
There is no significant disturbance of the species	Harbour porpoise may experience behavioural effects in response to change in prey availability in the vicinity of the Morgan Generation Assets, however potential impacts to prey species are predicted to be localised, short term and intermittent, and harbour porpoise are expected to adapt and recover quickly. As such there is a negligible risk of disruption of foraging activities of harbour porpoise. Therefore, changes in prey availability associated with the Morgan Generation Assets will not significantly disturb the harbour porpoise designated feature.
The supporting habitats and processes relevant to harbour porpoises and their prey are maintained	There is no pathway for changes in prey availability to result in adverse effects on the habitats of harbour porpoise and there are no adverse effects expected for fish and shellfish species. Therefore, changes in prey availability associated with the Morgan Generation Assets will not prevent the condition of habitats and their processes and the availability of prey from being maintained.

1.8.4.389 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the North Channel SAC as a result of changes in prey availability from the Morgan Generation Assets in-combination with other plans/projects.

1.9 Assessment of potential adverse effects on integrity: Offshore ornithology

1.9.1.1 The HRA Stage 1 Screening Report identified the potential for LSEs on the eight European sites designated for offshore ornithological features listed in Table 1.190 and showed in Figure 1.12.

Table 1.190: European sites and relevant offshore ornithological features for which the potential for LSE could not be ruled out and therefore considered in the HRA Stage 2 ISAA.

European site	Offshore ornithological features
Liverpool Bay/Bae Lerpwl SPA	• Non-breeding red-throated diver • Non-breeding common scoter • Non-breeding little gull • Breeding common tern • Breeding little tern • Non-breeding waterbird assemblage.
Morecambe Bay and Duddon Estuary SPA	• Non-breeding and breeding lesser black-backed gull • Breeding herring gull.
Ribble and Alt Estuaries SPA	• Breeding lesser black-backed gull
Irish Sea Front SPA	• Breeding Manx shearwater
Lambay Island SPA	• Breeding common guillemot.
Grassholm SPA	• Breeding northern gannet
Ailsa Craig SPA	• Breeding northern gannet
Ireland's Eye SPA	• Breeding common guillemot.

1.9.1.2 LSEs on these European sites were identified for the following potential impacts:

- During the construction and decommissioning phases
  - Changes in prey availability (construction only)
  - In-combination effects
- During the operations and maintenance phase
  - Changes in prey availability
  - Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effects only)
  - Collison risk (in-combination effects only).

1.9.1.3 This section presents the Appropriate Assessments (considering effects both alone and in-combination) for each designated site. A summary of all assessments undertaken within this report is provided in the concluding section of this report (section 1.10).

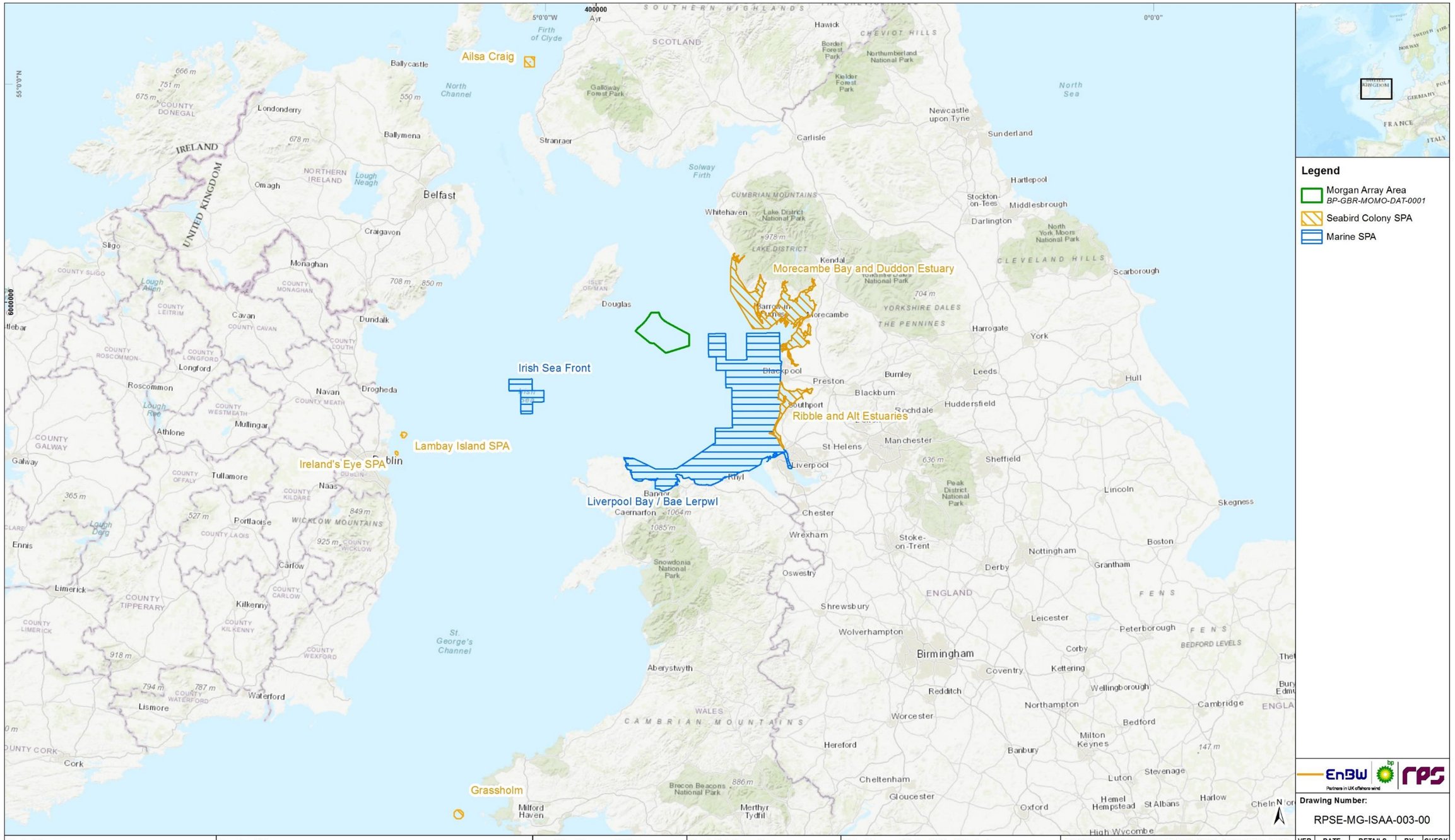


Figure 1.12: Location of European Sites designated for offshore ornithological features for which an Appropriate Assessment is required.

1.9.2 Baseline Information

1.9.2.1 Baseline information on the offshore ornithological features of the European Sites identified for further assessment within the HRA process has been gathered through a comprehensive desktop study of existing studies and datasets and supported by 12-month site-specific aerial survey data full details of which are presented within volume 2, chapter 10: Offshore ornithology of the PEIR.

Liverpool Bay/Bae Lerpwl SPA

Site description

1.9.2.2 The Liverpool Bay/Bae Lerpwl SPA is situated in the east of the Irish Sea, bordering the northwest of England and the north of Wales, and running as a broad arc from Morecambe Bay to the east coast of Anglesey. The Liverpool Bay/Bae Lerpwl SPA is located 10km from the Morgan Array Area. The seabed of Liverpool Bay/Bae Lerpwl SPA contains a wide range of mobile sediments. Sand is the most common substrate, with a concentrated area of gravelly sand located off the Mersey Estuary.

1.9.2.3 The Liverpool Bay/Bae Lerpwl SPA was designated by the UK Government to meet obligations set out in the Birds Directive (2009/147/EC) and is protected by the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended).

1.9.2.4 It covers an area of approximately 2,528km^2, designated for the protection of red-throated diver, common scoter, and little gull during the non-breeding season, as well as a waterbird assemblage, and foraging areas for little tern and common tern breeding within coastal SPAs.

Feature accounts

Red-throated diver

1.9.2.5 Red throated diver *Gavia stellata* are listed as a Schedule 1 species under the Wildlife and Countryside Act. Red-throated diver are also listed on Annex I of the Wild Birds Directive. The SPA protects the third largest aggregation of red-throated diver in the UK during the non-breeding season, with 6.89% of the UK population, with a classified red-throated diver population of 1,171 individuals. Webb *et al.* (2006) and Lawson *et al.* (2016) have found large concentrations of red-throated diver along the north Wales coast.

1.9.2.6 The latest densities of red-throated diver in the Liverpool Bay/Bae Lerpwl SPA were derived from wintering aerial surveys carried out between 2004 and 2011 (Lawson *et al*., 2016) (Figure 1.13).

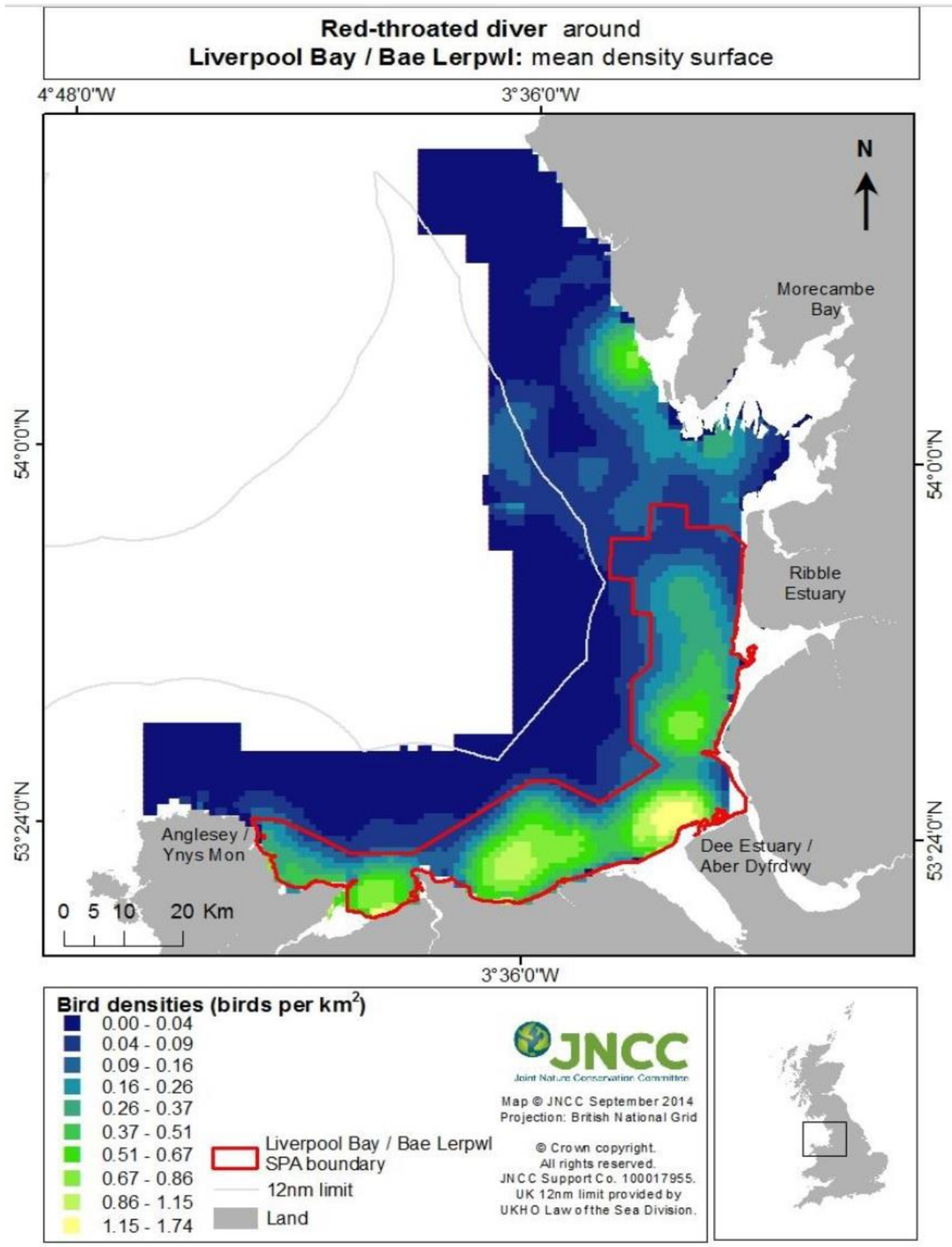


Figure 1.13: Red-throated diver densities in Liverpool Bay/Bae Lerpwl SPA from five years of winter aerial survey data recorded between 2005 and 2011 (Lawson *et al*. 2016).

Little gull

1.9.2.7 The SPA protects the largest marine aggregation of little gull in the UK during the non-breeding season. Little gull is listed on Annex I of the Wild Birds Directive.

1.9.2.8 A mean peak population estimate of 319 individuals was produced from Lawson *et al*. (2016). Observations of little gull were consistently recorded at a well-defined location in the Liverpool Bay/Bae Lerpwl SPA and the species was distributed close to the 12nm limit (Lawson *et al*., 2016) (Figure 1.14).

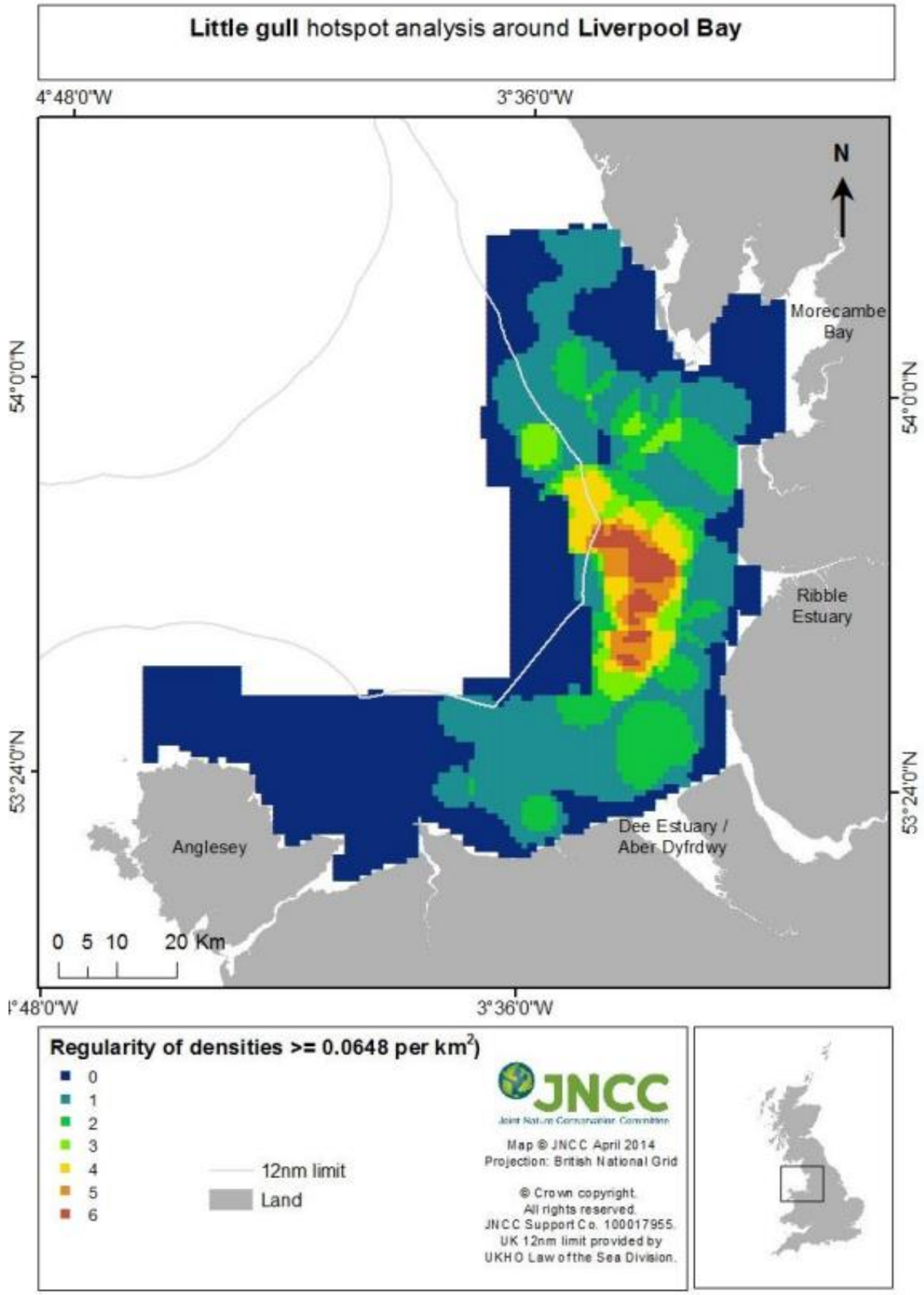


Figure 1.14: Little gull densities in Liverpool Bay/Bae Lerpwl SPA from five years of winter aerial survey data recorded between 2005 and 2011 (Lawson *et al*., 2016).

Common scoter

1.9.2.9 Common scoter is a red-listed species in the UK due to severe declines in their long-term breeding population and range, being a rare breeder, and supporting an important non-breeding population. The species is a regularly occurring migratory species under the Wild Birds Directive (not listed in Annex I). The SPA protects the largest aggregation of common scoter in the UK and it supports 10.31% of the northwest European population, with a classified common scoter population of 56,679 individuals.

1.9.2.10 Webb *et al.* (2006) and Lawson *et al.* (2016) found concentrations of common scoter along the north Wales coast. The nearshore waters between the Dee Estuary and Colwyn Bay were a stronghold for the species within the Liverpool Bay/Bae Lerpwl SPA (Lawson *et al*, 2016) (Figure 1.15).

1.9.2.11 Kaiser *et al*. (2006) collected data on the distribution and behaviour of common scoter in Liverpool Bay/Bae Lerpwl SPA and found concentrations in the nearshore waters off the north Wales coast. Kaiser *et al*. (2006) also used bathymetry to model the seafloor and collected data on prey distribution. The authors found that the north Wales seafloor falls away relatively steeply and that the highest prey densities along this coastline were located at a depth of 7.88m. Common scoter were most frequently found in water between 7m – 15m deep and it is widely accepted that common scoter forage in water less that 20m deep.

1.9.2.12 Densities of common scoter in the Liverpool Bay/Bae Lerpwl SPA are shown in Lawson *et al*. (2016) (Figure 1.15).

