MORGAN AND MORECAMBE OFFSHORE WIND FARMS: TRANSMISSION ASSETS

Habitats Regulations Assessment Stage 2 Information to Support Appropriate Assessment
Part Two: Special Areas of Conservation (SACs) Assessment

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Glossary

Term	Meaning
Annex I Habitat	A natural habitat type of community interest, defined in Annex I 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.
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.
Anthropogenic	An activity resulting from or relating to the influence of humans.
Applicants	Morgan Offshore Wind Limited (Morgan OWL) and Morecambe Offshore Windfarm Ltd (Morecambe OWL).
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.
Commitment	This term is used interchangeably with mitigation and enhancement measures. The purpose of commitments is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects. Primary and tertiary commitments are taken into account and embedded within the assessment set out in this ES.
Competent Authority	The term derives from the Habitats Regulations and relates to the duties which the Regulations impose on public bodies and individuals. Regulation 7 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.
Cumulative Effects	The combined effect of the Transmission Assets in combination with the effects from other proposed developments, on the same receptor or resource.
Design Envelope	A description of the range of possible elements and parameters that make up the Transmission Assets options under consideration, as set out in detail in Volume 1, Chapter 3: Project Description. This envelope is used to define the Transmission Assets for EIA purposes when the exact engineering parameters are not yet known. This is also referred to as the Maximum Design Scenario or Rochdale Envelope approach.
Development Consent Order	An order made under the Planning Act 2008, as amended, granting development consent.

Term	Meaning
Duration (of impact)	The time over which an impact occurs. An impact may be described as short, medium or long-term and permanent or temporary.
Effect	The term used to express the consequence of an impact. The significance of effect is determined by correlating magnitude of the impact with the importance, or sensitivity, of the receptor or resource in accordance with defined significance criteria.
EIA Scoping Report	A report setting out the proposed scope of the Environmental Impact Assessment process. The Transmission Assets Scoping Report was submitted to The Planning Inspectorate (on behalf of the Secretary of State) for the Morgan and Morecambe Offshore Windfarms Transmission Assets in October 2022.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Environmental Statement	The document presenting the results of the Environmental Impact Assessment process.
European Sites	Designated nature conservation sites which include the National Site Network (designated within the UK) and Natura 2000 sites (designated in any European Union country). This includes Sites of Community Importance, Special Areas of Conservation and Special Protection Areas.
Evidence Plan Process	A voluntary consultation process with specialist stakeholders to agree the approach to, and information to support, the Environmental Impact Assessment and Habitats Regulations Assessment processes for certain topics.
Expert Working Group	A forum for targeted engagement with regulators and interested stakeholders through the Evidence Plan Process.
Export Cable Corridor	The specific corridor of seabed (seaward of Mean High Water Springs and land (landward of Mean High Water Springs) from the Generation Assets to the National Grid Penwortham substation through which the export cable will be located.
Generation Assets	The generation assets associated with the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm include the offshore wind turbines, inter-array cables, offshore substation platforms and platform link (interconnector) cables to connect offshore substations.
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 of Habitats and Species Regulations 2017 (as amended) and the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended).

Term	Meaning
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.
Impact	Change that is caused by an action/proposed development, e.g., land clearing (action) during construction which results in habitat loss (impact).
In-combination effects	The combined effect of the Transmission Assets in-combination with the effects from other proposed developments, on the same receptor or feature.
Interconnector Cables	Cables to connect the Offshore Substation Platforms to each other.
Intertidal Area	The area between Mean High Water Springs and Mean Low Water Springs.
Intertidal Infrastructure Area	The temporary and permanent areas between MLWS and MHWS.
Landfall	The area in which the offshore export cables make landfall (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Lytham St. Annes between Mean Low Water Springs and the transition joint bays inclusive of all construction works, including the offshore and onshore cable routes, intertidal working area and landfall compound(s).
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.
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 to apply for 'deemed marine licences' in English waters as part of the development consent process.
Maximum Design Scenario	The realistic worst case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the Transmission Assets.
Mean High Water Springs	The height of mean high water during spring tides in a year.
Mean Low Water Springs	The height of mean low water during spring tides in a year.
Method Statements	A document that describes how a particular task or action should be undertaken correctly.
Mitigation Measures	This term is used interchangeably with Commitments. The purpose of such measures is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects.
Morecambe Offshore Windfarm: Generation Assets	The offshore generation assets and associated activities for the Morecambe Offshore Windfarm.

Term	Meaning
Morecambe Offshore Windfarm: Transmission Assets	The offshore export cables, landfall and onshore infrastructure required to connect the Morecambe Offshore Windfarm to the National Grid.
Morecambe OWL	Morecambe Offshore Windfarm Ltd is a joint venture between Zero-E Offshore Wind S.L.U. (Spain) (a Cobra group company) (Cobra) and Flotation Energy Ltd.
Morgan and Morecambe Offshore Wind Farms: Transmission Assets	The offshore and onshore infrastructure connecting the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm to the national grid. This includes the offshore export cables, landfall site, onshore export cables, onshore substations, 400 kV grid connection cables and associated grid connection infrastructure such as circuit breaker compounds. Also referred to in this report as the Transmission Assets, for ease of reading.
Morgan Offshore Wind Project: Generation Assets	The offshore generation assets and associated activities for the Morgan Offshore Wind Project.
Morgan Offshore Wind Project: Transmission Assets	The offshore export cables, landfall and onshore infrastructure required to connect the Morgan Offshore Wind Project to the National Grid.
Morgan OWL	Morgan Offshore Wind Limited is a joint venture between bp Alternative Energy investments Ltd. and Energie Baden-Württemberg AG (EnBW).
Non-Statutory Consultee	Organisations that an applicant may choose to consult in relation to a project who are not designated in law but are likely to have an interest in the project.
National Site Network	Following the UK's exit from the European Union, Special Areas of Conservation and Special Protection Areas in the UK no longer form part of the European Union's Natura 2000 ecological network. The 2019 (European Union Exit) Regulations have created a national site network on land and at sea, including both the inshore and offshore marine areas in the UK, including existing Special Areas of Conservation and Special Protection Areas as well as new Special Areas of Conservation and Special Protection Areas designated under these Regulations.
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 Export Cables	The cables which would bring electricity from the Generation Assets to the landfall.
Offshore Export Cable Corridor	The corridor within which the offshore export cables will be located.
Offshore Order Limits	See Transmission Assets Order Limits: Offshore (below).
Planning Inspectorate	The agency responsible for operating the planning process for applications for development consent under the Planning Act 2008.
Policy	A set of decisions by governments and other political actors to influence, change, or frame a problem or issue that has been recognized as in the political realm by policy makers and/or the wider public.

Term	Meaning
Preliminary Environmental Information Report	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables consultees to understand the likely significant environmental effects of a project and which helps to inform consultation responses.
Ramsar Sites	Wetlands of international importance that have been designated under the criteria of the Ramsar Convention. In combination with Special Protection Areas and Special Areas of Conservation, these sites contribute to the national site network.
Reversibility	A reversible impact is one where recovery is possible naturally in a relatively short time period, or where mitigation measures can be effective at reversing the impact. An irreversible impact may occur when recovery is not possible within a reasonable timescale, or there is no reasonable chance of action being taken to reverse it.
Scoping Opinion	Sets out the Planning Inspectorate's response (on behalf of the Secretary of State) to the Scoping Report prepared by the Applicants. The Scoping Opinion contains the range of issues that the Planning Inspectorate, in consultation with statutory stakeholders, has identified should be considered within the Environmental Impact Assessment process.
Scour Protection	Protective materials to avoid sediment being eroded away from the base of the foundations due to the flow of water.
Sound Exposure Levels	The representation of a noise event if all the energy were compressed into a one second period. This provides a uniform way to make comparisons between noise events of different durations.
Spatial Extent	Geographical area over which the impact may occur.
Special Areas of Conservation	A site designation specified in the Conservation of Habitats and Species Regulations 2017. Each site is designated for one or more of the habitats and species listed in the Regulations. The legislation requires a management plan to be prepared and implemented for each SAC to ensure the favourable conservation status of the habitats or species for which it was designated. In combination with Special Protection Areas and Ramsar sites, these sites contribute to the national site network.
Special Protection Areas	A site designation specified in the Conservation of Habitats and Species Regulations 2017, classified for rare and vulnerable birds, and for regularly occurring migratory species. Special Protection Areas contribute to the national site network.
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 section 42 of the Planning Act 2008 in relation to an application for development consent. Not all consultees will be statutory consultees (see non-statutory consultee definition).
Study Area	This is an area which is defined for each environmental topic which includes the Transmission Assets Order Limits as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.

Term	Meaning
Transmission Assets	See Morgan and Morecambe Offshore Wind Farms: Transmission Assets (above).
Transmission Assets Order Limits	The area within which all components of the Transmission Assets will be located, including areas required on a temporary basis during construction and/or decommissioning.
Transmission Assets Order Limits: Offshore	The area within which all components of the Transmission Assets seaward of Mean Low Water Springs will be located, including areas required on a temporary basis during construction and/or decommissioning. Also referred to in this report as the Offshore Order Limits, for ease of reading.
Voltage	Voltage is the pressure from an electrical circuit's power source that pushes charged electrons (current) through a conducting loop.

Acronyms

Acronym	Meaning
AC	Alternating Current
ADD	Acoustic Deterrent Device
CAP	Conservation Advice Package
CCS	Carbon Capture and Storage
CCW	Countryside Council for Wales
CEA	Cumulative Effects Assessment
Cefas	Centre for Environment Fisheries and Aquaculture Science
CI	Confidence Intervals
CIS	Celtic and Irish Seas
CMS	Construction Method Statement
Cobra	Zero-E Offshore Wind S.L.U. (Spain) (a Cobra group company)
CSIP	Cable Specification and Installation Plan
DAERA	Department of Agriculture, Environment and Rural Affairs
DCO	Development Consent Order
EA	Environment Agency
EDR	Effective Deterrent Range
EIA	Environmental Impact Assessment
EMF	Electric and Magnetic Fields
EnBW	Energie Baden-Württemberg AG
EPP	Evidence Plan Process

Acronym	Meaning
ES	Environmental Statement
EWG	Expert Working Group
FCS	Favourable Conservation Status
GSRP	Grey Seal Reference Population
HE	Historic England
HRA	Habitats Regulations Assessment
HVAC	High Voltage Alternating Current
IAMMWG	Inter Agency Marine Mammal Working Group
ISAA	Information to Support Appropriate Assessment
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effect
MCZ	Marine Conservation Zone
MDS	Maximum Design Scenario
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMMP	Marine Mammal Mitigation Protocol
MMOs	Marine Mammal Observers
Morecambe OWL	Morecambe Offshore Windfarm Limited
Morgan OWL	Morgan Offshore Wind Limited
MU	Management Unit
N/A	Not Applicable
NEQ	Net Explosive Quantity
NRW	Natural Resources Wales
OSP	Offshore Substation Platform
OSPAR	Oslo and Paris Conventions
PAM	Passive Acoustic Monitoring
PEIR	Preliminary Environmental Information Report
PTS	Permanent Threshold Shift
rms	Root Mean Square
SAC	Special Area of Conservation
SCANS	Small Cetacean Abundance in the North Sea
SCOS	Special Committee on Seals
SEL_{cum}	cumulative Sound Exposure Level

Acronym	Meaning
SNCB	Statutory Nature Conservation Body
SoCC	Statement of Community Consultation
SPA	Special Protection Area
SPL_{pk}	peak Sound Pressure Level
SSC	Suspended Sediment Concentration
SSSI	Site of Special Scientific Interest
TTS	Temporary Threshold Shift
UK	United Kingdom
UXO	Unexploded Ordnance
ZOI	Zone of Influence

Units

Unit	Description
%	Percentage
dB	Decibel
GW	Gigawatt
GWh	Gigawatt-hour
Hz	Hertz
kg	Kilogram
kHz	Kilohertz
km	Kilometre
km^2	Square kilometre
kV	Kilovolt
m	Metre
m^2	Square metre
m^3	Cubic metre
mG	Milligauss
mg/l	Milligram per litre
Ml/d	Megaliters per day
mm	Millimetre
mV/m	Millivolt per metre
MW	Megawatt
V/m	Volt per metre

Unit	Description
µT	Microtesla
µPa	MicroPascal

1 Habitats Regulations Assessment Stage 2 Information to Support Appropriate Assessment

1.1 Introduction

1.2 Outline of the HRA Stage 2 ISAA

1.2.1 Purpose of the HRA Stage 2 ISAA

1.2.1.1 This document forms part of the Habitats Regulations Assessment (HRA) Stage 2 Information to Support Appropriate Assessment (ISAA) for the Morgan and Morecambe Offshore Wind Farms Transmission Assets (hereafter referred to as the 'Transmission Assets').