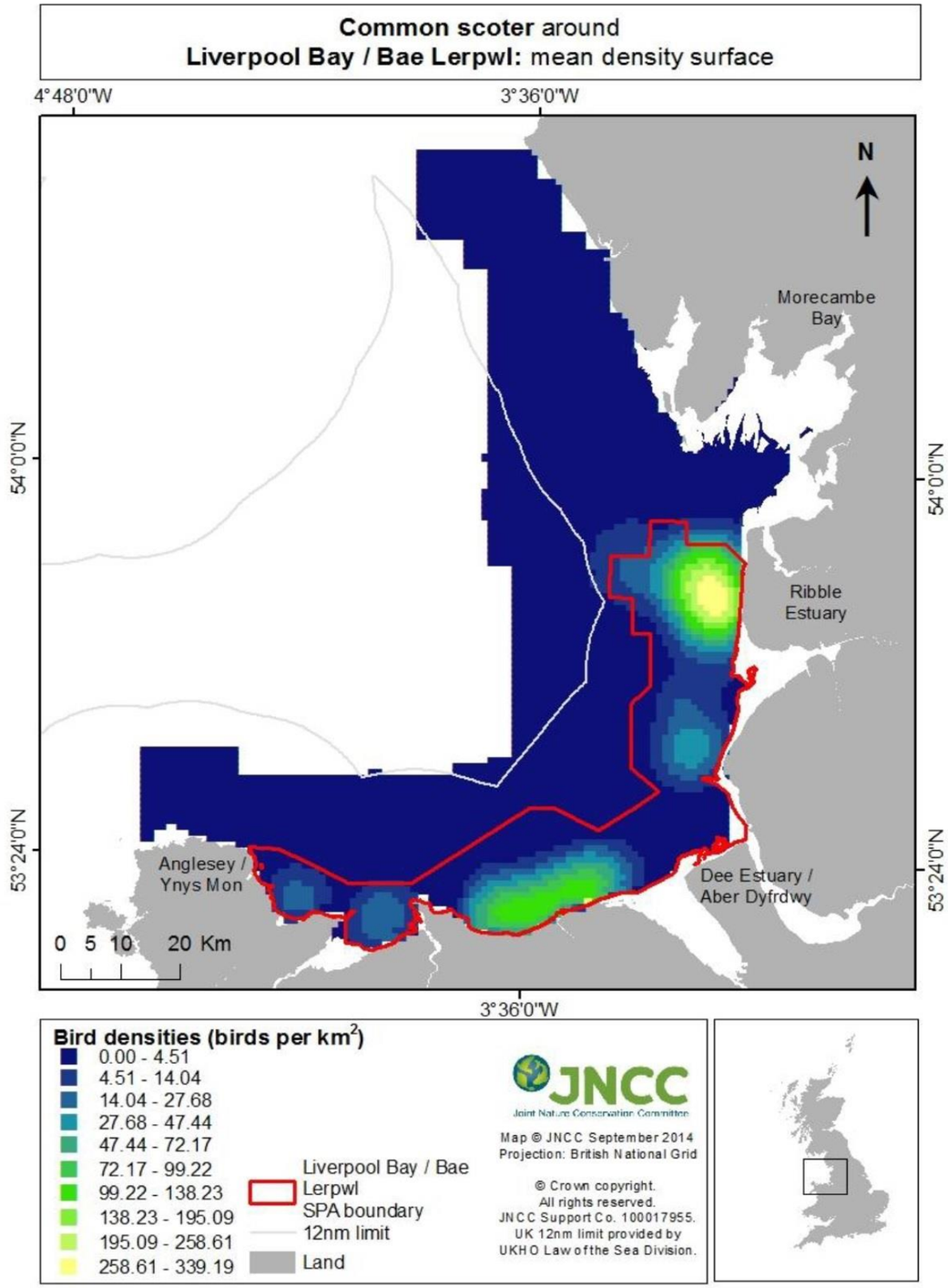


Figure 1.15: Common scoter densities in Liverpool Bay/Bae Lerpwl SPA from five years of winter aerial survey data recorded between 2005 and 2011 (Lawson *et al*., 2016).

Little tern

1.9.2.13 Little tern is the smallest species of tern breeding in the UK, nesting exclusively on the coast in well-camouflaged shallow scrapes on beaches, spits or inshore islets (Mitchell *et al.,* 2004). The SPA supports foraging areas for nearly 7% of the UK population of little tern. Little tern is listed on Annex I of the Wild Birds Directive.

1.9.2.14 Little tern forage close to their breeding site (Woodward *et al*., 2019), and therefore require shallow, sheltered feeding areas close their breeding site. The species feed on a variety of small fish and invertebrates. According to Woodward *et al*. (2019), the maximum foraging range from the colony is 5km with of a mean of 2.1km. Specific data collected at the Dee Estuary colony indicated a mean maximum range of 1.8km from the colony (Parsons *et al*., 2015).

1.9.2.15 The coastal area of Gronant in Denbighshire and the Point Ayre on the Dee Estuary supported a combined total of 175 pairs in 2021. During the breeding season, these birds are likely to use the very nearshore areas of the Liverpool Bay/Bae Lerpwl SPA to forage.

Common tern

1.9.2.16 The SPA also supports nearly 2% of the UK population of common tern. The species is listed on Annex I of the Wild Birds Directive. There is a common tern colony at Shotton Lagoons reserve within the Dee Estuary SPA. During the breeding season, individuals from Shotton Lagoons are likely to forage in the inshore waters of the Liverpool Bay/Bae Lerpwl SPA that are located in close vicinity of the Dee Estuary. There is also a small colony at Seaforth (Lancashire) and individuals from this colony forage from the River Mersey mouth at New Brighton to Hilbre (Dee Estuary Birding Website, 2022). Common tern also breed at Ribble Marshes on the Ribble Estuary. A generic model applied at Ribble Marshes predicted the distribution to be the highest around the colony, and to decrease with distance from the colony and from the shore (Wilson *et al*., 2014). For a seabird species, common tern has a small foraging range, with a mean-maximum foraging range of 18.0km±8.9km (Woodward *et al*., 2019).

Waterbird assemblage

1.9.2.17 The main components of the assemblage include all the non-breeding qualifying features listed above, as well as an additional two species present in numbers exceeding 1% of the UK total: red-breasted merganser *Mergus serrator* and great cormorant *Phalacrocorax carbo*. Only red-breasted merganser and great cormorant have been assessed within the assessments below.

Conservation objectives

1.9.2.18 A CAP for the Liverpool Bay/Bae Lerpwl SPA was released on the 24 January 2023 (Natural England, NRW and JNCC, 2022)[39]. The CAP contains revised conservation objectives for each feature of the site, site-specific clarifications and advice in order for the conservation objectives to be achieved, and advice on management requirements to achieve the conservation objectives. However, due to the limited timeframe between the release date of this CAP and the submission date of this HRA Stage 2 ISAA Report, the Appropriate Assessment has been undertaken against the conservation objectives of the Liverpool Bay/Bae Lerpwl SPA released in 2019 (Natural England, 2019a) (see paragraph 1.9.2.19). Whilst it is considered that the conclusions would also be applicable to the conservation objectives detailed in the latest CAP for the Liverpool Bay/Bae Lerpwl SPA (Natural England, NRW and JNCC, 2022), these will be fully reviewed and considered in the HRA Stage 2 ISAA Report submitted with the application for consent.

1.9.2.19 The conservation objectives for the protected features of the SPA (as outlined in Natural England, 2019a)[40] are to ensure that subject to natural change, the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

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

Morecambe Bay and Duddon Estuary SPA

Site description

1.9.2.20 The Morecambe Bay and Duddon Estuary SPA extends between Rossall Point in Lancashire and Drigg Dunes in Cumbria. The Morecambe Bay and Duddon Estuary SPA is located 31km from the Morgan Array Area. Morecambe Bay is the second largest embayment in Britain after the Wash, at over 310km^2, and has four estuaries – the Wyre, Lune, Kent and Leven. It contains the largest continuous area of intertidal mudflats and sandflats in the UK. Morecambe Bay supports a wide range of other habitats including large areas of saltmarsh and transitional habitats as well as sand dune systems and coastal lagoons. The Duddon and Ravenglass Estuaries support saltmarsh, intertidal mud and sand communities and sand dune systems with small areas of stony reef.

1.9.2.21 The Morecambe Bay and Duddon Estuary SPA is designated for the protection of the following offshore ornithological features: Mediterranean gull *Larus melanocephalus*, lesser black-backed gull, European herring gull, sandwich tern *Sterna sandvicensis*, common tern, little tern, and seabird assemblage (including black-headed gull *Chroicocephalus ridibundus*, great black-backed gull *Larus marinus*, and arctic tern *Sterna paradisaea*).

1.9.2.22 After the LSE screening (HRA Stage 1 Screening Report), only lesser black-backed gull and European herring gull were screened in for further assessment in this HRA Stage 2 ISAA Report due to potential impacts on other features being none to negligible as highlighted in the volume 2, chapter 10: Offshore ornithology of the PEIR. Furthermore, these species are the only individual qualifying features that are within foraging range of the Morgan Generation Assets.

[39] http://publications.naturalengland.org.uk/publication/3236717

[40] http://publications.naturalengland.org.uk/publication/5089733892898816

Feature accounts

Lesser black-backed gull

1.9.2.23 Lesser black-backed gull is listed as a regularly occurring migratory species under the Wild Birds Directive. Colony counts during the 2011 – 2015 breeding season indicated that the Morecambe and Duddon Estuary SPA supported 9,720 individuals, 2.7% of biogeographic population (Seabird Monitoring Programme (SMP) database 2011 – 2015 (JNCC, 2022h). However, the population has declined in recent years due to mammal predation on the South Walney Nature Reserve near Barrow – a stronghold for the species in the Morecambe and Duddon Estuary SPA. For the first time since 2015 chicks have fledged at the South Walney Nature Reserve in 2021. The latest estimate is of 413 AONs for the Morecambe and Duddon Estuary SPA (JNCC, 2022h). Langley *et al.* (2022) Global Positioning System (GPS) tagged individuals from the South Walney nature reserve and recorded use of costal habitats (albeit along the coastline).European herring gull

1.9.2.24 The population of European herring gull has declined since the SPA citation value of 20,000 individuals in 1991 (1.0% of biogeographic population). Similarly to lesser black-backed gull, the population has declined due to mammal predation on the South Walney Nature Reserve near Barrow – a stronghold for the species in the Morecambe and Duddon Estuary SPA. For the first time since 2015 chicks have fledged at the South Walney Nature Reserve in 2021. The latest estimate is of 450 AONs for the Morecambe and Duddon Estuary SPA (JNCC, 2022h).

Conservation objectives

1.9.2.25 The conservation objectives for the protected features of the SPA (as outlined in Natural England, 2019b)[41] are to ensure that subject to natural change, the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

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

Ribble and Alt Estuaries SPA

Site description

1.9.2.26 The Ribble and Alt Estuaries SPA lies on the coast of Lancashire and Sefton in the northwest of England. The Ribble and Alt Estuaries SPA is located 50.9km from the Morgan Array Area. It is comprised of two estuaries, of which the Ribble estuary is the larger of the two. Together with an extensive area of sandy foreshore along the Sefton Coast, it forms part of the chain of UK west coast SPAs that fringe the Irish Sea. The site consists of extensive areas of sand and mudflats and, particularly in the Ribble, large areas of saltmarsh.

1.9.2.27 The site supports internationally important populations of waterbirds in winter, including swans, geese, ducks and waders. It is also of major importance during migration periods, especially for wader populations moving along the west coast of Britain. The larger expanses of saltmarsh and areas of coastal grazing marsh support breeding birds, including large concentrations of gulls and terns. These seabirds feed both offshore and inland, outside the SPA.

1.9.2.28 The Ribble and Alt Estuary SPA is designated for the protection of the following offshore ornithological features: great cormorant *Phalacrocorax carbo*, lesser black-backed gull, common tern, and seabird assemblage (including common scoter).

1.9.2.29 After the LSE screening (HRA Stage 1 Screening Report), only lesser black-backed gull was screened in for further assessment in the HRA Stage 2 due to potential impacts on other features being none to negligible as highlighted in the volume 2, chapter 10: Offshore Ornithology of the PEIR. Furthermore, this species is the only individual qualifying feature that is within foraging range of the Morgan Generation Assets.

Feature accounts

Lesser black-backed gull

1.9.2.30 Lesser black-backed gull is listed as a regularly occurring migratory species under the Wild Bird Directives. The Ribble Estuary supported a population of 4,100 Apparently Occupied Nests (AONs) of lesser black-backed gulls during Seabird 2000 in 1998-2002 (Mitchell *et al*., 2004) and a latest estimate of 4,489 AONs was produced in 2021 (JNCC, 2022h).

1.9.2.31 Despite this SPA being only 50.9km from the Morgan Generation Assets, lesser black-backed gull were rarely observed during the site-specific surveys. A tagging study of lesser black-backed gull at urban and coastal sites in Cumbria showed that most of foraging trips during the breeding season were inland trips, with only occasional marine trips (Langley *et al.*, 2022) (Figure 1.16).

[41] http://publications.naturalengland.org.uk/publication/6242841537806336

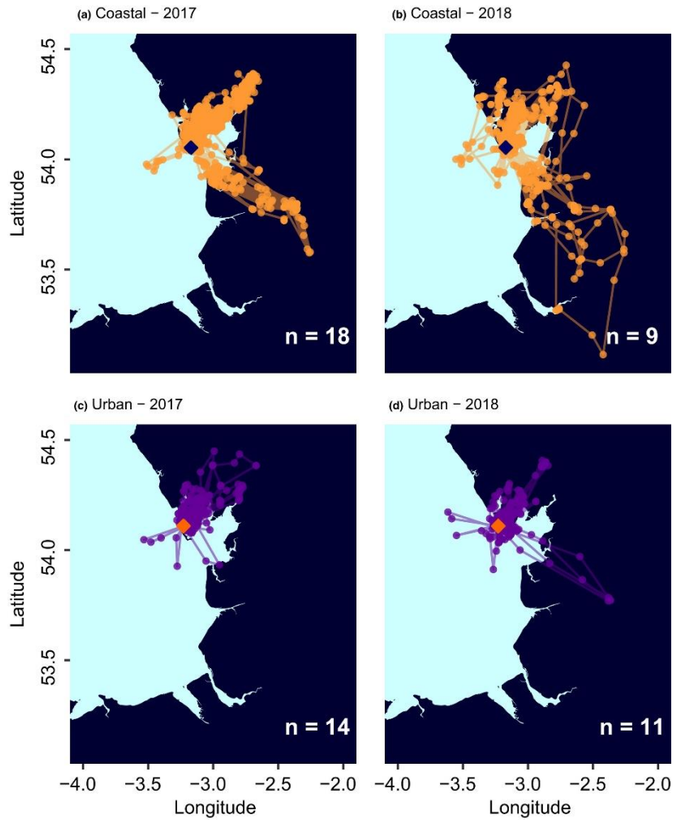


Figure 1.16: Complete foraging trips by 42 tracked lesser black-backed gulls from 4 to 19 June from coastal (a, b) and urban (c, d) colonies in 2017 and 2018. Colony locations are marked with navy (coastal) or orange (urban) diamonds. n = the number of individuals tracked at each site in each year (Langley *et al*., 2022).

Conservation objectives

1.9.2.32 The conservation objectives for the protected features of the SPA (as outlined in Natural England, 2019c)[42] are to ensure that subject to natural change, the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by **maintaining or restoring**:

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

Irish Sea Front SPA

Site description

1.9.2.33 The Irish Sea Front SPA is an area of the Irish Sea between Anglesey and the Isle of Man; it covers an area 180km^2. The area is an SPA for the Manx shearwater and is located 56.7km from the Morgan Array Area.

1.9.2.34 This site is located over part of a large tidal front which forms in the spring every year. This tidal front creates an area of very productive sea, with high concentrations of zooplankton leading to large numbers of prey species contributing to the site's importance.

Feature accounts

Manx shearwater

1.9.2.35 The Irish Sea Front SPA is the third largest marine aggregation of breeding Manx shearwater identified in the UK. Data from the extensive European Seabirds at Sea (ESAS) database suggest that more than 12,000 Manx shearwater could be present in the area (Kober *et al.,* 2010; Kober *et al*., 2012).

1.9.2.36 Tracking studies indicate that Manx shearwaters from at least three different colonies around the Irish Sea (Northern Ireland, Wales and Devon) are likely to use the Irish Sea Front SPA for foraging during the breeding season (Dean *et al.*, 2010; Dean *et al.,* 2012).

Conservation objectives

1.9.2.37 The conservation objectives for the protected features of the SPA (as outlined in JNCC, 2016)[43] are to avoid significant deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, subject to natural change, thus ensuring that the integrity of the site is maintained in the long term and makes an appropriate contribution to achieving the aims of the Birds Directive for each of the qualifying species. This contribution would be achieved through delivering the following objectives for the sites qualifying feature:

- Avoid significant mortality, injury and disturbance of the qualifying features, so that the distribution of the species and ability to use the site are maintained in the long-term
- Maintain the habitats and food resources of the qualifying features in favourable condition
- Ensure access to the site from linked breeding colonies.

Lambay Island SPA

Site description

1.9.2.38 Lambay Island lies approximately 4km off the north Co. Dublin coastline and is separated from it by a channel of 10m to 13m in depth. The Lambay Island SPA is

[42] http://publications.naturalengland.org.uk/publication/4868920422957056

[43] https://data.jncc.gov.uk/data/0032da71-db02-44b5-b4e1-022d77ef7ee3/irish-sea-front-sas-conservation-objectives.pdf

located 130.2km from the Morgan Array Area. The Lambay Island SPA is internationally important for its breeding seabirds and is of particular note for the diversity of these, with 12 species breeding regularly. As such, the site is an SPA under the EU Birds Directive, of special conservation interest for the following species: Northern fulmar *Fulmarus glacialis*, great cormorant, European shag *Gulosus aristotelis*, greylag goose *Anser*, lesser black-backed gull, European herring gull, black-legged kittiwake, common guillemot, razorbill and Atlantic puffin. The site is also of special conservation interest for holding an assemblage of over 20,000 breeding seabirds.

1.9.2.39 After the LSE screening (HRA Stage 1 Screening Report), only common guillemot was screened in for further assessment in the HRA Stage 2 ISAA Report due to potential impacts on other features being none to negligible as highlighted in the volume 2, chapter 10: Offshore ornithology of the PEIR.