1.2.1.2 This report has been prepared by RPS on behalf of the Applicants to support the HRA 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 Transmission Assets.

1.2.1.3 The HRA Stage 2 ISAA builds upon the Transmission Assets: HRA Stage 1 Screening Report (hereafter referred as 'HRA Stage 1 Screening Report') (document reference: E3) and considers whether the Transmission Assets could have an adverse effect, either alone or in-combination with other plans or projects, on the integrity of any European site. This report will provide the Competent Authority with the information required to undertake an HRA Stage 2 Appropriate Assessment (see HRA Stage 2 ISAA Part 1 – Introduction (document reference: E2.1) for more detail on the HRA process).

1.2.1.4 The scope of this document covers all relevant Special Areas of Conservation (SAC) and designated features where Likely Significant Effects (LSEs) have been identified in the HRA Stage 1 Screening Report (document reference: E3), due to the potential impacts arising from the Transmission Assets. Designated features include Annex I habitats (offshore and coastal), Annex II diadromous fish species and Annex II marine mammals.

1.2.2 Progress to date

1.2.2.1 A HRA Stage 1 Screening Report (document reference: E3) for the Transmission Assets has been produced to determine whether the Transmission 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 (document reference: E3) determined that, on the basis of theoretical spatial connectivity, the potential for LSEs to result from component elements of the Transmission Assets could not be discounted.

1.2.2.2 The HRA Stage 1 Screening Report (document reference: E3) 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, operation and maintenance and decommissioning phases of the Transmission 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 Transmission 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 the HRA Stage 2 ISAA.
- 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 Transmission 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.

1.2.2.3 A summary of the HRA Stage 1 Screening Report conclusions (document reference: E3) for the Transmission Assets is provided in **section 1.4**.

1.2.3 Key changes to the HRA Stage 2 ISAA - Part 2 SAC Assessments since PEIR

1.2.3.1 The draft HRA Stage 2 ISAA that accompanied the Preliminary Environmental Information Report (PEIR) has been updated following stakeholder feedback and additional data analysis for the Application. The main changes, which are reflected in this HRA Stage 2 ISAA - Part 2 SAC Assessments submitted with the application, are detailed below.

- Removal of Offshore Substation Platforms (OSPs) and Morgan Offshore Booster Station from the Project design, resulting in piling being screened out of the HRA Stage 2 ISAA - Part 2 SAC Assessments for Annex II fish and marine mammal features.
- 'Effects on marine mammals due to changes in prey availability' has also now been screened out of the HRA Stage 2 ISAA – Part 2 SAC Assessments (document reference: E2.2) for all Annex II marine mammal features, as any potential underwater sound impacts resulting from construction on marine mammal prey resources will be localised and largely restricted to the boundaries of the Transmission Assets Order Limits: Offshore. As such, only a small area will be affected when compared to available foraging habitat in the Irish and Celtic Seas, making any effects negligible on marine mammal species Marine mammals exploit a range of different prey items and can forage widely and change prey sources, sometimes covering extensive distances (see Volume 2, Chapter 4: Marine mammals of the ES; document reference F2.4). Therefore, it is reasonable to assume that there will be similar prey

resources available in the wider area, given the highly mobile nature of marine mammals and type of fish and shellfish communities found around the Offshore Order Limits (which are characteristic of the wider Irish Sea) (see Table 1.17 of HRA Stage 1 Screening Report for further information; document reference: E3).

- The impact 'disturbance to marine mammals from pre-construction surveys' has also been screened out of the HRA Stage 2 ISAA - Part 2 SAC Assessments for all Annex II marine mammal features as surveys will not be undertaken nearby or within any of the SACs identified and potential disturbance impact zones will not overlap with the SAC (see HRA Stage 1 Screening Report (document reference: E3) for further information).
- There has been a reduction in the number of vessels associated with all phases of the Transmission Assets, which has resulted in the impact 'disturbance to marine mammals from vessel use and other sound-producing activities' being screened out of the HRA Stage 2 ISAA – Part 2 SAC Assessments (document reference: E2.2) for all Annex II marine mammal features. This impact has been screened out on the basis that the extent of potential disturbance will be spatially restricted to within the Offshore Order Limits and along vessel routes to ports used in support of the Transmission Assets during construction, operation and maintenance, and decommissioning phases. Sound modelling results have also demonstrated that the potential disturbance impact zones will not overlap with any SAC designated for marine mammal species. As such, this impact is unlikely to result in adverse impacts on Annex II marine mammal features, in terms of injury (Permanent Threshold Shift) or disturbance (Temporary Threshold Shift as a proxy) (see Table 1.17 of HRA Stage 1 Screening Report (document reference: E3) for further information).
- Inclusion of physical processes assessment in the HRA Stage 1 Screening Report, which resulted in 'changes in physical processes' on Annex I habitats features being screened out of the HRA Stage 2 ISAA - Part 2 SAC Assessments (see HRA Stage 1 Screening Report (document reference: E3) for further information). This impact was screened out on the basis of physical processes modelling, which showed that effects from this impact will be spatially restricted to within 1 km of the Transmission Assets Order Limits: Offshore (hereafter referred to as the Offshore Order Limits) and the Intertidal Infrastructure Area. Since the closest SAC to the (the Shell Flat and Lune Deep SAC) is located approximately 5.7 km from the Transmission Assets, it is outside the ZOI for this impact. Therefore, there is no potential for LSE on Annex I habitat features from changes in physical processes.

1.2.4 Structure of the HRA Stage 2 ISAA

1.2.4.1 For clarity and ease of navigation, the HRA Stage 2 ISAA is structured and reported in several 'Parts', as follows.

- Part 1 – Introduction (document reference: E2.1).

- Part 2 (this document) – SAC Assessments.
- Part 3 – Special Protection Area (SPA) and Ramsar site Assessments (document reference: E2.3).

1.2.4.2 Each 'Part' of the HRA Stage 2 ISAA is supported by a series of topic specific appendices and relevant documentation including European site summaries.

1.2.5 Structure of this document

1.2.5.1 This document constitutes the HRA Stage 2 ISAA Part 2 - SAC assessments and provides consideration of the implications of the Transmission Assets on SACs.

1.2.5.2 This document is structured as follows.

- **Section 1.1**: Introduction – this section describes the Transmission Assets and the Generation Assets.
- **Section 1.2**: Outline of the HRA Stage 2 ISAA – This section details the purpose and structure of the HRA Stage 2 ISAA.
- **Section 1.3**: Consultation – this section provides a summary of the consultation undertaken of relevance to the qualifying features of SACs, responses provided and how these have been addressed within this HRA Stage 2 ISAA - Part 2 SAC Assessments.
- **Section 1.4**: Summary of HRA Stage 1 Screening Report conclusions – this section presents the SACs where LSEs were identified and the features and pathways which require assessment in this HRA Stage 2 ISAA - Part 2 SAC Assessments, both from the project alone and in-combination.

1.2.5.3 Information to support the Competent Authority when undertaking the HRA Stage 2 Appropriate Assessments is then provided in:

- **Section 1.5**: Information to support the Appropriate Assessments, including Maximum Design Scenarios (MDSs), measures adopted as part of the Transmission Assets, an outline of the approach taken to baseline data, conservation objectives and the in-combination assessments;
- **Section 1.6**: Assessment of potential adverse effects on the integrity of European sites designated for Annex I habitats (offshore and coastal), alone and in-combination;
- **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; and
- **Section 1.9**: Summary – Conclusions of the assessments and the overall finding of this HRA Stage 2 ISAA - Part 2 SAC Assessments.

1.3 Consultation

1.3.1 Scoping

1.3.1.1 On 28 October 2022, the Applicants submitted a Scoping Report to the Secretary of State, which described the scope and methodology for the technical studies being undertaken to provide an assessment of any LSEs for the construction, operation and maintenance and decommissioning phases of the Transmission Assets. Following consultation with the appropriate statutory bodies, the Planning Inspectorate (on behalf of the Secretary of State) provided a Scoping Opinion on 8 December 2022. A Statement of Community Consultation (SoCC) was then prepared setting out the proposed approach to consultation, in consultation with local authorities. The SoCC was published in October 2023 and all consultation for the Transmission Assets has been undertaken in accordance with the approach set out in this document.

1.3.1.2 These scoping responses have been taken into account in the topic specific Environmental Statement (ES) chapters and have in turn been accounted for in the HRA Stage 1 Screening Report (document reference: E3) and all Parts of the HRA Stage 2 ISAA also (document reference: E2.1; this document; and E2.3). **Table 1.1** presents relevant Scoping Opinion responses which have been identified as being directly applicable to the this HRA Stage 2 ISAA – Part 2 SAC Assessments.

1.3.2 The Evidence Plan Process

1.3.2.1 Following scoping, consultation and engagement with interested parties specific to HRA and relevant chapter topics has continued. An Evidence Plan Process (EPP) has been developed for the Transmission Assets, seeking to ensure engagement with the relevant aspects of the Environmental Impact Assessment (EIA) and HRA processes throughout the pre-application phase. Evidence plans are formal mechanisms to agree what information the Applicants need 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 Development Consent Order (DCO) application.

1.3.2.2 The development and monitoring of the Evidence Plan and its subsequent progress has been undertaken by the EPP Steering Group. The Steering Group comprises the Planning Inspectorate, the Applicants, the Marine Management Organisation, Natural England, Historic England (HE), the Environment Agency (EA) and the Local Planning Authorities as the key regulatory and bodies. These Steering Groups have met at key milestones throughout the Application process.

1.3.2.3 As part of the EPP, Expert Working Groups (EWGs) have been established to discuss topic specific matters with relevant statutory and non-statutory stakeholders. EWG meetings have been held at key stages in the EIA and HRA process or when new information became available for each topic, which provided the opportunity for stakeholders to provide feedback and advice at an early stage. EWGs have been established for the following

topics which are relevant to this HRA Stage 2 ISAA – Part 2 SAC Assessments:

- Benthic ecology, fish and shellfish ecology and physical processes; and
- Marine mammals.

1.3.3 Section 42 responses

1.3.3.1 The preliminary findings of the EIA and HRA process were published in the PEIR in October 2023. The PEIR was prepared to provide the basis for formal consultation under the Planning Act 2008. This included consultation with statutory bodies under section 42 of the Planning Act 2008.

1.3.3.2 Further information regarding the consultation process can be found in the Consultation Report (document reference: E1) and in Volume 1, Chapter 5: Environmental assessment methodology of this ES (document reference: F1.5).

1.3.4 Summary of consultation responses received

1.3.4.1 A summary of the details of key consultation undertaken to date which is relevant to this HRA Stage 2 ISAA - Part 2 SAC Assessments, the Transmission Assets and the HRA process in general, together with how these have been considered in the production of this document, is presented in **Table 1.1**.

1.3.4.2 EWG meetings were also considered in this section and are included in **Table 1.1**, specifically advice provided by the stakeholders relevant to the HRA Stage 1 Screening Report (document reference: E3) and HRA Stage 2 ISAA Part 2 – SAC Assessments and how it was addressed.

Table 1.1: Summary of key consultation comments raised during consultation activities undertaken for the Transmission Assets, relevant to the HRA Stage 2 ISAA – Part 2 SAC Assessments.