Feature accounts

Common guillemot

1.9.2.40 The species is the most numerous breeding bird at the Lambay Island SPA, which is the largest colony in Ireland. The breeding population has remained relatively stable (-1%) since seabird 2000 (JNCC, 2020b). The latest count in 2015 produced an estimate of 59,983 breeding individuals at the Lambay Island SPA (JNCC, 2022h).

Conservation objectives

1.9.2.41 The conservation objectives for the protected features of the SPA (as outlined in NPWS, 2022)[44] are to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.

1.9.2.42 The FCS of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future,
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Ireland's Eye SPA

Site description

1.9.2.43 Ireland's Eye is an uninhabited island located about 1.5km north of Howth in Co. Dublin. The Ireland's Eye SPA is located 138.5km from the Morgan Array Area. The site encompasses Ireland's Eye, Rowan Rocks, Thulla, Thulla Rocks, Carrageen Bay and a seaward extension of 200m in the west and 500m to the north and east. The site is an SPA under the Wild Birds Directive, of special conservation interest for the following species: great cormorant, European herring gull, black-legged kittiwake, common guillemot and razorbill.

1.9.2.44 After the LSE screening (HRA Stage 1 Screening Report), only common guillemot was screened in for further assessment into HRA Stage 2 due to potential impacts on other features being negligible as highlighted in the volume 2, chapter 10: Offshore Ornithology of the PEIR.

Feature accounts

Common guillemot

1.9.2.45 The latest count in 2015 produced an estimate of 4,410 breeding individuals at the Ireland's Eye SPA (JNCC, 2022h).

Conservation objectives

1.9.2.46 The conservation objectives for the protected features of the SPA (as outlined in JNCC, 2016)[45] are to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA. The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future,
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Ailsa Craig SPA

Site description

1.9.2.47 The Ailsa Craig SPA is an island rising to 338m, situated in the outer part of the Firth of Clyde, 141.3km from the Morgan Array Area. Cliffs up to 100m encircle the island and provide nesting sites for a variety of seabirds, notably one of the largest northern gannet colonies in the world. The seaward extension extends approximately 2km into the marine environment to include the seabed, water column and surface.

1.9.2.48 The Ailsa Craig SPA is a designated for the protection of the following ornithological features: northern gannet, black-legged kittiwake, European herring gull, common guillemot, and waterbird assemblage.

1.9.2.49 The LSE screening (HRA Stage 1 Screening Report) revealed that only northern gannet and black-legged kittiwake are within foraging range of this SPA and only northern gannet was screened in for further assessment due to the potential impact on black-legged kittiwake being negligible as highlighted in the volume 2, chapter 10: Offshore ornithology of the PEIR.

[44] https://www.npws.ie/protected-sites/sac/000204

[45] https://data.jncc.gov.uk/data/0032da71-db02-44b5-b4e1-022d77ef7ee3/irish-sea-front-sas-conservation-objectives.pdf

Feature accounts

Northern gannet

1.9.2.50 The species is a regularly occurring migratory species (not listed in Annex I) at the Ailsa Craig SPA. The breeding population has increased by 22% between the 2003-2004 counts and the latest count carried out in 2014 (JNCC, 2021). There were 33,226 AONs on Ailsa Craig in 2014.

Conservation objectives

1.9.2.51 The conservation objectives for the protected features of the SPA (as outlined in Marine Scotland, 2022)[46] are to avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and to ensure for the qualifying species that the following are maintained in the long term:

- Population of the species as a viable component of the site
- Distribution of the species within site
- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species,
- No significant disturbance of the species.

Grassholm SPA

Site description

1.9.2.52 Grassholm is a small uninhabited island, lying 8 miles offshore, due west of Skomer. The Grassholm SPA is located 260.2km from the Morgan Array Area. The Grassholm SPA supports a large breeding population of northern gannet, holding around 9% of the global breeding population (Mitchell *et al*., 2004). It is the third largest gannetry in the UK and Ireland.

Feature accounts

Northern gannet

1.9.2.53 The species is a regularly occurring migratory species (not listed on Annex I). Changes in the size of the Grassholm gannetry have been documented since its foundation around 1820. Since the 1940s, when 6,000 apparently occupied sites (AOS) were estimated, the colony has grown rapidly, with 15,500 AOS estimated by aerial survey in 1964. Since 1984, counts have been made from aerial photographs, varying in quality of resolution and coverage (JNCC, 2020b). The most recent survey in 2015 counted 36,011 AOS (JNCC, 2022h).

1.9.2.54 A study by Carter *et al.* (2016) used tracking data from 160 breeding northern gannet at Grassholm SPA over a period of 5 years to investigate rafting and foraging behaviour on waters around the colony. Results from 389 foraging trips showed that northern gannet from the Grassholm SPA tended to forage predominantly in the south-west waters, with few core foraging areas also identified in Cardigan Bay (Figure 1.17).

Conservation objectives

1.9.2.55 The conservation objectives for the protected features of the SPA (as outlined in NRW, 2008)[47] are to be in a favourable conservation status, where all of the following conditions are satisfied:

- The population will not fall below 30,000 pairs in three consecutive years
- It will not drop by more than 25% of the previous year's figures in any one year
- There will be no decline in this population significantly greater than any decline in the North Atlantic population as a whole.

[46] https://sitelink.nature.scot/site/8463

[47] https://naturalresources.wales/media/674134/Grassholm%20SPA%20Management%20Plan%2021%5B1%5D.4.08%20(English).pdf

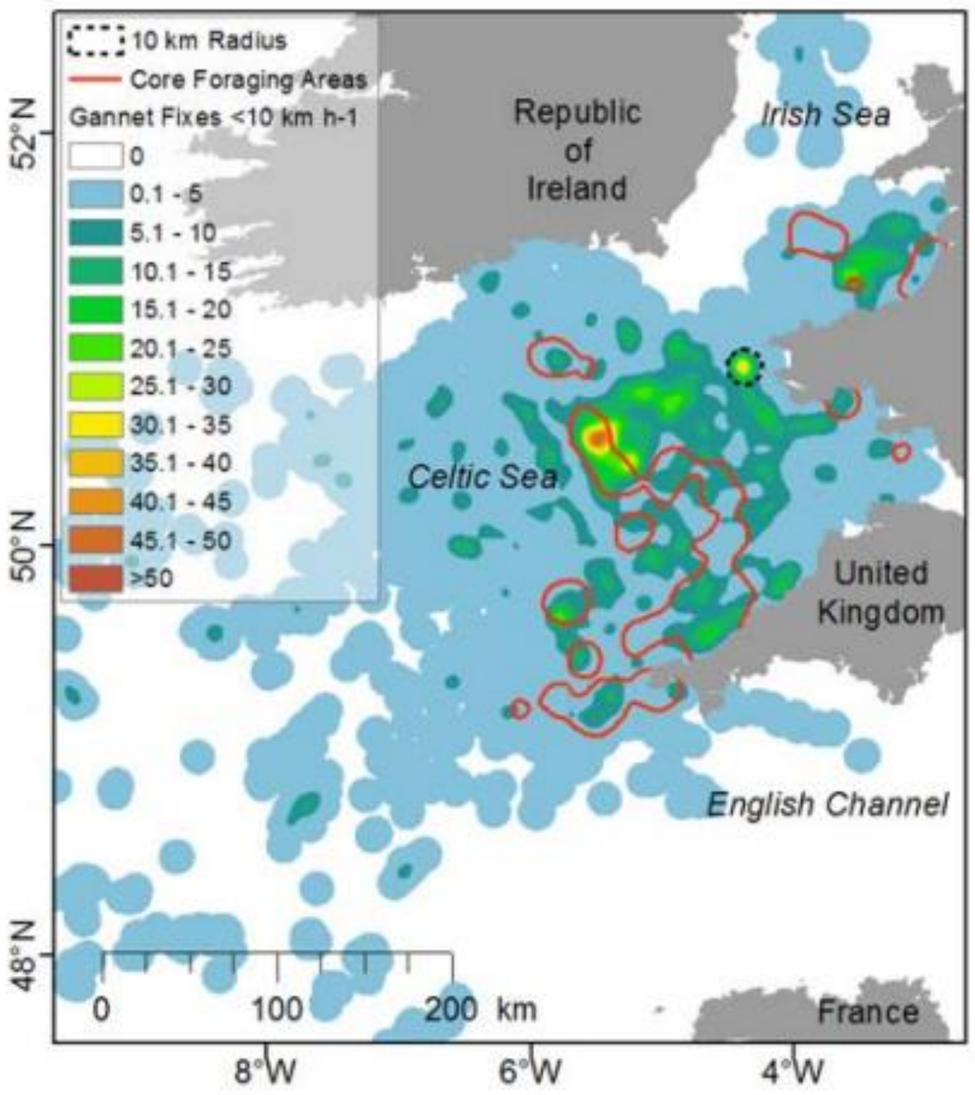


Figure 1.17: Kernel density estimate of GPS location fixes of birds travelling <10km h-1 together (rafting was defined as two or more consecutive GPS fixes below a speed threshold of 10km h−1) with core foraging areas (red lines) calculated from 50% kernel cores of northern gannet dives. Kernel smoothing parameter (h) = 10km, cell size = 200m. Colour palette indicates number of GPS fixes per unit area (Carter *et al.*, 2016).

1.9.3 Assessment of adverse effects alone

Changes in prey availability

1.9.3.1 There is the potential for changes in prey (e.g. fish species) abundance and distribution to arise as a result of construction activities which physically disturb the seabed and generate underwater sound. The installation of foundations within the Morgan Array Area may lead to injury and/or disturbance to fish and shellfish species due to underwater sound during pile driving. UXO clearance (including detonation) also has the capability to cause injury and/or disturbance to fish and shellfish. 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.

1.9.3.2 There were no potential impacts screened into the HRA Stage 2 ISAA Report for the Morgan Generation Assets alone during the operations and maintenance phase, as the main phase during which such effects on fish species may occur is during construction; primarily due to piling sound. Several potential impacts were screened into the HRA Stage 2 ISAA Report in-combination with other plans/projects. The in-combination assessment is presented in section 1.9.4.

1.9.3.3 The assessment of LSE in the HRA Stage 1 Screening Report identified that during construction, LSE could not be ruled out for the potential impact of changes in prey availability. This relates to the designated sites and relevant offshore ornithological features listed in Table 1.191.

Table 1.191: European sites and relevant offshore ornithological features from which the potential for an LSE could not be ruled out in relation to changes in prey availability.

European site	Offshore ornithological features
Liverpool Bay/Bae Lerpwl SPA	• Non-breeding red-throated diver • Non-breeding common scoter • Non-breeding little gull • Breeding common tern • Breeding little tern • Non-breeding waterbird assemblage (red-breasted merganser and great cormorant in addition to species listed above).
Morecambe Bay and Duddon Estuary SPA	• Non-breeding and breeding lesser black-backed gull • Breeding herring gull.
Ribble and Alt Estuaries SPA	• Breeding lesser black-backed gull
Irish Sea Front SPA	• Breeding Manx shearwater

1.9.3.4 The MDS considered for the assessment of potential impacts on offshore ornithological features from changes in prey availability during construction are shown in Table 1.192.

Table 1.192: Maximum design scenario considered for the assessment of potential impacts offshore ornithological features from changes in prey availability from underwater sound generated during the construction phase.

Phase	Maximum design scenario	Justification
Construction phase	As described in volume 2, chapter 8: Fish and shellfish ecology of the PEIR: Monopiles: • Wind turbines: installation of up to 68 wind turbines with a 16m diameter monopile foundations installed by impact piling • OSPs: installation of one OSP with foundations consisting of two 15m diameter piled monopile foundations installed by impact piling • Maximum hammer energy of up to 5,500kJ • Up to two vessels piling concurrently (minimum distance 875m, maximum distance 28.5km, between piling vessels) • Maximum of up to 9.5 hours of piling for a monopile with a cumulative total of up to 665 hours • Consecutive piling over a maximum of 24 hours • One monopile installed per 24 hours per vessel = 70 days for a single vessel (maximum temporal) or 35 days for two vessels (maximum spatial). Pin piles: • Wind turbines: installation up to 68 3-legged jacket foundations with one pile per leg (a total of up to 204 piles) and each pile with a diameter of 5.5m installed by impact piling • OSP: installation of one OSP with 6-legged jacket foundations, with three piles per leg (a total of 18 piles) and each pile with a diameter of 5.5m installed by impact piling • Maximum hammer energy of up to 3,700kJ • Up to two vessels piling concurrently (minimum distance 875m, maximum distance 28.5km, between piling vessels) • Wind turbines: maximum duration of up to 8.02 hours per pile with a cumulative total of up to 1,638 hours; installation of wind turbines over 103 days (=16.04 hours of piling per day; two piles per day) • OSP: maximum duration of up to 8.02 hours per pile with a cumulative total of up to 145 hours; installation of OSP over 9 days (=16.04 hours piling per day) • Consecutive piling over a maximum of 24 hours • Single piling of 103 days for wind turbine plus approx. 9 days for OSP = 112 days (maximum temporal) or 56 days for two vessels (maximum spatial). Total piling phase (foundation installation) of up to two years within a four-year construction programme. Geophysical site investigation: Geophysical site investigation activities will include the following activities: • MBES • SSS • SBES • SBP • UHRS. UXO: • For the purposes of this assessment, it has been assumed that the MDS will be clearance of UXO with a NEQ of 907kg cleared by either low order or high order techniques • Clearance of up to 13 UXOs within the Morgan Array Area • Realistic maximum of 130kg UXO. • Up to 0.5kg NEQ clearance shot for neutralisation of residual explosive material at each location. • Clearance during daylight hours only.	For both monopiles and pin piles the largest hammer energy and maximum spacing between concurrent piling events would lead to the largest spatial extent of ensonification at any one time. Minimum spacing between concurrent piling represents the highest risk of injury to fish and shellfish as sound from adjacent foundations could combine to produce a greater radius of effect compared to a single piling event. For both monopiles and pin piles the maximum temporal scenario was assessed on the greatest number of days on which piling could occur based on the number of piles that could be installed within a 24-hour period. Consecutive piling is assumed over a maximum period of 24 hours. <u>Geophysical site investigation</u> Range of geophysical and geotechnical activities likely to be undertaken using equipment typically employed for these types of surveys. <u>UXO</u> Maximum number and maximum size of UXOs encountered in the Morgan Generation Assets Boundary. Donor charge is maximum required to initiate low order/low yield detonation. Assumption of a clearance shot of up to 0.5kg at all locations although noting that this may not always be required.

Measures adopted as part of the Morgan Generation Assets

1.9.3.5 Measures adopted as part of the Morgan Generation Assets which are of relevance to the assessment of potential impacts on offshore ornithological features from changes in prey availability during construction are presented in Table 1.193.

Table 1.193: Measures adopted as part of the Morgan Generation Assets relevant to the assessment of adverse effect on European sites designated for offshore ornithological features from changes in prey availability.

Measure	Justification	How the measure will be secured
Tertiary measures: Measures required to meet legislative requirements, or adopted standard industry practice		
An offshore EMP which will include measures to minimise disturbance to rafting birds from transiting vessels.	The development of and adherence to an EMP, which will include measures to minimise disturbance to rafting seabirds.	Proposed to be secured through a condition in the marine licence(s).
Offshore EMP	Implementation of an offshore EMP including a MPCP which will include planning for accidental spills, address all potential contaminant releases and include key emergency details.	Proposed to be secured through a condition in the marine licence(s).

Construction phase

Information to support assessment

1.9.3.6 Sound modelling presented in volume 3, annex 3.1: Underwater noise technical report of the PEIR has been used to inform the assessment. Volume 2, chapter 8: Fish and shellfish ecology of the PEIR indicates that behavioural effects on fish would be limited in spatial extent, temporary and reversible.

1.9.3.7 As the result of changes in prey availability, displaced birds may move to areas already occupied by other birds and thus face higher intra- or inter-specific competition due to a higher density of individuals competing for the same resource. Alternatively, displaced birds may be forced to move into areas of lower quality (e.g. areas of lower prey availability). Such changes in prey availability could ultimately affect their demographic fitness (i.e. survival rates and breeding productivity) as well as potentially impacting on other birds in areas that displaced birds move to.

Liverpool Bay/Bae Lerpwl SPA

Red-throated diver

1.9.3.8 During the non-breeding season, red-throated diver are primarily fish-eaters. Although they feed predominantly on small fish such as herring, sprats and sandeels *Ammodytes marinus*, they can switch to alternative small prey, depending on the species of fish available, (e.g. cod and flounder *Paralichthys flesus* (Cramp and Simmons 1977; Guse *et al*., 2009; Dierschke *et al*., 2017)). Herring and sandeel are sensitive to offshore wind development (including underwater sound) and there is the potential for the abundance and distribution of these prey species to be affected in the Morgan Array Area and beyond during piling activities and UXO clearance.

1.9.3.9 Site specific surveys have shown to date the absence of red-throated diver in the Morgan Array Area and buffer zones (up to 10km) (volume 2, chapter 10: Offshore ornithology of the PEIR). The interim findings were corroborated by the literature which indicated that aggregations of red-throated divers were located further inshore in Liverpool Bay/Bae Lerpwl SPA (Webb *et al.,* 2006; Lawson *et al.,* 2016).

1.9.3.10 Piling activities during the construction at the Morgan Array Area are likely to generate underwater sound which is predicted to propagate beyond the boundary of the Morgan Array Area (volume 2, chapter 8, Fish and shellfish ecology of the PEIR). Behavioural effects are likely to occur within the range of several kilometres from the Morgan Array Area and therefore behavioural effects are unlikely to extend to the key red-throated diver foraging areas associated with the coastal regions of the Liverpool Bay/Bae Lerpwl SPA.

1.9.3.11 The species distribution in the east part of the Irish Sea and Liverpool Bay/Bae Lerpwl SPA is such that the change in prey availability associated with the Morgan Generation Assets will not adversely affect the red-throated diver qualifying feature of Liverpool Bay/Bae Lerpwl SPA.

Little gull

1.9.3.12 During the non-breeding season the diet of little gull consists of small fish and marine invertebrates. The Liverpool Bay/Bae Lerpwl SPA supports a small population (319 birds) (Lawson *et al.*, 2016).