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
Scoping Opinion				
8 December 2022	The Planning Inspectorate	Scoping Opinion	Advice has been provided on impacts to be scoped in and out of the ES.	Given that this advice has been considered in the relevant chapters of the ES, the HRA Stage 1 Screening Report (document reference: E3) and the HRA Stage 2 ISAA – Part 2 SAC Assessments have been aligned with the following. • Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the ES (document reference: F2.2). • Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3). • Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4). As such, please refer to the reports listed above for more details.
8 December 2022	The Planning Inspectorate	Scoping Opinion	For benthic receptors, consideration of European sites should also include SPAs, which have benthic habitats that are supporting habitats for designated features of SPAs.	Given that 'supporting habitats' for designated features of the SPAs encompass various environments other than benthic (e.g., water column), impacts on all supporting habitats of the potentially affected SPAs have not been assessed in this HRA Stage 2 ISAA – Part 2 SAC Assessments. This has instead been assessed alongside the ornithology receptors in the HRA Stage 2 ISAA – Part 3 SPA and Ramsar site Assessments (document reference: E2.3) and HRA Stage 1 Screening report (document reference: E3).
8 December 2022	Natural Resources Wales (NRW)	Scoping Opinion	Cross-border designations are taken into consideration in relation to the EIA and HRA.	Where relevant, cross-border designations are considered in the assessments presented in **sections 1.6, section 1.7** and **section 1.8.** For example, consideration has been given to sites within UK, Irish and French waters in the HRA Stage 1 Screening Report (at the screening stage; document reference: E3) and HRA Stage 2 ISAA – Part 2 SAC Assessments, where relevant.
8 December 2022	NRW	Scoping Opinion	NRW advise that diadromous fish migration routes are also included even if located outside relevant SAC.	Migration routes for diadromous fish (Annex II fish species) are considered in the HRA Stage 1 Screening Report (document

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
				reference: E3) and in this HRA Stage 2 ISAA – Part 2 SAC Assessments in **section 1.7.**
8 December 2022	NRW	Scoping Opinion	NRW advise to use the large OSPAR (Oslo and Paris Conventions) Region III area (west coast of United Kingdom (UK) + Ireland) as an interim Management Unit (MU) for seals which adequately captures the connectivity between seal colonies and the range of grey/harbour seal movement.	OSPAR Region III was considered (alongside the Carter *et al.* (2022) foraging distances) during the initial screening of LSE in the HRA Stage 1 Screening Report (document reference: E3) and used to inform the Appropriate Assessment of sites designated for Annex II marine mammal features in **section 1.8.**
8 December 2022	Natural England	Scoping Opinion	Applicants to use the most up to date information on the foraging distances of grey and harbour seals *Phoca vitulina* as presented in Carter *et al*. (2022) in order to establish connectivity with the SACs for these species.	Carter *et al.* (2022) foraging distances were used to inform the initial screening of sites designated for Annex II marine mammal features in the HRA Stage 1 Screening report (document reference: E3) and as such those assessed in this HRA Stage 2 ISAA – Part 2 SAC Assessments in in **section 1.8.**
Expert Working Groups				
Benthic, fish and shellfish and physical processes				
30 March 2023	Marine Management Organisation, Centre for Environment Fisheries and Aquaculture Science (Cefas), EA, Natural England	EWG Meeting 1	• Meeting to introduce the Transmission Assets and to establish the EWG. • Overview of approach to baseline characterisation and to assessments for physical processes, benthic ecology and fish and shellfish ecology.	Baseline characterisation and assessments have been used to inform **sections 1.6** and **1.7** of this HRA Stage 2 ISAA - Part 2 SAC Assessments.

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
27 July 2023	Marine Management Organisation, Cefas, EA, Natural England, The Wildlife Trust	EWG Meeting 2	• Overview of baseline, initial assessment outputs and the approach to the Cumulative Effects Assessment (CEA) for physical processes, benthic and fish and shellfish. • Overview of Marine Conservation Zone (MCZ) assessment.	Baseline characterisation and assessments have been used to inform **sections 1.6** and **1.7** of this HRA Stage 2 ISAA – Part 2 SAC Assessments.
07February 2024	MMO, Cefas, Environment Agency, Natural England	EWG Meeting 3	• Project parameter refinements post-PEIR, including the removal of OSPs and interconnector cables from consideration in the Transmission Assets Application (i.e. removal of surface piercing infrastructure'), reducing in vessel and helicopter movements for construction and operation and maintenance and a reduction in sandwave clearance volumes across the offshore export cable corridor. • Discussion of S42 responses relevant to benthic ecology, including concerns regarding parameters for seabed preparation, which has now been reduced for the project, and concerns for future monitoring. • Clarification by RPS on the use of the precautionary approach suggested by NRW to assume that diadromous fish may be present within the area year-round.	The refined project parameters have been used to inform the screening in/out of sites in the HRA Stage 1 Screening report (document reference: E3) and to inform the assessments for benthic and fish and shellfish features of screened in SACs in this HRA Stage 2 ISAA – Part 2 SAC Assessments. These assessments are presented in section **1.6** and **1.7**, respectively.

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
Marine mammals				
05 April 2023	Marine Management Organisation, Cefas, Natural England	EWG Meeting 1	• Meeting to introduce the Transmission Assets and to establish the EWG. • Overview of approach to baseline characterisation, study areas and to assessments for underwater sound and marine mammals. • Position on the use of marine mammal MUs and densities for impact assessment or screening and advice on applying these marine mammal MUs during Appropriate Assessment was provided in NRW's position statement.	Feedback from the first marine mammal EWG has been incorporated into the ES, the HRA Stage 1 Screening report (document reference: E3) and this HRA Stage 2 ISAA - Part 2 SAC Assessments. The baseline characterisation and study areas, including marine mammal MUs and use of Carter *et al.* (2022) and telemetry data for grey and harbour seals, has informed the screening for LSE in the HRA Stage 1 Screening report (document reference: E3). This information has hence informed the assessments presented in **section 1.8** of this HRA Stage 2 ISAA - Part 2 SAC Assessments.
01 August 2023	Marine Management Organisation, Cefas, Natural England and The Wildlife Trust	EWG Meeting 2	Overview of marine mammals assessment to include: Permanent Threshold Shift (PTS) ranges, behavioural effects noise contours, mitigation considerations, Unexploded Ordnance (UXO) clearance and cumulative effects.	The marine mammal assessment approach presented in this EWG has been updated since August 2023, following refinements to the project design (see section 3.5.2 of Volume 1, Chapter 3: Project Description of the ES; document reference: F1.3). Therefore, some of the information (e.g. PTS ranges presented for piling) is not considered in the updated Transmission Assets HRA documents (document reference: E3, this document), as it is no longer relevant to the assessment (e.g. as piling has been removed from the project design). However, some of the information on the approach to the assessment (e.g. the approach to the assessment of UXO clearance) has been used to inform the assessments presented in **section 1.8** of this HRA Stage 2 ISAA - Part 2 SAC Assessments. The mitigation considerations for the Transmission Assets have also been updated post-PEIR (since this EWG), and are presented for marine mammals in **Table 1.87**.

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
February 2024	Marine Management Organisation, Cefas, EA, The Wildlife Trusts, Inshore Fisheries and Conservation Authority and Natural England	EWG Meeting 3	This EWG presented the updated approach to HRA Screening for Annex II marine mammals to the relevant stakeholders following post-PEIR refinement of the project design to include removal of OSPs (and associated piling impacts) and reduced numbers of vessels associated with all phases. This resulted in only "injury and disturbance from underwater sound generation from UXO detonation" being screened into the HRA Stage 2 ISAA - Part 2 SAC Assessments for a number of SACs and qualifying features, which were subsequently agreed with the EWG.	Natural England have provided a formal response via email on 22 March 2024 and confirmed that they agree with the suggested approach to LSE screening and the sites screened in for Annex II harbour porpoise and grey seal features (see SACs listed in HRA Stage 1 Screening Report (document reference: E3). The agreed approach to the HRA Screening has been carried out in the HRA Stage 1 Screening Report (document reference: E3). Due to the project refinements (see section 3.5.2 of Volume 1, Chapter 3: Project Description of the ES; document reference: F1.3) only the impact "injury and disturbance from underwater sound generation from UXO detonation" is assessed in this HRA Stage 2 ISAA – Part 2 SAC Assessments in **sections 1.8.4** (project alone) and **1.8.5** (in-combination assessment).
Section 42 Responses				
Benthic, fish and shellfish and physical processes				
23 March 2024	Natural England	Section 42 response	Natural England are broadly in agreement that the HRA methodology, appropriate Statutory Nature Conservation Body (SNCB) guidance has been followed.	Noted, no action required.

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			We note that the screening assessment concluded that a risk of LSE on the Shell Flat and Lune Deep SAC could not be ruled out due to impacts to the Annex I habitat: sandbanks which are slightly covered by sea water all the time. Natural England have concerns about the volume of sandwave clearance required and the subsequent effects on Shell Flat and Lune Deep SAC. Please refer to upfront comments in Table 1 for further advice on mitigating sandwave clearance. The submitted ES should carefully assess the impacts of sandwave clearance on the SAC and identify any mitigation measures needed to rule out adverse effects.	The MDS for sandwave clearance has been refined post-PEIR (**Table 1.5**). These refinements have significantly reduced the requirements for sandwave clearance from 60% to 9% for the Morgan Offshore Wind Project: Generation Assets export cables and from 30% to 9% for the Morecambe export cables (see also **Table 1.6**) The Shell Flat and Lune Deep SAC has been screened into the HRA Stage 2 ISAA – Part 2 SAC Assessments (this document). The 'increases in Suspended Sediment Concentrations (SSCs) and associated deposition' impact resulting from sandwave clearance on the Shell Flat and Lune Deep SAC has been assessed fully in **section 1.6.3** and **1.6.4,** accounting for project refinements post-PEIR. Measures (commitments) adopted as part of the Transmission Assets relevant to the assessment of adverse effect on European sites designated for Annex I habitat features from increased SSCs and associated deposition are also considered and are outlined in **Table 1.6.**
23 March 2024	Lancashire County Council	Section 42 response	The Marine Management Organisation and Natural England should be consulted regarding potential ecological impacts of OSPs and booster stations.	Noted, however as outlined in Volume 1, Chapter 3: Project description of the ES (document reference: F1.3), OSPs and the Morgan Offshore Wind Project: Generation Assets booster station have been removed from Transmission Assets project design post-PEIR and therefore no action is required for this project.

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
23 March 2024	NRW	Section 42 response	• Overall, NRW agree with the shadow HRA conclusion of no significant impact to site integrity for diadromous fish features of the following sites: Dee Estuary/Aber Dyfrwy SAC, River Dee and Bala lake/Afon Dyfrwy a Llyn Tegid SAC and Afon Gwyrfai a Llyn Cwellyn SAC. We do, however, provide some advice below that would improve the robustness of the shadow HRA. We do not agree with some of the (in – combination) conclusions of the ES. • While NRW recognises the response made in Table 3.4, Vol 2, Chapter 3, page 23 we note that throughout the PEIR repeated reference is made to diadromous fish "passing through the area during migrations to and from rivers located on the west coast of England and Wales, such as to rivers with designated sites with diadromous fish species listed as qualifying features". Consequently, it appears that our advice has not been followed and we reiterate the advice that diadromous fish should be assumed to be present throughout the year.	Diadromous fish are considered for all project stages; more explicit consideration has been given to key migratory periods within Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3). However, the project alone assessment in **section 1.7.3** and in-combination assessment in **section 1.7.4** is based upon the precautionary assumption that Annex II diadromous fish features may be present within the area year-round, due to the uncertainties in their movements during their marine stage.