1.9.3.13 Piling activities during construction at the Morgan Array Area will generate underwater sound. Behavioural effects are likely to occur within the range of several kilometres from the Morgan Array Area and therefore may extend into the Liverpool Bay/Bae Lerpwl SPA and associated aggregations of little gull. However, within the assessment of fish species (volume 2, chapter 8, Fish and shellfish ecology of the PEIR), it was concluded that the temporary nature of the piling activities and associated behavioural effects on prey species would be limited in spatial extent, temporary, reversible and would not lead to any long-term impact on prey species. The change in prey availability associated with the Morgan Generation Assets will not adversely affect the little gull qualifying feature of Liverpool Bay/Bae Lerpwl SPA.

Common scoter

1.9.3.14 Common scoter feed by diving to the seabed to exploit prey species that live upon or within the upper few centimetres of the substratum. The diet of common scoter is thought to comprise mainly bivalve molluscs, with crabs, small fishes and gastropods also incorporated but less frequently (Stott and Olson, 1973; Bourne, 1984; Ferns, 1984; Stempniewicz, 1986; Vaitkus and Bubinas, 2001; Kaiser *et al*., 2006). In Liverpool Bay, the highest numbers of common scoter coincided with sites that had a high abundance and biomass of bivalve prey species (Kaiser *et al*., 2006).

1.9.3.15 Site specific surveys have shown to date the absence of common scoter in the Morgan Array Area and buffer zones (up to 10km) (volume 2, chapter 10: Offshore ornithology of the PEIR). The interim findings were corroborated by the literature which indicated that aggregations of common scoter were located in very nearshore areas in Liverpool Bay/Bae Lerpwl SPA (Webb *et al.,* 2006; Lawson *et al.,* 2016). Kaiser *et al. (*2006) showed that common scoter were most frequently found in water between 7m to 15m deep in Liverpool Bay/Bae Lerpwl whilst it is widely accepted that common scoter forage in water less that 20m deep.

1.9.3.16 There is no published scientific evidence to suggest that bivalve molluscs, the main prey items of common scoter, are sensitive to underwater sound produced during piling activities and UXO clearance. Therefore, changes in prey availability associated with the Morgan Generation Assets is not anticipated to adversely affect the population of common scoter within the Liverpool Bay/Bae Lerpwl SPA.

Little tern

1.9.3.17 Although the little tern colonies are located in the Dee Estuary SPA, the species forage in the inshore waters of the Liverpool Bay SPA close to the colonies. According to Woodward *et al*. (2019), the maximum foraging range from the colony is 5km with of a mean of 2.1km. Specific data collected at the Dee Estuary colony indicated a mean maximum range of 1.8km from the colony (Parsons *et al*., 2015).

1.9.3.18 Volume 2, chapter 8, Fish and shellfish ecology of the PEIR predicted that behavioural effects are likely to occur within the range of several kilometres from the Morgan Array Area. Therefore, the area within which behavioural effects may occur is located outside the mean maximum foraging range of little tern breeding from the Dee Estuary SPA. There is therefore no indication that indirect impacts from underwater sound affecting prey species associated with the Morgan Generation Assets will adversely affect the little tern qualifying feature of Liverpool Bay/Bae Lerpwl SPA.

Common tern

1.9.3.19 As the Morgan Array Area is located outside the foraging range of common tern breeding on the Dee, Mersey and the Ribble Estuaries (mean max 18.0km ± 8.9km (Woodward *et al.,* 2019)), there is no impact from changes in prey availability at the Morgan Array Area.

1.9.3.20 As outlined above in paragraph 1.9.3.18 for little tern, the area within which behavioural effects may occur is located outside the mean maximum foraging range of common tern breeding in the Dee, Mersey and the Ribble estuaries (Wilson *et al.,* 2014).

1.9.3.21 There is therefore no indication that indirect impacts from underwater sound affecting prey species associated with the Morgan Generation Assets will adversely affect the common tern qualifying feature of Liverpool Bay/Bae Lerpwl SPA.

Waterbird assemblage

1.9.3.22 In addition to the qualifying species assessed above, great cormorant and red-breasted merganser are part of the waterbird assemblage in Liverpool Bay. Great cormorant and red-breasted merganser occur in numbers that exceed 1% of their respective UK populations in Liverpool Bay, with 826 and 160 individuals respectively (Lawson *et al*., 2016). Both species have a very nearshore distribution in Liverpool Bay, and no overlap with the Morgan Generation Assets.

1.9.3.23 There is therefore no indication that indirect impacts from underwater sound affecting prey species associated with the Morgan Generation Assets will adversely affect the waterbird assemblage qualifying feature of Liverpool Bay/Bae Lerpwl SPA.

Conclusions

1.9.3.24 Adverse effects on the qualifying seabird features of the Liverpool Bay/Bae Lerpwl SPA which undermine the conservation objectives of the SPA will not occur as a result of changes in prey availability. An assessment of the potential impact 'changes in prey availability' against each relevant conservation objective (as presented in paragraph 1.9.2.18) is presented in Table 1.194. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.194: Conclusions against the conservation objectives of the Liverpool Bay/Bae Lerpwl SPA for changes in prey availability.

Conservation objective	Conclusion
The extent and distribution of the habitats of the qualifying features [are maintained or restored]	There is no pathway linking changes in prey availability from Morgan Generation Assets construction with the extent and distribution, structure and function and the supporting processes on which the habitats of qualifying features rely in Liverpool Bay/Bae Lerpwl SPA. Therefore, changes in prey availability during the construction phase will not prevent the extent, distribution, structure and function of the habitats of the qualifying features and the supporting processes on which the habitats of qualifying features rely from being maintained or restored.
The structure and function of the habitats of the qualifying features [are maintained or restored]	
The supporting processes on which the habitats of the qualifying features rely [are maintained or restored]	
The population of each of the qualifying features [are maintained or restored]	The potential impact of the Morgan Generations Assets construction will be temporary, short-term, and reversible. Prey species of qualifying ornithological features may potentially be affected temporarily by piling activities, but this is far away from the SPA and the main foraging areas of the qualifying features. The potential impact on prey distributions will not have an appreciable impact on populations of qualifying ornithological features. Therefore, changes in prey availability during the construction phase will not prevent the population of each of the qualifying features from being maintained or restored
The distribution of the qualifying features within the site [are maintained or restored]	The potential impact of the Morgan Generations Assets construction will be temporary, short-term, and reversible. Prey species of qualifying ornithological features may potentially be affected temporarily by piling activities, but this is far away from the SPA and the main foraging areas of the qualifying features. Therefore, changes in prey availability during the construction phase will not prevent the distribution of each of the qualifying features from being maintained or restored

1.9.3.25 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Liverpool Bay/Bae Lerpwl SPA as a result of changes in prey availability with respect to the construction and decommissioning of the Morgan Generation Assets alone. The conclusions of no risk of an adverse effect on the integrity of the Liverpool Bay/Bae Lerpwl SPA have been made with reference to the conservation objectives detailed in Natural England (2019a). Whilst it is considered that these conclusions would also be applicable to the conservation objectives detailed in the latest CAP for the Liverpool Bay/Bae Lerpwl SPA (Natural England, NRW and JNCC, 2022), these will be fully reviewed and considered in the HRA Stage 2 ISAA Report submitted with the application for consent.

Morecambe Bay and Duddon Estuary SPA

Lesser black-backed gull

1.9.3.26 Underwater sound produced during pile driving and UXO clearance (including detonation) associated with construction activities may impact upon the availability of

prey items. Indeed, underwater sound may cause injury and/or disturbance to fish and shellfish species. Underwater sound may also affect the physiology and behaviour of fish and mobile invertebrates over a very large (thousands of metres) area due to the ability of sound to propagate further underwater.

1.9.3.27 The lesser black-backed gull is a typical non-specific surface-feeding seabird with a widespread, and patchy distribution in the Morgan Generation Assets. Overall the abundance was deemed 'low' with 74 birds recorded during the 12 months of surveying (volume 2, chapter 10: Offshore ornithology of the PEIR). There is potential that birds recorded within the Morgan Generation Assets are associated with the Morecambe Bay and Duddon Estuary SPA as there is overlap between the species foraging range and the Morgan Array Area.

1.9.3.28 For a gull species, lesser black-backed gull have a large foraging range (127 ± 109km) (Woodward *et al*., 2019). The species is non-specific in its prey requirement and will be able to prey on range of fish species at the surface (including discards from fish vessels). Due to the distribution of lesser black-backed gull, low numbers and foraging behaviour (i.e. non-specific surface feeding), it is anticipated that any changes in prey availability (arising from underwater sound, increased SSC and habitat), if they occur at all, will have little impact on lesser black-backed gull during the construction phase.

Herring gull

1.9.3.29 Underwater sound produced during pile driving and UXO clearance (including detonation) associated with construction activities may impact upon the availability of prey items. Indeed, underwater sound may cause injury and/or disturbance to fish and shellfish species. Underwater sound may also affect the physiology and behaviour of fish and mobile invertebrates over a very large (thousands of metres) area due to the ability of sound to propagate further underwater.

1.9.3.30 European herring gull is a typical non-specific surface-feeding seabird with a widespread, and patchy distribution in Morgan Generation Assets. Overall, the abundance was deemed 'low' with 144 birds recorded during the 12 months of site-specific surveys (volume 2, chapter 10: Offshore ornithology of the PEIR). There is potential that birds recorded within the Morgan Generation Assets are associated with the Morecambe Bay and Duddon Estuary SPA as there is overlap between the species foraging range and the Morgan Array Area.

1.9.3.31 Due to the distribution of herring gull, low numbers and foraging behaviour (i.e. non-specific surface feeding), it is anticipated that any changes in prey availability (arising from underwater sound, increased SSC and habitat), if they occur at all, will have little impact on herring gull during the construction phase.

Conclusions

1.9.3.32 Adverse effects on the lesser black-backed gull feature of the Morecambe Bay and Duddon Estuary SPA which undermine the conservation objectives of the SPA will not occur as a result of changes in prey availability. An assessment of the potential impact 'changes in prey availability' against each relevant conservation objective (as presented in paragraph 1.9.2.25) is presented in Table 1.195. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.195: Conclusions against the conservation objectives of the Morecambe Bay and Duddon Estuary SPA for changes in prey availability

Conservation objective	Conclusion
The extent and distribution of the habitats of the qualifying features [are maintained or restored]	There is no pathway linking changes in prey availability from Morgan Generation Assets construction with the extent and distribution, structure and function and the supporting processes on which the habitats of qualifying features rely, in Morecambe Bay and Duddon Estuary SPA. Therefore, changes in prey availability during the construction phase will not prevent the extent, distribution, structure and function of the habitats of the qualifying features and the supporting processes on which the habitats of the qualifying features rely from being maintained or restored.
The structure and function of the habitats of the qualifying features [are maintained or restored]	
The supporting processes on which the habitats of the qualifying features rely [are maintained or restored]	
The population of each of the qualifying features [are maintained or restored]	The potential impact of the Morgan Generation Assets construction will be temporary, short-term, and reversible, affecting only a small fraction of suitable habitat and prey species for lesser black-backed and European herring gull. Although the Morgan Generation Assets is within foraging range of lesser black-backed and European herring gull from the Morecambe Bay and Duddon Estuary SPA, only a small fraction of that population forages that far out at sea. Therefore, the magnitude of the potential impact on prey distributions will not expected to have an appreciable impact on populations of lesser black-backed and European herring gull. Therefore, changes in prey availability during the construction phase will not prevent the population of each of the qualifying features from being maintained or restored.
The distribution of the qualifying features within the site [are maintained or restored]	The potential impact of the Morgan Generation Assets construction will be temporary, short-term, and reversible, affecting only a small fraction of suitable habitat and prey species for lesser black-backed and European herring gull. Although the Morgan Generation Assets is within foraging range of lesser black-backed and European herring gull from the Morecambe Bay and Duddon Estuary SPA, only a small fraction of that population forages that far out at sea. Therefore, the magnitude of the potential impact on prey distributions will not expected to have an appreciable impact on the distribution of European herring gull and lesser black-backed gull. Therefore, changes in prey availability during the construction phase will not prevent the distribution of each of the qualifying features from being maintained or restored.

1.9.3.33 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Morecambe Bay and Duddon Estuary SPA as a result of changes in prey availability with respect to the construction and decommissioning of the Morgan Generation Assets alone.

Ribble and Alt Estuaries SPA

Lesser black-backed gull

1.9.3.34 Underwater sound produced during pile driving and UXO clearance (including detonation) in the construction phase may impact upon the availability of prey items. Indeed, underwater sound may cause injury and/or disturbance to fish and shellfish species. Underwater sound may also affect the physiology and behaviour of fish and

mobile invertebrates over a very large (thousands of metres squared) area due to the ability of sound to propagate further underwater.

1.9.3.35 The lesser black-backed gull is a typical non-specific surface-feeding seabird with a widespread, and patchy distribution in the Morgan Generation Assets. Overall, the abundance was deemed 'low' with 74 birds recorded during the 12 months of surveying (volume 2, chapter 10: Offshore ornithology of the PEIR). There is potential that birds recorded within the Morgan Generation Assets are associated with the Ribble and Alt Estuaries SPA as there is overlap between the species foraging range (Woodward *et al.*, 2019) and the Morgan Array Area.

1.9.3.36 Lesser black-backed gull have a large foraging range (127 ± 109km), providing a wide area to forage over. The species is non-specific in its prey requirement and will be able to forage on a range of fish species at the surface (including discarded fish). Due to the distribution of lesser black-backed gull, low numbers and foraging behaviour (i.e. non-specific surface feeding), it is anticipated that any changes in prey availability (arising from underwater sound, increased SSC and habitat), if they occur at all, will have little impact on lesser black-backed gull during the construction phase.

Conclusions

1.9.3.37 Adverse effects on the lesser black-backed gull feature of the Ribble and Alt Estuaries SPA which undermine the conservation objectives of the SPA will not occur as a result of changes in prey availability. An assessment of the potential impact 'changes in prey availability' against each relevant conservation objective (as presented in paragraph 1.9.2.32) is presented in Table 1.196. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.196: Conclusions against the conservation objectives of the Ribble and Alt Estuaries SPA for changes in prey availability

Conservation objective	Conclusion
The extent and distribution of the habitats of the qualifying features [are maintained or restored]	There is no pathway linking construction of the Morgan Generation Assets with the extent and distribution, structure and function and the supporting processes on which the habitats of qualifying features rely, in the Ribble and Alt Estuaries SPA. Therefore, changes in prey availability during the construction phase will not prevent the extent, distribution, structure and function of the habitats of the qualifying features and the supporting processes on which the habitats of the qualifying features rely from being maintained or restored.
The structure and function of the habitats of the qualifying features [are maintained or restored]	
The supporting processes on which the habitats of the qualifying features rely [are maintained or restored]	
The population of each of the qualifying features [are maintained or restored]	The potential impact of the Morgan Generation Assets construction will be temporary, short-term, and reversible, affecting only a small fraction of suitable habitat and prey species for lesser black-backed gull. Although the Morgan Generation Assets is within foraging range of lesser black-backed gull from the Ribble and Alt Estuaries SPA, only a small fraction of that population forages that far out at sea. The magnitude of the potential impact on prey distributions will not have an appreciable impact on the population of lesser black-backed gull. Therefore, changes in prey availability during the construction phase will not prevent the population of each of the qualifying features from being maintained or restored.
The distribution of the qualifying features within the site [are maintained or restored]	The potential impact of the Morgan Generation Assets construction will be temporary, short-term, and reversible, affecting only a small fraction of suitable habitat and prey species for lesser black-backed gull. Although the Morgan Generation Assets is within foraging range of lesser black-backed gull from the Ribble and Alt Estuaries SPA, only a small fraction of that population forages that far out at sea. Therefore, the magnitude of the potential impact on prey distributions will not have an appreciable impact on the distribution of lesser black-backed gull within this site. Therefore, changes in prey availability during the construction phase will not prevent the distribution of each of the qualifying features from being maintained or restored.

1.9.3.38 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ribble and Alt Estuaries SPA as a result of changes in prey availability with respect to the construction and decommissioning of the Morgan Generation Assets alone.

Irish Sea Front SPA

Manx shearwater

1.9.3.39 The underwater sound modelling indicates that the Irish Sea Front SPA (volume 2, chapter 8, Fish and shellfish ecology of the PEIR) does not overlap with the 160dB sound contour and therefore no prey species would be impacted with a change in distribution. Therefore, Manx shearwater distribution and abundance within the site would not be impacted. Even if prey resources were impacted, Manx Shearwater have a very large foraging range of >1300km (Woodward *et al.,* 2019), so they are flexible in their habitat use.

Conclusions

1.9.3.40 Adverse effects on the Manx shearwater feature of the Irish Sea Front SPA which undermine the conservation objectives of the SPA will not occur as a result of changes in prey availability. An assessment of the potential impact 'changes in prey availability' against each relevant conservation objective (as presented in paragraph 1.9.2.37) is presented in Table 1.197.

Table 1.197: Conclusions against the conservation objectives of the Irish Sea Front SPA for changes in prey availability

Conservation objective	Conclusion
Avoid significant mortality, injury and disturbance of the qualifying features, so that the distribution of the species and ability to use the site are maintained in the long-term	There is no pathway linking underwater sound associated with the Morgan Generation Assets to mortality, injury and disturbance of the qualifying feature. Therefore, changes in prey availability during the construction phase will not result in significant mortality or injury and disturbance of the qualifying features and the distribution of the species and ability to use the site will be maintained in the long-term
Maintain the habitats and food resources of the qualifying features in favourable condition	It is unlikely that prey species within the Irish Sea Front SPA will be affected by underwater sound from the construction of the Morgan Generations Assets given the sound contour modelling. Moreover, Manx Shearwater are flexible in habitat use with a large foraging range. Therefore, changes in prey availability during the construction phase will not prevent the habitats and food resources of the qualifying features from being maintained at favourable condition.
Ensure access to the site from linked breeding colonies.	There is no pathway linking underwater sound affecting prey and access of Manx shearwater between linked breeding colonies. Therefore, changes in prey availability during the construction phase will not prevent access to the site from linked breeding colonies.

1.9.3.41 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Irish Sea Front SPA as a result of changes in prey availability with respect to the construction and decommissioning of the Morgan Generation Assets alone.

1.9.4 Assessment of adverse effects in-combination

1.9.4.1 The other developments (projects/plans) that could result in, in-combination effects associated with the Morgan Generation Assets on offshore ornithological features of the designated sites identified have been summarised in Table 1.198 and shown in Figure 1.18.