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			Furthermore, we note that in the Habitats Regulations Assessment Stage 2 ISAA p. 143, sections 1.8.1.14 - 1.8.1.16, it states that no site-specific information is available for the feature. Please note that NRW publish an annual catchments specific report for migratory salmonids on the river Dee, available online (Know your river - Dee), as for river and sea lamprey this would be the same information as set out above for the Dee Estuary.	Baseline information on diadromous fish populations have been considered in Volume 2, Chapter 3.1: Fish and shellfish ecology technical report of the ES (document reference: F2.3.1), including relevant information on diadromous fish in north west England and north Wales. The baseline has been updated with the NRW publication for migratory salmonids published (summarised in **paragraph 1.7.2.16**)
Marine mammals				
23 March 2024	NRW	Section 42 response	NRW are not able to agree the conclusions of the PEIR without significant revisions with respect to the methodology. This position is particularly with regard to densities for harbour porpoise, use of acoustic deterrent devices (ADDs), cumulative assessment of vessel noise, and technical aspects of behavioural noise thresholds. NRW noted that the densities for harbour porpoise in Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4) were inconsistent and advised that the Applicant should choose one or provide a strong and ecologically relevant justification for the use of multiple densities.	• The assessment methodology for marine mammals presented in Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4) has been updated in line with stakeholder feedback at PEIR. Resulting changes to the assessment methodology were agreed with stakeholders and have been carried through to this document (where applicable) in **section 1.8.4** and **1.8.5.** Specifically, the following updates have been carried out. – A single density assessment for each species including harbour porpoise has been carried through to the assessment, and these densities are presented in **Table 4.8** of Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4). – The assessment of Injury and disturbance from elevated underwater sound during UXO clearance (**section 4.1.1.2** of Volume 2, Chapter 4: Marine mammals of the ES; document reference: F2.4) presents impact ranges both without ADD and with ADD, the latter providing evidence to demonstrate the potential efficacy of using ADD as a tool in the mitigation strategy.

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			Effective Deterrence Ranges (EDRs) have been incorrectly applied in the PEIR. They are area-based thresholds defined as reflecting the overall loss of habitat that would occur if all animals vacated an area within the EDR, being equivalent to the mean loss of habitat per animal for use in HRA/ISAA rather than estimating the number of animals disturbed.	Text on the EDR approach in **section 1.8.4** and **1.8.5** to remove reference to the number of animals disturbed and are used as area-based thresholds to reflect the overall loss of habitat that would occur if all animals vacated an area within the EDR. This area is then compared with the area of the site to ensure that the thresholds for disturbance outlined in Joint Nature Conservation Committee (JNCC) (2020) are not exceeded.
			NRW does not agree with the use of Special Committee on Seal (SCOS) (2018) for screening. We advise the use of Carter *et al.,* (2022).	The maximum foraging ranges for grey and harbour seals presented in Carter *et al.* (2022) as well as telemetry data has informed the screening for LSE in the HRA Stage 1 Screening report (document reference: E3). Reference to the 100 km and 40 - 50 km foraging ranges for grey seal and harbour seal respectively have been removed. This information has hence informed the assessments presented in **section 1.8** of this HRA Stage 2 ISAA - Part 2 SAC Assessments.
23 March 2024	Natural England	Section 42 response	The maximum foraging ranges for grey seals and harbour seals from Carter *et al*., 2022 should be used as a screening range instead of the average foraging distances of 100 km and 40-50 km respectively. Use Carter *et al.*, 2022 maximum foraging distances for screening in the submitted report.	The maximum foraging ranges for grey and harbour seals presented in Carter *et al.* (2022) as well as telemetry data has informed the screening for LSE in the HRA Stage 1 Screening report (document reference: E3). Reference to the 100 km and 40 - 50 km foraging ranges for grey seal and harbour seal respectively have been removed. This information has hence informed the assessments presented in **section 1.8** of this HRA Stage 2 ISAA - Part 2 SAC Assessments.
23 March 2024	Northwest Wildlife Trust	Section 42 response	Current Department for Environment, Food & Rural Affairs (Defra) policy is to ensure that all existing and potential fishing operations are managed in line with Article 6 of the	It is not feasible to consider each fishing vessel as a separate project within the CEA. It is well understood that the area has been subject to extensive fishing activity long-term, therefore it would be remiss to not consider this part of the baseline scenario presented in the topic

Date	Consultee	Type of Consultation	Summary of Consultation	Where addressed
			Habitats Directive. The current, risk-based, 'revised approach' to fisheries management in UK national site network is a compromise agreed by all to prevent the closure of fisheries during assessment. This approach further supports the view that fishing is considered a plan or a project and therefore, must be included in the in-combination assessment in line with Article 6(3) of the Habitats Directive.	chapters (e.g. Volume 2, Chapter 4: Marine mammals of the ES; document reference: F2.4). The assessment presented in the chapter and hence in the HRA Stage 2 ISAA – Part 2 SAC Assessments has been undertaken proportionately, taking into consideration the regional characteristics prior to any project construction, based upon the current baseline environment which encompasses a relatively high degree of commercial fishing activity.
23 March 2024	Department of Agriculture, Environment and Rural Affairs (DAERA)	Section 42 response	Due to the location of the wind farm, we would like to highlight that the North Channel SAC, designated for Harbour porpoise, should be considered within the HRA carried out for this proposal. This is due to the screening range used for Harbour porpoise – all SACs within 100 km of the project should be screened in, and the North Channel SAC lies approximately 60 km from the proposal's location.	The North Channel SAC designated for harbour porpoise was screened in for the impact 'injury and disturbance from elevated underwater sound during UXO clearance' in the HRA Stage 1 Screening report (document reference: E3) and is fully assessed for this impact in **section 1.7.3** and **1.7.4.**

1.4 Summary of HRA Stage 1 Screening Report conclusions

1.4.1 Introduction

1.4.1.1 This section summarises all pathways identified for potential LSE (arising alone and/or in-combination) and defines the scope of the assessments within this HRA Stage 2 ISAA – Part 2 SAC Assessments.

1.4.2 Screening outcomes for the Transmission Assets alone

1.4.2.1 The potential for LSE as a result of the Transmission Assets alone has been identified in the HRA Stage 1 Screening Report (document reference: E3) with respect to 20 SACs.

Annex I habitats (onshore)

1.4.2.2 The HRA Stage 1 Screening Report (document reference: E3) identified that there were no European sites with Annex I onshore habitat features to be taken forward for determination of LSE. This was based on no European sites meeting the criterion which considered sites with Annex I habitats overlapping with or within the potential Zone of Influence (ZOI) of impacts associated with Transmission Assets. This was based on the potential for indirect effects associated with increased SSCs and associated deposition. A precautionary buffer for this indirect effect of 350 m from the Offshore Order Limits and the Intertidal Infrastructure Area was applied, which is considered large enough to encompass all direct and indirect impacts associated with Transmission Assets. There are no European sites within this ZOI for Annex I onshore habitats and so no sites were screened in for further consideration on this basis.