1.9.4.2 In-combination effects on seabird ornithological receptors with schemes other than offshore wind farms and tidal energy projects are considered to be unlikely due the to the specific impacts (i.e. collision and displacement) generated by turbine arrays in the offshore environment and therefore have not been screened into the in-combination assessment.

1.9.4.3 The screening process for in-combination effects on ornithological features has been based on the species and their associated population designation (i.e. breeding species, over-wintering species and passage species) enabling a ZOI to be defined in which in-combination effects may occur.

1.9.4.4 The assumption for the in-combination assessment has been that most schemes will be operational when the Morgan Generation Assets and the Mona Offshore Wind Project are under construction. There is potential overlap between the construction phase of Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr. The expected mortality for the schemes will be depicted as the same number when discussing in-combination mortalities during construction and operation, whereas the numbers for the Morgan Generation Assets, the Mona Offshore Wind Project and Awel y Môr. will differ between those phases.

1.9.4.5 For those breeding seabirds that have been screened into the in-combination assessment, a foraging range approach has been used to determine the potential for in-combination effects on a designated site during the breeding bio-season. Any wind farm and tidal energy project which falls within the mean-maximum foraging range + 1 standard deviation (SD) (Woodward *et al.,* 2019) for a relevant species from a European site included in the alone assessment above have been included within the in-combination assessment.

1.9.4.6 During the non-breeding bio-season, plans and projects within the biologically defined minimum population scales (BDMPS) region for each species has been considered in-combination with the Morgan Generation Assets (see Furness, 2015) for further information on BDMPS).

1.9.4.7 For the ornithology in-combination assessment, potential impacts from tier 1 and tier 2 projects have been assessed together.

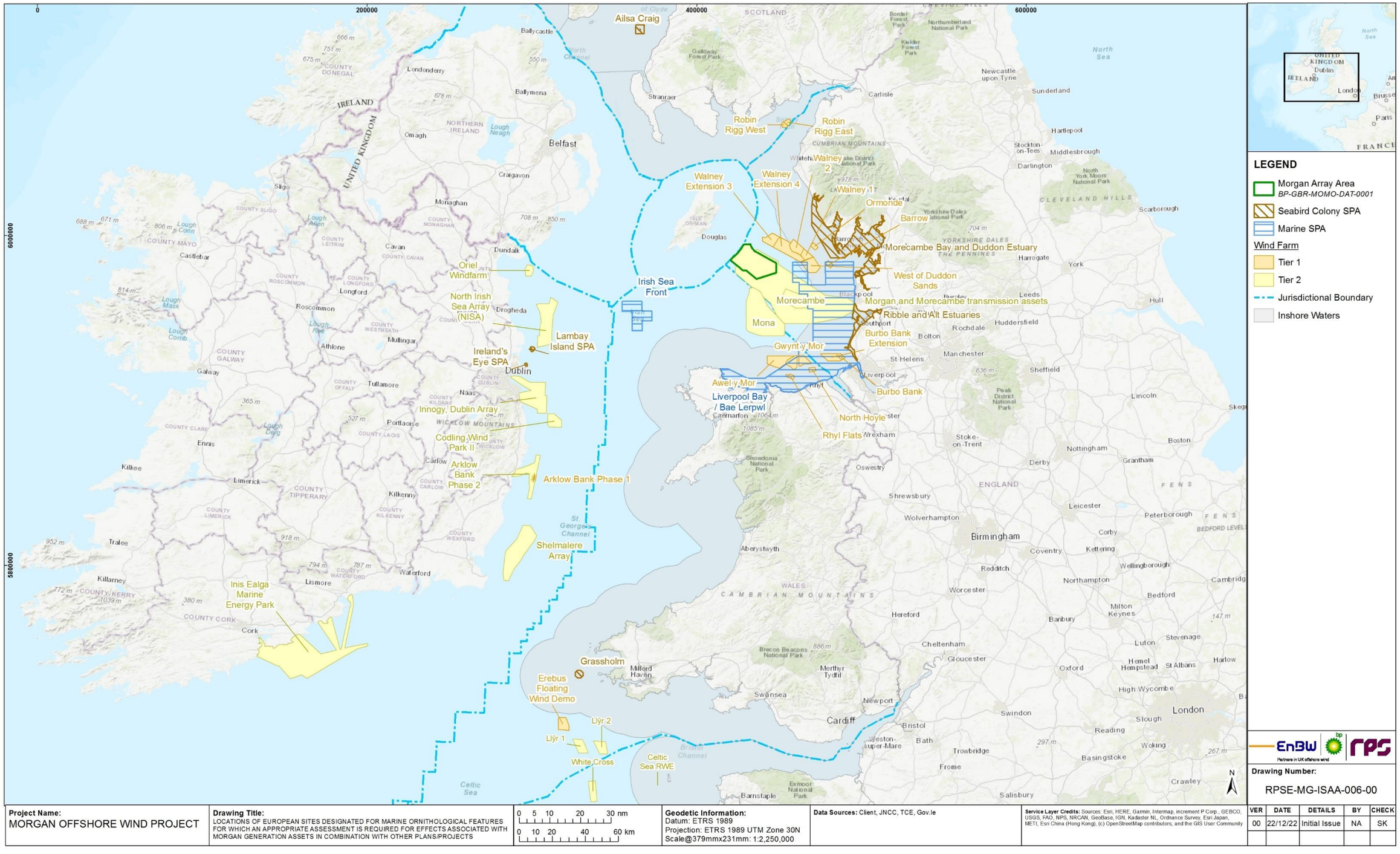
1.9.4.8 All potential impacts considered for the Morgan Generation Assets alone, as set out in section 1.9.2, have been considered in the in-combination assessment. Two additional potential impact pathways are considered in the in-combination assessment. On this basis, the potential impacts identified for assessment as part of the volume 2, chapter 10: Offshore Ornithology of the PEIR, and which have been brought forward for consideration in the in-combination assessment of the HRA Stage 2 ISAA Report are:

- Changes in prey availability
  - Red-throated diver, common scoter, little gull, little tern, common tern and waterbird assemblage at the Liverpool Bay/Bae Lerpwl SPA; European herring gull and lesser black-backed gull at the Morecambe Bay and Duddon Estuary SPA; Lesser black-backed gull at the Ribble and Alt Estuaries SPA, Manx shearwater at the Irish Sea Front SPA during the construction phase
- Disturbance and displacement from airborne sound, and presence of vessels and infrastructure
  - Common guillemot at the Lambay Island SPA and Ireland's Eye SPA during the construction, operations and maintenance and decommissioning phases
- Combined potential impacts of collision and disturbance and displacement.
  - Northern gannet at Ailsa Craig SPA and Grassholm SPA during the construction, operations and maintenance and decommissioning phases.

Table 1.198: List of other projects and plans with potential for in-combination effects on offshore ornithological features.

Plan/project	Status	Details	Tier	Distance from the Morgan Generation Assets (km)	Date of construction (C)/operation (O)	Spatial overlap	Temporal overlap	Futher assesment required? (Yes/No)
Walney Extension 4 offshore wind farm	Operational	40 8.25MW wind turbines. Hub height 113m. Rotor diameter 164m.	Tier 1	7.6	O: 2018 to 2039	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Walney Extension 4 offshore wind farm	Yes
Walney Extension 3 offshore wind farm	Operational	47 7MW wind turbines. Hub height 111m. Rotor diameter 154m.	Tier 1	7.6	O: 2018 to 2039	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Walney Extension 3 offshore wind farm	Yes
Walney 2 offshore wind farm	Operational	51 3.6MW wind turbines. Hub height 84m. Rotor diameter 107m.	Tier 1	11.9	O: 2012 to 2032	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Walney 2 offshore wind farm	Yes
West of Duddon Sands offshore wind farm	Operational	108 3.6MW wind turbines. Hub height 90m Rotor diameter 120m.	Tier 1	15.2	O: 2014 to 2033	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of West of Duddon Sands offshore wind farm	Yes
Walney 1 offshore wind farm	Operational	51 3.6MW wind turbines. Hub height 84m. Rotor diameter 107m.	Tier 1	15.5	O: 2011 to 2032	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Walney 1 offshore wind farm	Yes
Ormonde offshore wind farm	Operational	30 5MW turbines. Hub Height 100m. Rotor diameter 126m.	Tier 1	23.3	O: 2012 to 2036	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Ormonde offshore wind farm	Yes
Barrow offshore wind farm	Operational	30 3MW turbines. Hub height 75m. Rotor diameter 90m.	Tier 1	30.0	O: 2006 to 2028	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Barrow offshore wind farm	Yes
Awel y Môr Offshore Wind Farm	Submitted application	Greater than 350MW (up to 50 turbines)	Tier 1	47.2	C: 2026 to 2029 O: 2030 to 2055	No	Construction and operational activities for the Morgan Generation Assets may overlap with construction and operational activities of Awel y Môr Offshore Wind Farm	Yes
Gwynt y Môr Offshore Wind Farm	Operational	160 3.6MW turbines. Hub height 98m. Rotor diameter 107m.	Tier 1	51.5	O: 2015 to 2033	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Gwynt y Môr Offshore Wind Farm	Yes
Burbo Bank Extension offshore wind farm	Operational	32 8MW wind turbines. Hub height 105m. Rotor diameter 160m	Tier 1	56.0	O: 2017 to 2045	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Burbo Bank Extension offshore wind farm	Yes
Rhyl Flats offshore wind farm	Operational	25 3.6MW wind turbines. Hub height 80m. Rotor diameter 107m.	Tier 1	60.5	O: 2009 to 2027	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Rhyl Flats offshore wind farm	Yes
North Hoyle offshore wind farm	Operational	30 2MW wind turbines. Hub height 70m. Rotor diameter 80m.	Tier 1	61.1	O: 2004 to 2028	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of North Hoyle offshore wind farm	Yes
Burbo Bank offshore wind farm	Operational	23 3.6MW wind turbines. Hub height 78m. Rotor diameters 107m.	Tier 1	61.6	O: 2007 to 2039	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Burbo Bank offshore wind farm	Yes
Robin Rigg offshore wind farm	Operational	58 3MW wind turbines. Hub height 80m Rotor diameter 90m.	Tier 1	75.3	O: 2010 to 2023	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Robin Rigg offshore wind farm	Yes

Plan/project	Status	Details	Tier	Distance from the Morgan Generation Assets (km)	Date of construction (C)/operation (O)	Spatial overlap	Temporal overlap	Futher assesment required? (Yes/No)
Arklow Bank Phase 1 offshore wind farm	Operational	Seven 3.6MW wind turbines. Hub height 73.5m. Rotor diameter 124m.	Tier 1	176.2	O: 2004 to 2028	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Arklow Bank Phase 1 offshore wind farm	Yes
Project Erebus	Submitted application	Floating Demonstration Projects. 96MW capacity test and demonstration floating wind farm within the Celtic Sea. Seven to ten wind turbines.	Tier 1	289.9	C: 2025 O: 2026 to 2051	No	Construction and operational activities for the Morgan Generation Assets may overlap with construction and operational activities of the Project Erebus.	Yes
Morgan Offshore Wind Project and Morecambe offshore wind farm transmission assets	Pre-application	n/a	Tier 2	0	C: 2026 to 2029 O: 2029 to 2065	Yes	Construction activities for the Morgan Generation Assets may overlap with construction activities of Morgan Offshore Wind Project and Morecambe offshore wind farm transmission assets	Yes
Mona Offshore Wind Project	Pre-application	Up to 107 wind turbines	Tier 2	5.5	C: 2026 to 2029 O: 2030 to 2065	No	Construction and operational activities for the Mona Offshore Wind Project may overlap with construction and operational activities of Morgan Generation Assets	Yes
Morecambe Offshore Wind Farm Generation Assets	Pre-application	480MW capacity within an area of 497km^2	Tier 2	11.2	C: 2026 to 2028 O: 2029 to 2064	No	Construction and operational activities for the Morgan Generation Assets may overlap with construction and operational activities of Morecambe generation offshore wind farm	Yes
North Irish Sea Array offshore wind farm	Pre-application	500MW capacity within an area of 227km^2.	Tier 2	107.6	unknown	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of North Irish Sea Array offshore wind farm	Yes
Oriel offshore wind farm	Pre-application	375MW capacity within an area of 28km^2.	Tier 2	119.4	unknown	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Oriel offshore wind farm	Yes
Dublin Array offshore wind farm	Pre-application	600MW capacity within an area of 54km^2.	Tier 2	134.4	unknown	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Dublin Array offshore wind farm	Yes
Codling Wind Park offshore wind farm	Pre-application	900MW capacity within an area of 125km^2.	Tier 2	125.1	unknown	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Codling Wind Park offshore wind farm	Yes
Arklow Bank Phase 2 offshore wind farm	Pre-application	800MW capacity within an area of 68km^2.	Tier 2	165.3	unknown	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Arklow Bank Phase 2 offshore wind farm	Yes
Shelmalere offshore wind farm	Pre-application	1,000MW capacity.	Tier 2	201.4	unknown	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Shelmalere offshore wind farm	Yes
Llyr 1 offshore wind farm	Pre-application	100MW capacity.	Tier 2	295.0	C: 2024 to 2025 O: 2026 to 2051	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Llyr 1 offshore wind farm	Yes
Llyr 2 offshore wind farm	Pre-application	1,000MW capacity.	Tier 2	298.5	C: 2024 to 2025 O: 2026 to 2051	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Llyr 2 offshore wind farm	Yes
White Cross offshore wind farm	Pre-application	100MW test and demonstration floating wind farm within the Celtic Sea.	Tier 2	319.6	unknown	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of White Cross offshore wind farm	Yes
Inis Ealga Marine Energy Park offshore wind farm	Pre-application	1,000MW capacity.	Tier 2	327.0	unknown	No	Operational activities for the Morgan Generation Assets may overlap with operational activities of Inis Ealga Marine Energy Park offshore wind farm	Yes



Project Name: MORGAN OFFSHORE WIND PROJECT	**Drawing Title:** LOCATIONS OF EUROPEAN SITES DESIGNATED FOR MARINE ORNITHOLOGICAL FEATURES FOR WHICH AN APPROPRIATE ASSESSMENT IS REQUIRED FOR EFFECTS ASSOCIATED WITH MORGAN GENERATION ASSETS IN COMBINATION WITH OTHER PLANS/PROJECTS	0 5 10 20 30 nm 0 10 20 40 60 km	**Geodetic Information:** Datum: ETRS 1989 Projection: ETRS 1989 UTM Zone 30N Scale@379mmx231mm: 1:2,250,000	**Data Sources:** Client, JNCC, TCE, Gov.ie	**Service Layer Credits:** Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community	**Drawing Number:** RPSE-MG-ISAA-006-00			

VER	DATE	DETAILS	BY	CHECK
00	22/12/22	Initial Issue	NA	SK

Figure 1.18: Location of other projects and plans considered for in-combination effects on SPAs with offshore ornithological features.

In-combination changes in prey availability

Construction phase

1.9.4.9 There is the potential for changes in prey (e.g. fish species) abundance and distribution to arise as a result of construction activities 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.

1.9.4.10 The assessment of LSE (in HRA Stage 1 Screening Report) identified that LSE could not be ruled out for the potential in-combination impacts of changes in prey availability during construction. This relates to the designated site and relevant marine ornithological features listed in Table 1.199.

Table 1.199: European sites and relevant offshore ornithological features from which the potential for an LSE could not be ruled out in relation to in-combination changes in prey availability.

European site	Offshore ornithological features
Liverpool Bay/Bae Lerpwl SPA	• Red-throated diver • Little gull • Common scoter • Little tern • Waterbird assemblage (red-breasted merganser and great cormorant in addition to species listed above).
Morecambe Bay and Duddon Estuary SPA	• Lesser black-backed gull • Herring gull.
Ribble and Alt Estuaries SPA	• Lesser black-backed gull
Irish Sea Front SPA	• Manx shearwater

1.9.4.11 This impact pathway is limited to the construction phase of the project and therefore temporal overlap with other plans/projects is limited to Awel y Môr, Project Erebus, Mona Offshore Wind Project, Morecambe Offshore Wind Farm Generation Assets, Morgan and Morecambe Transmission Assets as indicated within Table 1.200. Information on the assessment of changes in prey availability is only available for Awel y Môr, Project Erebus and the Mona Offshore Wind Project.

1.9.4.12 All assessments undertaken for each plan/project considered within this section concluded a negligible impact on offshore ornithology from changes in prey availability (Table 1.200). No guidance is currently presented which provides a way to quantitively assess how changes in prey availability impact species and the SPA for which they are a feature, therefore a qualitative assessment has to be undertaken.

Table 1.200: Predicted impact resulting from changes in prey availability from projects considered in-combination during construction.

Plan/project	SPA(s) included in alone assessment for each plan/project which overlap with Morgan Generation Assets assessment	Predicted impact of changes in prey availabilty or impacts on fish and benthos
Morgan Generation Assets	All	**Negligible**
Morgan and Morecambe Transmission Assets	Unknown	Unknown– scoped into assessment.
Morecambe Offshore Windfarm Generation Assets	Unknown	Unknown– scoped into assessment.
Mona Offshore Wind Project	N/A	**Negligible**
Awel y Môr	None	Not assessed for offshore ornithology, **non- significant** impact on fish and benthos.
Project Erebus	None	Not assessed for offshore ornithology, **non- significant** impact on fish and benthos.
Overall impact	**N/A**	**Negligible**

1.9.4.13 The overall potential impact during construction of the plan/projects within Table 1.37 will have a negligible impact on offshore ornithology from changes in prey availability, therefore the ability to apportion impacts to individual SPAs is not possible and this section has not been presented as such. Potential effects from this impact on the relevant conservation objectives of Liverpool Bay/Bae Lerpwl SPA, Morecambe and Duddon Estuary SPA, Ribble and Alt Estuaries SPA and Irish Sea Front SPA are discussed in turn below.

Liverpool Bay/Bae Lerpwl

All species

Conclusions

1.9.4.14 Adverse effects on the qualifying features which undermine the conservation objectives of the Liverpool Bay/Bae Lerpwl SPA will not occur as a result of in-combination changes in prey availability. An assessment of the potential in-combination impact ‘changes in prey availability’ against each relevant conservation objective described in Natural England (2019a) (as presented in paragraph 1.9.2.18) is presented in Table 1.201. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.201: Conclusions against the conservation objectives of the Liverpool Bay/Bae Lerpwl SPA for in-combination changes in prey availability

Conservation objective	Conclusion
The extent and distribution of the habitats of the qualifying features [are maintained or restored]	There is no effect of changes in prey availability on the extent and distribution of supporting habitats. Therefore, for in-combination changes in prey availability during the construction phase will not prevent the extent, distribution, structure and function of the habitats of the qualifying features and the supporting processes on which the habitats of the qualifying features rely from being maintained or restored.
The structure and function of the habitats of the qualifying features [are maintained or restored]	
The supporting processes on which the habitats of the qualifying features rely [are maintained or restored]	
The population of each of the qualifying features [are maintained or restored]	Changes in prey availability could have an indirect effect on the population size of the SPA. However, potential constructional impacts are short-term, temporary and reversible in nature, lasting only for the duration of construction activities, as birds would return to the area once construction activities have ceased. For all projects assessed, any changes in prey distributions was not predicted to have an appreciable impact on populations of qualifying ornithological features. Therefore, for in-combination changes in prey availability during the construction phase will not prevent the population and distribution of each of the qualifying features from being maintained or restored.
The distribution of the qualifying features within the site [are maintained or restored]	

1.9.4.15 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Liverpool Bay/Bae Lerpwl SPA as a result of changes in prey availability with respect to the construction of the Morgan Generation Assets in-combination with other plans/projects. The conclusions of no risk of an adverse effect on the integrity of the Liverpool Bay/Bae Lerpwl SPA have been made with reference to the conservation objectives detailed in Natural England (2019a). Whilst it is considered that these conclusions would also be applicable to the conservation objectives detailed in the latest CAP for the Liverpool Bay/Bae Lerpwl SPA (Natural England, NRW and JNCC, 2022), these will be fully reviewed and considered in the HRA Stage 2 ISAA Report submitted with the application for consent.

Morecambe and Duddon Estuary SPA

Lesser black-backed gull and European herring gull

Conclusions

1.9.4.16 Adverse effects on the qualifying features which undermine the conservation objectives of the Morecambe and Duddon Estuary SPA will not occur as a result of in-combination changes in prey availability. An assessment of the potential in-combination impact 'changes in prey availability' against each relevant conservation objective (as presented in paragraph 1.9.2.25) is presented in Table 1.202. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.202: Conclusions against the conservation objectives of the Morecambe and Duddon Estuary SPA for in-combination changes in prey availability

Conservation objective	Conclusion
The extent and distribution of the habitats of the qualifying features [are maintained or restored]	There is no effect of changes in prey availability on the extent and distribution of supporting habitats. Therefore, for in-combination changes in prey availability during the construction phase will not prevent the extent, distribution, structure and function of the habitats of the qualifying features and the supporting processes on which the habitats of the qualifying features rely from being maintained or restored.
The structure and function of the habitats of the qualifying features [are maintained or restored]	
The supporting processes on which the habitats of the qualifying features rely [are maintained or restored]	
The population of each of the qualifying features [are maintained or restored]	Changes in prey availability could have an indirect effect on the population size of the SPA. However, potential constructional impacts are short-term, temporary and reversible in nature, lasting only for the duration of construction activities, as birds would return to the area once construction activities have ceased. For all projects assessed, any changes in prey distributions was not predicted to have an appreciable impact on populations of qualifying ornithological features. Therefore, for in-combination changes in prey availability during the construction phase will not prevent the population and distribution of each of the qualifying features from being maintained or restored.
The distribution of the qualifying features within the site [are maintained or restored]	

1.9.4.17 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Morecambe and Duddon Estuary SPA as a result of changes in prey availability with respect to the construction of the Morgan Generation Assets in-combination with other plans/projects.

Ribble and Alt Estuaries SPA

Lesser black-backed gull

Conclusions

1.9.4.18 Adverse effects on the lesser black-backed gull feature which undermine the conservation objectives of the Ribble and Alt Estuaries SPA will not occur as a result of in-combination changes in prey availability. An assessment of the potential in-combination impact 'changes in prey availability' against each relevant conservation objective (as presented in paragraph 1.9.2.32) is presented in Table 1.203. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.203: Conclusions against the conservation objectives of the Ribble and Alt Estuaries SPA for in-combination changes in prey availability

Conservation objective	Conclusion
The extent and distribution of the habitats of the qualifying features [are maintained or restored]	There is no effect of changes in prey availability on the extent and distribution of supporting habitats. Therefore, for in-combination changes in prey availability during the construction phase will not prevent the extent, distribution, structure and function of the habitats of the qualifying features and the supporting processes on which the habitats of the qualifying features rely from being maintained or restored.
The structure and function of the habitats of the qualifying features [are maintained or restored]	
The supporting processes on which the habitats of the qualifying features rely [are maintained or restored]	
The population of each of the qualifying features [are maintained or restored]	Changes in prey availability could have an indirect effect on the population size of the SPA. However, potential constructional impacts are short-term, temporary and reversible in nature, lasting only for the duration of construction activities, as birds would return to the area once construction activities have ceased. For all projects assessed, any changes in prey distributions was not predicted to have an appreciable impact on populations of qualifying ornithological features. Therefore, for in-combination changes in prey availability during the construction phase will not prevent the population and distribution of each of the qualifying features from being maintained or restored.
The distribution of the qualifying features within the site [are maintained or restored]	

1.9.4.19 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ribble and Alt Estuaries SPA as a result of changes in prey availability with respect to the construction of the Morgan Generation Assets in-combination with other plans/projects.

Irish Sea Front SPA

Manx shearwater

1.9.4.20 Adverse effects on the Manx shearwater feature which undermine the conservation objectives of the Irish Sea Front SPA will not occur as a result of in-combination changes in prey availability. An assessment of the potential in-combination impact 'changes in prey availability' against each relevant conservation objective (as presented in paragraph 1.9.2.37) is presented in Table 1.204.

Table 1.204: Conclusions against the conservation objectives of the Irish Sea Front SPA for in-combination changes in prey availability

Conservation objective	Conclusion
Avoid significant mortality, injury and disturbance of the qualifying features, so that the distribution of the species and ability to use the site are maintained in the long-term	The sound contour modelling indicates that no impact would occur within the Irish Sea Front SPA and therefore no prey species would be impacted with a change in distribution. Similarly, no assessment was undertaken for other projects indicating no impact. Therefore there is no pathway linking change in prey availability to mortality, injury and disturbance of the qualifying feature. Therefore, in-combination changes in prey availability will not result in significant mortality, injury or disturbance of the qualifying features and the distribution of the species and ability to use the site will be maintained in the long-term.
Maintain the habitats and food resources of the qualifying features in favourable condition	It is unlikely that prey species at the Irish Sea Front SPA will be affected by construction of the Morgan Generation Assets given the sound contour modelling. Moreover, Manx Shearwater are flexible in habitat use with a large foraging range. Therefore, in-combination changes in prey availability will not prevent the habitats and food resources of the qualifying features from being maintained at favourable condition.
Ensure access to the site from linked breeding colonies	There is no pathway linking change in prey availability and access of Manx shearwater between linked breeding colonies. Therefore, in-combination changes in prey availability will not prevent access to the site from linked breeding colonies.

1.9.4.21 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Irish Sea Front SPA as a result of changes in prey availability with respect to the construction of the Morgan Generation Assets in-combination with other plans/projects.

In-combination disturbance and displacement from airborne sound, underwater sound and presence of vessels and infrastructure

1.9.4.22 The assessment for in-combination disturbance and displacement from airborne sound and presence of vessels and infrastructure is presented under all phases below for guillemot associated with Lambay Island SPA and Ireland's Eye SPA). This is because the assessment of potential mortality from disturbance and displacement has not been separated between the development phases. A single annual figure of estimated mortality is presented for all phases of the project noting that this number will be highly conservative for the construction and decommissioning phases.

All phases

1.9.4.23 Airborne sound, underwater sound, the presence of vessels and the presence of offshore infrastructure may disturb seabirds from offshore foraging or non-foraging areas (e.g. rafting, moulting) in the short-term, causing changes in behaviour or displacement 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.

1.9.4.24 The assessment of LSE in the HRA Stage 1 Screening Report identified that for all phases of the development, LSE could not be ruled out for the potential in-combination impacts of disturbance and displacement. This relates to the designated sites and relevant offshore ornithological features listed in Table 1.205.

Table 1.205: European sites and relevant offshore ornithological features from which the potential for an LSE could not be ruled out in relation to in-combination disturbance and displacement from airborne sound, underwater sound and presence of vessels and infrastructure.

European site	Offshore ornithological features
Lambay Island SPA	• Common guillemot

European site	Offshore ornithological features
Ireland's Eye SPA	• Common guillemot

1.9.4.25 The MDS considered for the assessment of potential impacts on offshore ornithological features from in-combination disturbance and displacement from airborne sound, underwater sound and presence of vessels and infrastructure during all phases is presented in Table 1.206. This MDS table is based on the MDS for the Morgan Generation Assets project alone in the offshore ornithology PEIR chapter. This has not been included in the assessment of adverse effects alone because this potential impact was screened out (as presented in the HRA Stage 1 Screening Report) for adverse effects alone and only screened in for adverse effect in-combination with other plans and projects.

Table 1.206: Maximum design scenario considered for the assessment of potential impacts on offshore ornithological features from disturbance and displacement from airborne sound, underwater sound and presence of vessels and infrastructure during all phases.

Phase	Maximum design scenario	Justification
Construction phase	Installation of wind turbines, OSPs, inter-array and interconnector cables in the Morgan Array Area of up to 322km^2. Monopiles (spatial maximum): • Wind turbines: installation of up to 68 wind turbines with a 16m diameter monopile foundations installed by impact piling • OSPs: installation of one OSP with foundations consisting of two 15m diameter piled monopile foundations installed by impact piling • Maximum hammer energy up to 5,500kJ • Up to two vessels piling concurrently (minimum distance 875m, maximum distance 28.5km, between piling vessels) • Up to 9.5 hours of piling per monopile, with a realistic maximum of 6.4 hours • Assuming concurrent piling and two monopiles installed within 24 hours = 35 piling days. Monopiles (temporal maximum): • Wind turbines: installation of up to 107 monopiles with up to 12m diameter piled monopile foundations • OSPs: installation of up to four OSPs with foundations consisting of four 12m diameter piled monopile foundations • Maximum hammer energy of up to 4,500kJ (wind turbine and OSP) • Single piling vessel • Up to 4.25 hours of piling per monopile (wind turbine and OSP) • Assuming one monopile installed within 24 hours = 111 piling days. Pin piles (spatial maximum): • Wind turbines: installation up to 68 3-legged jacket foundations with either one or two piles per leg (a total of up to 408 piles) and each pile with a diameter of 5.5m installed by impact piling • OSP: installation of one OSP with 6-legged jacket foundations, with three piles per leg (a total of 18 piles) and each pile with a diameter of 5.5m • Maximum hammer energy of up to 3,700kJ • Up to two vessels piling concurrently (minimum distance 875m, maximum distance 28.5km, between piling vessels) • Up to 6.4 hours of piling per pin pile • Total duration of piling per OSP foundation =115.2 hours with total installation of up to 5 days. • Consecutive piling over a maximum of 24 hours. Single piling of 68 days for wind turbine plus approx. 5 days for OSP = 73 days (maximum temporal) or 37 days for two vessels (maximum spatial). Pin piles (temporal maximum): • Wind turbines: installation of up to 107 piled 4-legged jacket foundations, with two piles per leg (a total of 856 piles) and each pile with a diameter of 3.2m • OSP: installation of up to four OSPs with piled 3-legged jacket foundations, with three piles per leg (a total of 36 piles) and each pile with a diameter of 3.5m • Maximum hammer energy of up to 1,900kJ (wind turbines and OSP) • Single piling vessel • Up to 8.02 hours of piling per pin pile (turbine and OSP) • Assuming single piling and four piles installed within 24 hours = 107 piling days. • Total piling phase (foundation installation) of up to two years within a four-year construction programme. Vessels and helicopters: • Up to 1,876 installation vessel movements (return trips) during construction (521 main installation and support vessels, 74 tug/anchor handlers, 8 cable lay installation and support vessels, 50 guard vessel, 29 survey vessels, 18 seabed preparation vessels, 1,135 CTVs, 41 scour protection installation vessels and 2 cable protection installation vessels). • Up to a total of 63 construction vessels on site at any one time. • Up to 1,460 helicopter movements by up to 7 helicopters on site at any one time.	Represents the maximum density of wind turbines and structures across the maximum Morgan Array Area that would cause greatest extent of disturbance and displacement to birds or the greatest duration of impact. Represents the maximum underwater sound impacts from impact piling for each of the relevant infrastructure foundation options. Represents the maximum number of vessel and helicopter movements that would cause greatest visual and sound disturbance and displacement to birds from the Morgan Array Area.

Phase	Maximum design scenario	Justification
	Other activities: • Drilling of up to 107 4-legged wind turbine jacket foundations with pin pile diameter of 3.5m and four 4-legged OSP jacket foundations with a pin pile diameter of 3.5m; up to two concurrent drilling vessels Maximum offshore construction duration of up to four years.	
Operations and maintenance phase	Disturbance and displacement from presence of operations wind turbines and associated operations and maintenance activity, including increased vessel, helicopter and inspection drone activity: • Presence of up to 107 operating wind turbines and four OSPs occupying the Morgan Array Area of up to 322km^2 • Minimum spacing of 875m between wind turbines • Up to 2,351 operations and maintenance vessel movements (return trips) each year • Up to a total of 21 operations and maintenance vessels on site at any one time • Up to 639 helicopter movements by up to 7 helicopters on site at any one time • Up to 214 inspection drones return trips per year (operated from vessel, two inspections per wind turbine per year as a maximum) • Operational lifetime of up to 35 years.	
Decommissiong phase	• Vessels used for a range of decommissioning activities such as removal of foundations • Sound from vessels assumed to be as per vessel activity described for construction phase above.	

Lambay Island SPA

Tier 1 and tier 2

Common guillemot

1.9.4.26 Based on the mean-maximum foraging range +1SD of common guillemot (Woodward *et al*., 2019) from Lambay Island SPA, numerous offshore wind farm projects are within foraging range. However, no plans or projects aside from the Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr Offshore Wind Farm have apportioned impacts to SPAs and therefore can be included within this assessment.

1.9.4.27 There are only a few tier 1 and tier 2 projects which are within the mean maximum +1SD foraging range of common guillemot and have produced a publicly available predicted mortality estimate. The majority of projects located within the Liverpool Bay/Irish Sea area either did not apportion impacts to designated sites or used mean-maximum foraging ranges from Thaxter *et al*. (2012) to determine the proportion of impact from their respectable project to relevant SPAs. The mean maximum +1SD foraging ranges used during the Morgan Generation Assets assessment are significantly greater than the Thaxter *et al*. (2012) ranges used by older projects. Projects located within the Liverpool Bay and the wider Irish Sea area therefore did not include the Irish and single Welsh SPAs considered in the Morgan Generation Assets alone assessment.

1.9.4.28 Although abundance data is available for a number of plans and projects for common guillemot, it would not be appropriate to reassess potential impacts for these designated sites. Therefore, only potential impacts from Mona Offshore Wind Project and Awel y Môr have been considered in-combination with the Morgan Generation Assets, shown in Table 1.207.

1.9.4.29 The predicted annual mortality rates presented in Table 1.207 are based on a 50% displacement and 1% mortality rate, with upper and lower limits (30 to 70% displacement, 1 to 10% mortality) presented for projects if available. The 50% displacement and 1% mortality rate values were used as they are in line with values used by other offshore wind farm displacement assessments, with strong evidence used to support a common guillemot displacement rate of 50% within offshore array areas and a 2km buffer (Peschko *et al*., 2020; Orsted, 2021; APEM, 2022).

Table 1.207: Predicted annual breeding season mortality rate of common guillemot resulting from disturbance and displacement from projects considered in-combination.

Plan/project	Predicted Annual Mortality
Morgan Generation Assets	2.33 (1.4 to 31.7)
Mona Offshore Wind Project	3.17 (1.9 to 44.7)
Awel y Môr	0.6
Other projects	Unknown
Total	**6.1 (3.9 to 76.4)**

1.9.4.30 The potential in-combination total is 6.1 (3.3 to 76.4) breeding adult common guillemot mortalities at Lambay Island SPA per annum during the operations and maintenance phase of the Morgan Generation Assets, together with the operation of Mona Offshore Wind Project and Awel y Môr (as stated above in paragraph 1.9.4.22, the estimated annual mortality figure during the construction and decommissioning phases will be lower than during the operations and maintenance phase). The latest count in 2015 produced an estimate of 59,983 breeding individuals at the Lambay Island SPA, which converts to 80,377 adults using a multiplication factor of 1.34 to control for the fact that only two out of three individuals are visible during the census according to Walsh *et al.* (1995).

1.9.4.31 The natural background mortality rate of adult common guillemot is 0.061 (Horswill and Robinson 2015), which means 4,903 guillemot are expected to experience natural mortality each year. The addition of 6.1 mortalities from in-combination displacement during operations and maintenance then equals an increase in baseline mortality of 0.12%.

1.9.4.32 The potential increase of 6.1 breeding adult common guillemot mortalities per annum would be indistinguishable from natural fluctuations in the population and therefore there would be no potential adverse effects from the operations and maintenance phase of the Morgan Generation Assets in-combination with other plans and projects.

Conclusions

1.9.4.33 Adverse effects on the common guillemot feature which undermine the conservation objectives of the Lambay Island SPA will not occur as a result of in-combination temporary disturbance/displacement during all phases. An assessment of the potential in-combination impact ‘disturbance and displacement from airborne sound, and presence of vessels and infrastructure’ against each relevant conservation objective (as presented in paragraphs 1.9.2.41 and 1.9.2.42) is presented in Table 1.208. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.208: Conclusions against the conservation objectives of Lambay Island SPA for in-combination disturbance and displacement from airborne sound, underwater sound and presence of vessels and infrastructure.

Conservation objective	Conclusion
The extent and distribution of the habitats of the qualifying features [are maintained or restored]	There is no pathway linking any phase of the Morgan Generation Assets and the extent and distribution of the habitats at the Lambay Island SPA. Therefore, for in-combination disturbance and displacement from airborne sound, and presence of vessels and infrastructure during all phases will not prevent the extent, distribution, structure and function of the habitats of the qualifying features and the supporting processes on which the habitats of the qualifying features rely from being maintained or restored.
The structure and function of the habitats of the qualifying features [are maintained or restored]	
The supporting processes on which the habitats of the qualifying features rely [are maintained or restored]	

Conservation objective	Conclusion
The population of each of the qualifying features [are maintained or restored]	The potential impact of the Morgan Generation Assets during all phases combined with other wind farms will be temporary, short-term, and reversible, affecting only a small fraction of the Lambay Island SPA population of common guillemot. Although the Morgan Generation Assets is within foraging range of common guillemot from the Lambay Island SPA, only a small fraction of that population forages that far from the colony. The potential in-combination impact (0.12% increase in baseline mortality) will not have an appreciable impact on population of common guillemot at Lambay Island SPA. Therefore, for in-combination disturbance and displacement from airborne sound, and presence of vessels and infrastructure during all phases will not prevent the population of each of the qualifying features from being maintained or restored.
The distribution of the qualifying features within the site [are maintained or restored]	There is no overlap between the Morgan Generation Assets and the Lambay Island SPA. Therefore, for in-combination disturbance and displacement from airborne sound, and presence of vessels and infrastructure during all phases will not prevent the distribution of each of the qualifying features from being maintained or restored.

1.9.4.34 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Lambay Island SPA as a result of disturbance and displacement from airborne sound and presence of vessels and infrastructure with respect to all phases of the Morgan Generation Assets in-combination with other plans and projects.

Ireland's Eye SPA

Tier 1 and tier 2

Common guillemot

1.9.4.35 Based on the mean-maximum foraging range +1SD of common guillemot (Woodward *et al*., 2019) from Lambay Island SPA, numerous offshore wind farm projects are within foraging range. However, no plans or projects aside from the Morgan Generation Assets, Mona Offshore Wind Project and Awel y Môr Offshore Wind Farm have apportioned impacts to SPAs and therefore can be included within this assessment.

1.9.4.36 There are only a few tier 1 and tier 2 projects which are within the mean maximum +1SD foraging range of common guillemot and have produced a publicly available predicted mortality estimate. The majority of projects located within the Liverpool Bay/Irish Sea area either did not apportion impacts to designated sites or used mean-maximum foraging ranges from Thaxter *et al*. (2012) to determine the proportion of impact from their respectable project to relevant SPAs. The mean maximum +1SD foraging ranges used during the Morgan Generation Assets assessment are significantly greater than the Thaxter *et al*. (2012) ranges used by older projects. Projects located within the Liverpool Bay and the wider Irish Sea area therefore did not include the Irish and single Welsh SPAs considered in the Morgan Generation Assets assessment.

1.9.4.37 Although abundance data is available for a number of plans and projects for guillemot, it would not be appropriate to reassess potential impacts for these designated sites. Therefore, only potential impacts from Mona Offshore Wind Project and Awel y Môr have been considered in-combination with the Morgan Generation Assets, shown in Table 1.209.

1.9.4.38 The predicted annual mortality rates presented in Table 1.209 are based on a 50% displacement and 1% mortality rate, with upper and lower limits (30 to 70% displacement, 1 to 10% mortality) presented for projects if available. The 50% displacement and 1% mortality rate values were used as they are in line with values used by other offshore wind farm displacement assessments, with strong evidence used to support a common guillemot displacement rate of 50% within offshore array areas and a 2km buffer (Peschko *et al*., 2020; Orsted, 2021; APEM, 2022).

Table 1.209: Predicted annual breeding season mortality rate of common guillemot resulting from disturbance and displacement from projects considered in-combination.

Plan/project	Predicted Annual Mortality
Morgan Generation Assets	0.15 (0.1 to 2.1)
Mona Offshore Wind Project	0.21 (0.1 to 3.1)
Awel y Môr	0.04
Other projects	Unknown
Total	**0.40 (0.24 to 5.24)**

1.9.4.39 The potential total is 0.40 (0.24 to 5.24) breeding adult common guillemot mortalities during operations and maintenance of the Morgan Generation Assets, together the operation of the Mona Offshore Wind Project and Awel y Môr (as stated above in paragraph 1.9.4.22, the estimated annual mortality figure during the construction and decommissioning phases will be lower than during the operations and maintenance phase). The latest count in 2015 produced an estimate of 4,410 breeding individuals at the Ireland's Eye SPA, which converts to 5,909 adults using a multiplication factor of 1.34 to control for the fact that only 2 out of 3 individuals are visible during the census according to Walsh *et al.* (1995).

1.9.4.40 The natural background mortality rate of adult common guillemot is 0.061 (Horswill and Robinson 2015), which means 360 common guillemot are expected to experience natural mortality each year at the Ireland's Eye SPA. The addition of 0.40 mortalities from in-combination displacement during operations and maintenance then equals an increase in baseline mortality of 0.11%.

1.9.4.41 The potential addition of 0.40 breeding adult common guillemot mortalities per annum would be indistinguishable from natural fluctuations in the population and therefore there would be no potential adverse effects from the operations and maintenance phase of the Morgan Generation Assets in-combination with other plans and projects.

Conclusions

1.9.4.42 Adverse effects on the common guillemot feature which undermine the conservation objectives of the Ireland's Eye SPA will not occur as a result of in-combination temporary disturbance/displacement during all phases. An assessment of the potential in-combination impact 'disturbance and displacement from airborne sound, and presence of vessels and infrastructure' against each relevant conservation objective (as presented in paragraph 1.9.2.46) is presented in Table 1.210. Where the

justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.210: Conclusions against the conservation objectives of Ireland's Eye SPA for in-combination disturbance and displacement from airborne sound, underwater sound and presence of vessels and infrastructure.

Conservation objective	Conclusion
The extent and distribution of the habitats of the qualifying features [are maintained or restored]	There is no pathway linking any phase of the Morgan Generation Assets and the extent and distribution of the habitats at the Ireland's Eye SPA. Therefore, for in-combination disturbance and displacement from airborne sound, and presence of vessels and infrastructure during all phases will not prevent the extent, distribution, structure and function of the habitats of the qualifying features and the supporting processes on which the habitats of the qualifying features rely from being maintained or restored.
The structure and function of the habitats of the qualifying features [are maintained or restored]	
The supporting processes on which the habitats of the qualifying features rely [are maintained or restored]	
The population of each of the qualifying features [are maintained or restored]	The potential impact of the Morgan Generation Assets during all phases combined with other wind farms will be temporary, short-term, and reversible, affecting only a small fraction of the Ireland's Eye SPA population of common guillemot. Although the Morgan Generation Assets is within foraging range of common guillemot from the Ireland's Eye SPA, only a small fraction of that population forages that far from the colony. The potential in-combination impact (0.11% increase in baseline mortality) will not have an appreciable impact on population of common guillemot at Ireland's Eye SPA. Therefore, for in-combination disturbance and displacement from airborne sound, and presence of vessels and infrastructure during all phases will not prevent the population of each of the qualifying features from being maintained or restored.
The distribution of the qualifying features within the site [are maintained or restored]	There is no overlap between the Morgan Generation Assets and the Ireland's Eye SPA. Therefore, for in-combination disturbance and displacement from airborne sound, and presence of vessels and infrastructure during all phases will not prevent the distribution of each of the qualifying features from being maintained or restored

1.9.4.43 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ireland's Eye as a result of disturbance and displacement from airborne sound and presence of vessels and infrastructure with respect to all phases of the Morgan Generation Assets in-combination with other plans and projects.

In-combination disturbance and displacement from airborne sound, underwater sound and presence of vessels and infrastructure and collision risk combined impacts

All phases

1.9.4.44 The assessment for potential in-combination disturbance and displacement from airborne sound, underwater sound and presence of vessels and infrastructure and collision risk combined impacts on northern gannet, is presented under all phases below for all sites (i.e. Grassholm SPA and Ailsa Craig SPA). The assessment of potential mortality from disturbance and displacement and collision risk has not been separated between the development phases. A single annual figure of estimated mortality is presented for all phases of the project noting that this number will be highly conservative for the construction and decommissioning phases.

1.9.4.45 The MDS considered for the assessment of potential impacts on offshore ornithological features from in-combination collision risk and displacement during all phases is presented in Table 1.211. This MDS table is based on the MDS for the Morgan Generation Assets project alone in the offshore ornithology PEIR chapter. This has not been included in the assessment of adverse effects alone because this potential impact was screened out for adverse effects alone and only screened in for adverse effect in-combination with other plans and projects.

Table 1.211: Maximum design scenario considered for the assessment of potential impacts on offshore ornithological features from collision risk and displacement.

Phase	Maximum design scenario	Justification
Operations and maintenance phase	Presence of operational wind turbines: • Presence of up to 107 wind turbines within the Morgan Array Area • Minimum lower blade tip height of 34m above LAT • Maximum hub height of 168m above LAT • Maximum blade tip height of 293m above LAT • Maximum rotor diameter of 250m • Maximum chord width of 6.8m • Maximum rotor speed of 8.4rpm (with maximum average speed of 6.4rpm) • Operational lifetime of up to 35 years.	Represents the maximum density of wind turbines and structures across the maximum Morgan Generation Assets that would cause greatest potential of collision.

Ailsa Craig SPA

Tier 1 and tier 2

Northern gannet

1.9.4.46 During all phases, potential displacement and collision impacts are attributed to Ailsa Craig SPA from the Morgan Generation Assets. The in-combination assessment therefore combines these potential impacts, alongside potential impacts from other plans and projects within mean-maximum foraging range + 1SD (Woodward *et al.*, 2019) attributed to the Ailsa Craig SPA. This includes Walney Wind Farm extension, Awel y Môr Wind Farm and Mona Offshore Wind Project, alongside the Morgan Generation Assets.

1.9.4.47 Aside from the offshore wind farms included in Table 1.212, no other plans or projects have assessed potential displacement impacts to northern gannet at Ailsa Craig SPA.

1.9.4.48 The predicted annual mortality rates presented in Table 1.212 are based on a 70% displacement and 1% mortality rate, with upper and lower limits (60 to 80% displacement, 1 to 10% mortality) presented for projects if available. The 70% displacement and 1% mortality rate values were used as they are in line with values used by other offshore wind farm displacement assessments, with evidence used to

support a northern gannet displacement rate of 70% within offshore array areas and a 2km buffer (Krijgsveld *et al.,* 2011).

Table 1.212: Ailsa Craig SPA predicted annual mortality rate of breeding adult northern gannet resulting from collision risk, disturbance and displacement from projects considered in-combination during operations and maintenance.

Plan/project	Predicted Annual Mortality
Morgan Generation Assets	0.5 (0.4 to 5.6)
Mona Offshore Wind Project	0.7 (0.6 to 7.5)
Walney extension	25.0
Awel y Môr	7.4
Other projects	Unknown
Total	**33.6 (33.4 to 45.5)**

1.9.4.49 For Ailsa Craig SPA during the operations and maintenance phase of the Mona Offshore Wind Project, 33.6 mortalities are expected for Ailsa Craig SPA in-combination with the other offshore wind projects, with 0.5 of which are attributable to the Morgan Generation Assets (as stated above in paragraph 1.9.4.44, the estimated annual mortality figure during the construction and decommissioning phases will be lower than during the operations and maintenance phase). With an adult breeding population of 66,452, and a background mortality of 0.081, the expected baseline mortality is 5,383 gannets. The addition of 33.6 mortalities from in-combination displacement during operations and maintenance then equals an increase in baseline mortality of 0.62%.

1.9.4.50 The potential addition of 33.6 breeding adult northern gannet mortalities per annum would be indistinguishable from natural fluctuations in the population and therefore there would be no potential adverse effects from all phases of the Morgan Generation Assets in-combination with other plans and projects.

Conclusions

1.9.4.51 Adverse effects on the northern gannet feature which undermine the conservation objectives of the Ailsa Craig SPA will not occur as a result of in-combination temporary disturbance/displacement or collision during all phases. An assessment of the potential in-combination impact 'temporary disturbance/displacement or collision' against each relevant conservation objective (as presented in paragraph 1.9.2.51) is presented in Table 1.213. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.213: Conclusions against the conservation objectives of Ailsa Craig SPA for in-combination disturbance and displacement from airborne sound, underwater sound and presence of vessels and infrastructure and collision risk combined impacts on northern gannet

Conservation objective	Conclusion
The extent and distribution of the habitats of the qualifying features [are maintained or restored]	There is no pathway linking any phase of the Morgan Generation Assets and the extent and distribution of the habitats at the Ailsa Craig SPA. Therefore, for in-combination displacement and collision risk combined impacts during all phases will not prevent the extent, distribution, structure and function of the habitats of the qualifying features and the supporting processes on which the habitats of the qualifying features rely from being maintained or restored.
The structure and function of the habitats of the qualifying features [are maintained or restored]	
The supporting processes on which the habitats of the qualifying features rely [are maintained or restored]	
The population of each of the qualifying features [are maintained or restored]	The potential impact of the Morgan Generation Assets during all phases combined with other wind farms will be affecting only a small fraction of the Ailsa Craig SPA population of northern gannet. Although the Morgan Generation Assets is within foraging range of northern gannet from the Ailsa Craig SPA, only a small fraction of that population forages that far from the colony. The potential in-combination impact (0.62% increase in baseline mortality) will not have an appreciable impact on population of northern gannet at Ailsa Craig SPA. Therefore, for in-combination displacement and collision risk combined impacts during all phases will not prevent the population of each of the qualifying features from being maintained or restored
The distribution of the qualifying features within the site [are maintained or restored]	There is no overlap between the Morgan Generation Assets and the Ailsa Craig SPA. **T**herefore, for in-combination displacement and collision risk combined impacts during all phases will not prevent the distribution of each of the qualifying features from being maintained or restored.

1.9.4.52 Therefore, it can be concluded that there is **no risk of an adverse effect** on the integrity of the Ailsa Craig SPA as a result of the potential combined impacts of disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision with offshore wind turbines with respect to all phases of the Morgan Generation Assets in-combination with other plans and projects.

Grassholm SPA

Tier 1 and tier 2

Northern gannet

1.9.4.53 During all phases, potential displacement and collision impacts are attributed to Grassholm SPA from the Morgan Generation Assets. The in-combination assessment therefore combines these potential impacts, alongside potential impacts from other plans and projects within mean-maximum foraging range + 1SD (Woodward *et al*., 2019) attributed to the Grassholm SPA.

1.9.4.54 Only the Project Erebus and Awel y Môr offshore wind farm have apportioned potential displacement impacts to northern gannet for Grassholm SPA. Aside from the offshore wind farms included in Table 1.214, no other plan/project has assessed potential displacement impacts to northern gannet at Grassholm SPA.

1.9.4.55 The predicted annual mortality rates presented in Table 1.214 are based on a 70% displacement and 1% mortality rate, with upper and lower limits (60 to 80% displacement, 1 to 10% mortality) presented for projects if available.

Table 1.214: Grassholm SPA predicted annual mortality rate of breeding adult northern gannet resulting from collision risk, disturbance and displacement from projects considered in-combination during operations and maintenance.

Plan/project	Predicted annual mortality
Morgan Generation Assets	0.2 (0.1 to 2.0)
Mona Offshore Wind Project	0.5 (0.4 to 5.8)
Awel y Môr	5.1
Project Erebus	24.8
Other projects	Unknown
Total	**30.6 (30.4 to 37.7)**

1.9.4.56 For Grassholm SPA during the operations and maintenance phase of the Morgan Generation Assets, 30.6 mortalities are expected for Grassholm SPA, 0.2 of which are attributable to the Morgan Generation Assets (as stated above in paragraph 1.9.4.44, the estimated annual mortality figure during the construction and decommissioning phases will be lower than during the operations and maintenance phase). With an adult breeding population of 72,022, and a background mortality of 0.081, the expected baseline mortality is 5,834 gannets. The addition of 30.6 mortalities from in-combination displacement during operations and maintenance then equals an increase in baseline mortality of 0.52%.

1.9.4.57 The potential increase of 30.6 (30.4 to 37.7) breeding adult northern gannet mortalities per annum would be indistinguishable from natural fluctuations in the population and therefore there would be no potential adverse effects from the operations and maintenance phase of the Morgan Generation Assets in-combination with other plans and projects.

1.9.4.58 Additionally, tracking data of northern gannet from Grassholm SPA show that tracked individuals remain in the southwest region of Wales and England, spreading out to south Republic of Ireland (Wakefield *et al*., 2013). Northern gannet show foraging segregation between colonies (Wakefield *et al*., 2013) so northern gannet recorded at the Morgan Generation Assets are more likely to come from Ailsa Craig SPA than Grassholm SPA. The potential impact attributed to the Grassholm SPA from the Morgan Generation Assets is likely to be an overestimate of the actual impact, therefore, the total mortalities from the Morgan Generation Assets are likely to be less than 0.2 (0.1 to 2.0).

Conclusions

1.9.4.59 Adverse effects on the northern gannet feature which undermine the conservation objectives of the Grassholm SPA will not occur as a result of in-combination temporary disturbance/displacement or collision during all phases. An assessment of the potential in-combination impact 'temporary disturbance/displacement or collision' against each relevant conservation objective (as presented in paragraph 1.9.2.55) is presented in Table 1.215. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.215: Conclusions against the conservation objectives of Grassholm SPA for in-combination disturbance and displacement from airborne sound, underwater sound and presence of vessels and infrastructure and collision risk combined impacts on northern gannet

Conservation objective	Conclusion
The extent and distribution of the habitats of the qualifying features [are maintained or restored]	There is no pathway linking any phase of the Morgan Generation Assets and the extent and distribution of the habitats at the Grassholm SPA. Therefore, for in-combination displacement and collision risk combined impacts during all phases will not prevent the extent, distribution, structure and function of the habitats of the qualifying features and the supporting processes on which the habitats of the qualifying features rely from being maintained or restored.
The structure and function of the habitats of the qualifying features [are maintained or restored]	
The supporting processes on which the habitats of the qualifying features rely [are maintained or restored]	
The population of each of the qualifying features [are maintained or restored]	The potential impact of the Morgan Generation Assets during all phases combined with other wind farms will be affecting only a small fraction of the Grassholm SPA population of northern gannet. Although the Morgan Generation Assets is within foraging range of northern gannet from the Grassholm SPA, only a small fraction of that population forages that far from the colony. The potential in-combination impact (0.52% increase in baseline mortality) will not have an appreciable impact on population of northern gannet at Grassholm SPA. Therefore, for in-combination displacement and collision risk combined impacts during all phases will not prevent the population of each of the qualifying features from being maintained or restored.
The distribution of the qualifying features within the site [are maintained or restored]	There is no overlap between the Morgan Generation Assets and the Grassholm SPA. Therefore, for in-combination displacement and collision risk combined impacts during all phases will not prevent the distribution of each of the qualifying features from being maintained or restored.

1.9.4.60 Therefore, it can be concluded that there **is no risk of an adverse effect** on the integrity of the Grassholm SPA as a result of the potential combined impacts of disturbance and displacement from airborne sound and presence of vessels and infrastructure and collision with offshore wind turbines with respect to all phases of the Morgan Generation Assets in-combination with other plans and projects.

1.10 Summary

1.10.1 Effects of site integrity

1.10.1.1 A summary of the assessments presented in this HRA Stage 2 ISAA Report, considering the relevant SACs and SPAs, is provided in the sections below. Table 1.216 presents the conclusions of adverse effects on integrity in relation to the Morgan Generation Assets alone and in-combination with other plans and projects.

River Ehen SAC

1.10.1.2 Based on the information presented in sections 1.7.3 and 1.7.4, **no adverse effect on integrity** of the River Ehen SAC, with specific regard to the qualifying Annex II diadromous fish features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Dee Estuary/Aber Dyfrdwy SAC

1.10.1.3 Based on the information presented in sections 1.7.3 and 1.7.4, **no adverse effect on integrity** of the Dee Estuary/Aber Dyfrdwy SAC, with specific regard to the qualifying Annex II diadromous fish features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

River Derwent and Bassenthwaite Lake SAC

1.10.1.4 Based on the information presented in sections 1.7.3 and 1.7.4, **no adverse effect on integrity** of the River Derwent and Bassenthwaite SAC, with specific regard to the qualifying Annex II diadromous fish features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

River Kent SAC

1.10.1.5 Based on the information presented in sections 1.7.3 and 1.7.4, **no adverse effect on integrity** of the River Kent SAC, with specific regard to the qualifying Annex II diadromous fish features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Solway Firth SAC

1.10.1.6 Based on the information presented in sections 1.7.3 and 1.7.4, **no adverse effect on integrity** of the Solway Firth SAC, with specific regard to the qualifying Annex II diadromous fish features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

River Bladnoch SAC

1.10.1.7 Based on the information presented in sections 1.7.3 and 1.7.4, **no adverse effect on integrity** of the River Bladnoch SAC, with specific regard to the qualifying Annex II diadromous fish features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

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

1.10.1.8 Based on the information presented in sections 1.7.3 and 1.7.4, **no adverse effect on integrity** of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC, with specific regard to the qualifying Annex II diadromous fish features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Afon Gwyrfai a Llyn Cwellyn SAC

1.10.1.9 Based on the information presented in sections 1.7.3 and 1.7.4, **no adverse effect on integrity** of the Afon Gwyrfai a Llyn Cwellyn SAC, with specific regard to the qualifying Annex II diadromous fish features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

River Eden SAC

1.10.1.10 Based on the information presented in sections 1.7.3 and 1.7.4, **no adverse effect on integrity** of the River Eden SAC, with specific regard to the qualifying Annex II diadromous fish features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

North Anglesey Marine/Gogledd Môn Forol SAC

1.10.1.11 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the North Anglesey Marine/Gogledd Môn Forol SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

North Channel SAC

1.10.1.12 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the North Channel SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Strangford Lough

1.10.1.13 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Strangford Lough, with specific regard to the qualifying Annex II

marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Murlough SAC

1.10.1.14 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Murlough SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC

1.10.1.15 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, alone.

1.10.1.16 On the basis of the preliminary assessments undertaken to date it is considered unlikely that there will be an adverse effect on the integrity of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects. It is not, however, possible to conclude this definitely at this stage (i.e. beyond reasonable scientific doubt) until further assessment work, on the population level effects, is complete. The final conclusion of potential adverse effect on integrity is, therefore, deferred to the assessments which will be presented in the HRA Stage 2 ISAA Report submitted with the application for consent.

West Wales Marine/Gorllewin Cymru Forol SAC

1.10.1.17 Based on the information presented in sections 1.7.3 and 1.7.4, **no adverse effect on integrity** of the West Wales Marine/Gorllewin Cymru Forol SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

The Maidens SAC

1.10.1.18 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of The Maidens SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Cardigan Bay/Bae Ceredigion SAC

1.10.1.19 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Cardigan Bay/Bae Ceredigion SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets alone.

1.10.1.20 On the basis of the preliminary assessments undertaken to date it is considered unlikely that there will be an adverse effect on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects. It is not, however, possible to conclude this definitely at this stage (i.e. beyond reasonable scientific doubt) until further assessment work, on the population level effects, is complete. The final conclusion of potential adverse effect on integrity is, therefore, deferred to the assessments which will be presented in the HRA Stage 2 ISAA Report submitted with the application for consent.

Pembrokeshire Marine/Sir Benfro Forol SAC

1.10.1.21 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Pembrokeshire Marine/Sir Benfro Forol SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

1.10.1.22 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Lundy SAC

1.10.1.23 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Lundy SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Isles of Scilly Complex SAC

1.10.1.24 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Isles of Scilly Complex SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Rockabill to Dalkey Island SAC

1.10.1.25 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Rockabill to Dalkey Island SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Saltee Islands SAC

1.10.1.26 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Saltee Islands SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Roaringwater Bay and Islands SAC

1.10.1.27 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Roaringwater Bay and Islands SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Blasket Islands SAC

1.10.1.28 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Blasket Islands SAC, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Mers Celtiques - Talus du golfe de Gascogne SCI

1.10.1.29 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Mers Celtiques - Talus du golfe de Gascogne SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Abers - Côte des legends SCI

1.10.1.30 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Abers - Côte des legends SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Ouessant-Molène SCI

1.10.1.31 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Ouessant-Molène SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Côte de Granit rose-Sept-Iles SCI

1.10.1.32 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Côte de Granit rose-Sept-Iles SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Anse de Goulven, dunes de Keremma SCI

1.10.1.33 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Anse de Goulven, dunes de Keremma SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Tregor Goëlo SCI

1.10.1.34 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Tregor Goëlo SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Côtes de Crozon SCI

1.10.1.35 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Côtes de Crozon SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Chaussée de Sein SCI

1.10.1.36 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Chaussée de Sein SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Cap Sizun SCI

1.10.1.37 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Cap Sizun SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Récifs du talus du golfe de Gascogne SCI

1.10.1.38 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Récifs du talus du golfe de Gascogne SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Anse de Vauville SCI

1.10.1.39 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Anse de Vauville SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Cap d'Erquy-Cap Fréhel SCI

1.10.1.40 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Cap d'Erquy-Cap Fréhel SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Baie de Saint-Brieuc – Est SCI

1.10.1.41 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Baie de Saint-Brieuc – Est SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Banc et récifs de Surtainville SCI

1.10.1.42 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Banc et récifs de Surtainville SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI

1.10.1.43 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Baie de Lancieux, Baie de l'Arguenon, Archipel de Saint Malo et Dinard SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Estuaire de la Rance SCI

1.10.1.44 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Estuaire de la Rance SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Baie du Mont Saint Michel SCI

1.10.1.45 Based on the information presented in sections 1.8.3 and 1.8.4, **no adverse effect on integrity** of the Baie du Mont Saint Michel SCI, with specific regard to the qualifying Annex II marine mammal features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Liverpool Bay/Bae Lerpwl SPA

1.10.1.46 Based on the information presented in sections 1.9.2 and 1.9.4, **no adverse effect on integrity** of the Liverpool Bay/Bae Lerpwl SPA, with specific regard to the qualifying marine ornithological features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects. The conclusions of no risk of an adverse effect on the integrity of the Liverpool Bay/Bae Lerpwl SPA have been made with reference to the conservation objectives detailed in Natural England (2019a). Whilst it is considered that these conclusions would also be applicable to the conservation objectives detailed in the latest CAP for the Liverpool Bay/Bae Lerpwl SPA (Natural England, NRW and JNCC, 2022), these will be fully reviewed and considered in the HRA Stage 2 ISAA Report submitted with the application for consent.

Ribble and Alt Estuaries SPA

1.10.1.47 Based on the information presented in sections 1.9.2 and 1.9.4, **no adverse effect on integrity** of the Ribble and Alt Estuaries SPA, with specific regard to the qualifying marine ornithological features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Morecambe Bay and Duddon Estuary SPA

1.10.1.48 Based on the information presented in sections 1.9.2 and 1.9.4, **no adverse effect on integrity** of the Morecambe Bay and Duddon Estuary SPA, with specific regard to the qualifying marine ornithological features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Irish Sea Front SPA

1.10.1.49 Based on the information presented in sections 1.9.2 and 1.9.4, **no adverse effect on integrity** of the Irish Sea Front SPA, with specific regard to the qualifying marine ornithological features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Lambay Island SPA

1.10.1.50 Based on the information presented in sections 1.9.2 and 1.9.4, **no adverse effect on integrity** of the Lambay Island SPA, with specific regard to the qualifying marine ornithological features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Ireland's Eye SPA

1.10.1.51 Based on the information presented in sections 1.9.2 and 1.9.4, **no adverse effect on integrity** of the Ireland's Eye SPA, with specific regard to the qualifying marine ornithological features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Grassholm SPA

1.10.1.52 Based on the information presented in sections 1.9.2 and 1.9.4, **no adverse effect on integrity** of the Grassholm SPA, with specific regard to the qualifying marine offshore ornithological features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Ailsa Craig SPA

1.10.1.53 Based on the information presented in sections 1.9.2 and 1.9.4, **no adverse effect on integrity** of the Ailsa Craig SPA, with specific regard to the qualifying offshore ornithological features for which LSE could not be excluded, is predicted as a result of the Morgan Generation Assets, either alone or in-combination with other plans and projects.

Table 1.216: Summary of conclusions.

ID	European Site	Relevant qualifying features	Project phase	Potential impact	Conclusion – Morgan Generation Assets alone	Conclusion – Morgan Generation Assets in-combination with other plans and projects
Annex II diadromous fish species						
1	River Ehen SAC	Atlantic salmon Freshwater pearl mussel	Construction/decommissioning	• Underwater sound • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• EMF from subsea electric cables • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
2	Dee Estuary/Aber Dyfrdwy SAC	Sea lamprey River lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• EMF from subsea electric cables • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
3	River Derwent and Bassenthwaite SAC	Atlantic salmon Sea lamprey River lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• EMF from subsea electric cables • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
4	River Kent SAC	Freshwater pearl mussel	Construction/decommissioning	• Underwater sound • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• EMF from subsea electric cables • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
5	Solway Firth SAC	Sea lamprey River lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• EMF from subsea electric cables • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
6	River Bladnoch SAC	Atlantic salmon	Construction/decommissioning	• Underwater sound • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• EMF from subsea electric cables • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
7	River Dee and Bala Lake/Afon Dyfrydwy a Llyn Tegid SAC	Atlantic salmon Sea lamprey River lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• EMF from subsea electric cables • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
8	Afon Gywrfai a Llyn Gwellyn SAC	Atlantic salmon	Construction/decommissioning	• Underwater sound • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• EMF from subsea electric cables • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

ID	European Site	Relevant qualifying features	Project phase	Potential impact	Conclusion – Morgan Generation Assets alone	Conclusion – Morgan Generation Assets in-combination with other plans and projects
9	River Eden SAC	Atlantic salmon Sea lamprey River lamprey	Construction/decommissioning	• Underwater sound • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• EMF from subsea electric cables • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
Annex II marine mammal						
10	North Anglesey Marine/Gogledd Môn Forol SAC	Harbour Porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • Changes in prey availability (construction only) • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
11	North Channel SAC	Harbour Porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • Changes in prey availability (construction only) • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
12	Strangford Lough SAC	Harbour seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

ID	European Site	Relevant qualifying features	Project phase	Potential impact	Conclusion – Morgan Generation Assets alone	Conclusion – Morgan Generation Assets in-combination with other plans and projects
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
13	Murlough SAC	Harbour seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
14	Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC	Bottlenose dolphin Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	On the basis of the preliminary assessments undertaken to date it is considered unlikely that there will be an adverse effect on the integrity of the Lleyn Peninsula and the Sarnau/Pen Lleyn a'r Sarnau SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects. It is not, however, possible to conclude this definitely at this stage (i.e. beyond reasonable scientific doubt) until further assessment work, on the population level effects, is complete. The final conclusion of potential adverse effect on integrity is, therefore, deferred to the assessments which will be presented in the HRA Stage 2 ISAA Report submitted with the application for consent.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
15	West Wales Marine/Gorllewin Cymru Forol SAC	Harbour Porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

ID	European Site	Relevant qualifying features	Project phase	Potential impact	Conclusion – Morgan Generation Assets alone	Conclusion – Morgan Generation Assets in-combination with other plans and projects
16	The Maidens SAC	Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
17	Cardigan Bay/Bae Ceredigion SAC	Bottlenose Dolphin	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	On the basis of the preliminary assessments undertaken to date it is considered unlikely that there will be an adverse effect on the integrity of the Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects. It is not, however, possible to conclude this definitely at this stage (i.e. beyond reasonable scientific doubt) until further assessment work, on the population level effects, is complete. The final conclusion of potential adverse effect on integrity is, therefore, deferred to the assessments which will be presented in the HRA Stage 2 ISAA Report submitted with the application for consent.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
		Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
18	Pembrokeshire Marine/Sir Benfro Forol SAC	Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

ID	European Site	Relevant qualifying features	Project phase	Potential impact	Conclusion – Morgan Generation Assets alone	Conclusion – Morgan Generation Assets in-combination with other plans and projects
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
19	Bristol Channel Approaches SAC	Harbour Porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
20	Lundy SAC	Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
21	Isles of Scilly Complex SAC	Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

ID	European Site	Relevant qualifying features	Project phase	Potential impact	Conclusion – Morgan Generation Assets alone	Conclusion – Morgan Generation Assets in-combination with other plans and projects
22	Rockabill to Dalkey Island SAC	Harbour Porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
23	Saltee Islands SAC	Grey seal	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
24	Roaringwater Bay and Islands SAC	Harbour Porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
25	Blasket Islands SAC	Harbour Porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

ID	European Site	Relevant qualifying features	Project phase	Potential impact	Conclusion – Morgan Generation Assets alone	Conclusion – Morgan Generation Assets in-combination with other plans and projects
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
26-43	17 French Sites	Harbour Porpoise	Construction/decommissioning	• Underwater sound from piling • Underwater sound from clearance of UXO • Underwater sound from pre-construction site investigation surveys • Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Underwater sound from vessels and other vessel activities • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
Offshore ornithology features						
1	Liverpool Bay/Bae Lerpwl SPA	Red-throated diver Little gull Common scoter Little tern Common tern Waterbird assemblage	Construction/decommissioning	• Changes in prey availability (construction only) • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site. The conclusions of no risk of an adverse effect on the integrity of the Liverpool Bay/Bae Lerpwl SPA have been made with reference to the conservation objectives detailed in Natural England (2019a). Whilst it is considered that these conclusions would also be applicable to the conservation objectives detailed in the latest CAP for the Liverpool Bay/Bae Lerpwl SPA (Natural England, NRW and JNCC, 2022), these will be fully reviewed and considered in the HRA Stage 2 ISAA Report submitted with the application for consent.
			Operations and maintenance	N/A	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site. The conclusions of no risk of an adverse effect on the integrity of the Liverpool Bay/Bae Lerpwl SPA have been made with reference to the conservation objectives detailed in Natural England (2019a). Whilst it is considered that these conclusions would also be applicable to the conservation objectives detailed in the latest CAP for the Liverpool Bay/Bae Lerpwl SPA (Natural England, NRW and JNCC, 2022), these will be fully reviewed and considered in the HRA Stage 2 ISAA Report submitted with the application for consent.
2	Morecambe Bay and Duddon Estuary SPA	Lesser black-backed gull Herring gull	Construction/decommissioning	• Changes in prey availability (construction only) • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	N/A	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
3	Ribble Alt Estuaries SPA	Lesser black-backed gull	Construction/decommissioning	• Changes in prey availability (construction only) • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	N/A	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
4	Irish Sea Front SPA	Manx shearwater	Construction/decommissioning	• Changes in prey availability (construction only) • In-combination effects.	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

ID	European Site	Relevant qualifying features	Project phase	Potential impact	Conclusion – Morgan Generation Assets alone	Conclusion – Morgan Generation Assets in-combination with other plans and projects
			Operations and maintenance	N/A	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
5	Lambay Island SPA	Common guillemot	Construction/decommissioning	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only).	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only).	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
6	Ireland's Eye SPA	Common guillemot	Construction/decommissioning	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only)	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only)	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
7	Ailsa Craig SPA	Northern gannet	Construction/decommissioning	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only) • Collison risk (in-combination effect only).	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only) • Collison risk (in-combination effect only).	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
8	Grassholm SPA	Northern gannet	Construction/decommissioning	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only).	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
			Operations and maintenance	• Disturbance and displacement from airborne sound and presence of vessels and infrastructure (in-combination effect only).	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

1.11 Next steps

1.11.1.1 This HRA Stage 2 ISAA Report will be updated, where relevant, to address stakeholder responses and to include any additional data for submission with the application for consent.

1.11.1.2 As outlined in section 1.8.4, on the basis of the preliminary assessments undertaken to date, it is considered unlikely that there will be an adverse effect on the integrity of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC and Cardigan Bay/Bae Ceredigion SAC as a result of underwater sound from piling with respect to the Morgan Generation Assets in-combination with other plans/projects. It is not, however, possible to conclude this definitively at this stage (i.e. beyond reasonable scientific doubt) until further assessment work, on the population level effects, is complete. The final conclusion of potential adverse effect on integrity is, therefore, deferred to the assessments which will be presented in the HRA Stage 2 ISAA Report submitted with the application for consent.

1.11.1.3 As outlined in section 1.9.2, a CAP for the Liverpool Bay/Bae Lerpwl SPA was released on the 24 January 2023 (Natural England, NRW and JNCC, 2022). However, due to the limited timeframe between the release date of this CAP and the submission date of this HRA Stage 2 ISAA Report, the Appropriate Assessment has been undertaken against the conservation objectives of the Liverpool Bay/Bae Lerpwl SPA released in 2019 (Natural England, 2019a). Whilst it is considered that the conclusions would also be applicable to the conservation objectives detailed in the latest CAP for the Liverpool Bay/Bae Lerpwl SPA (Natural England, NRW and JNCC, 2022), these will be fully reviewed and considered in the HRA Stage 2 ISAA Report submitted with the application for consent.

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