Annex II species (onshore)

1.4.2.3 The HRA Stage 1 Screening Report (document reference: E3) also identified that there were no European sites with Annex II onshore species features, such as otter *Lutra lutra*, bats and great-crested newt *Triturus cristatus*, to be taken forward for determination of LSE. This is due to the distance of Transmission Assets from the SACs designated for Annex II onshore species; no European sites are located within the 27 km, 10 km and 2 km buffers used for otter, bats and great-crested newt, respectively.

Annex I habitats (offshore and coastal)

1.4.2.4 One European site (Shell Flat and Lune Deep SAC) was advanced to the HRA Stage 2 ISAA Part 2 - SAC Assessments due to the conclusion that LSEs could not be ruled out for one of the two Annex 1 habitats. Only the Annex I sandbank feature was screened in for further consideration in the HRA Stage 1 Screening Report (document reference: E3) and has hence been advanced to this HRA Stage 2 ISAA Part 2 – SAC Assessments. The other feature (Annex I reef) is located 16 km from the Offshore Order Limits and Intertidal Infrastructure Area and was therefore not screened in for the

HRA Stage 1 Screening Report (document reference: E3) or advanced to this HRA Stage 2 ISAA Part 2 – SAC Assessments.

1.4.2.5 The Shell Flat and Lune Deep SAC is located 5.7 km to the north of the from the Offshore Order Limits and Intertidal Infrastructure Area (i.e. perpendicular to the main orientation of the plume). The physical processes modelling presented in Volume 2, Chapter 1: Physical processes of the ES (document reference: F2.1) found that sediment plumes associated with cable installation activities may extend circa 5 km in a principally east/west orientation. Therefore, it was considered in the HRA Stage 1 Screening Report (document reference: E3) that the Shell Flat and Lune Deep SAC is located outside of the ZOI for changes in physical processes.

1.4.2.6 However, comments were raised by Natural England as part of S42 Consultation (**Table 1.1**) regarding the volume of sandwave clearance at PEIR and the subsequent effects on the Shell Flat and Lune Deep SAC. Despite the refinements in the MDS for sandwave clearance post-PEIR, which have significantly reduced the requirements for sandwave clearance (see **Table 1.1**), due to Natural England's comments, this SAC has been screened in on a precautionary basis (for the Annex I sandbank feature only). The Annex I reef feature is located approximately 16 km from the Offshore Order Limits and so was not screened into this HRA Stage 2 ISAA – Part 2 SAC Assessments, as it is located further outside the ZOI for this impact (see HRA Stage 1 Screening report; document reference: E3).

1.4.2.7 As such, on a precautionary basis, there is considered to be potential for LSE on the Annex I sandbank feature of this site from the impact increased SSCs and associated deposition and so this impact was screened in for further consideration in **section 1.6** of this HRA Stage 2 ISAA – Part 2 SAC Assessments.

Annex II diadromous fish

1.4.2.8 The nine European sites designated for Annex II diadromous fish species listed in **Table 1.2** were screened in and advanced to the assessment in **section 1.7** of this HRA Stage 2 ISAA Part 2 - SAC Assessments due to the conclusion that LSEs could not be ruled out.

Table 1.2: European sites and relevant Annex II diadromous fish features for which the potential for LSE could not be ruled out and therefore are considered in the HRA Stage 2 ISAA - Part 2 SAC Assessments

SAC	Annex II diadromous fish features
Dee Estuary/Aber Dyfrdwy SAC	• Sea lamprey • River lamprey
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	• Atlantic salmon • Sea lamprey • River lamprey
River Ehen SAC	• Atlantic salmon • Freshwater pearl mussel

SAC	Annex II diadromous fish features
River Kent SAC	• Freshwater pearl mussel
River Derwent and Bassenthwaite Lake SAC	• Sea lamprey • River lamprey • Atlantic salmon
Solway Firth SAC	• Sea lamprey • River lamprey
Afon Gwyrfai a Llyn Cwellyn SAC	• Atlantic salmon
River Bladnoch SAC	• Atlantic salmon
River Eden SAC	• Sea lamprey • River lamprey • Atlantic salmon

Annex II marine mammals

1.4.2.9 A total of 10 European sites were screened in and advanced to the assessment in **section 1.8** of this HRA Stage 2 ISAA Part 2 - SAC Assessments for Annex II marine mammals due to the conclusion that LSEs could not be ruled out. These sites are listed in **Table 1.3**, divided by country.

Table 1.3: European sites and relevant Annex II marine mammal features for which the potential for LSE could not be ruled out and therefore are considered in the HRA Stage 2 ISAA - Part 2 SAC Assessments

European site	Annex II marine mammal features
Eight sites in the United Kingdom	
North Anglesey Marine/Gogledd Môn Forol SAC	• Harbour porpoise *Phocoena phocoena*
North Channel SAC	• Harbour porpoise
Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC	• Grey seal *Halichoerus grypus*
West Wales Marine/Gorllewin Cymru Forol SAC	• Harbour porpoise
Lambay Island SAC	• Grey seal
Cardigan Bay/Bae Ceredigion SAC	• Grey seal
Pembrokeshire Marine/Sir Benfro Forol SAC	• Grey seal
Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	• Harbour porpoise
Two sites in Ireland	
Rockabill to Dalkey Island SAC	• Harbour porpoise

European site	Annex II marine mammal features
Saltee Islands SAC	• Grey seal

1.4.3 LSE in-combination

1.4.3.1 When undertaking an in-combination assessment, projects, plans or activities with which the Transmission Assets may interact to produce an in-combination effect must be identified in the HRA Stage 1 Screening Report (document reference: E3). These interactions may arise within the construction, operation 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'.

1.4.3.2 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 in-combination with the Transmission 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.

LSE in-combination for Annex I habitats (offshore and coastal)

1.4.3.3 Following stakeholder consultation, it was determined that one European site (Shell Flat and Lune Deep SAC) designated for Annex I habitats would be screened in on a precautionary basis for indirect effects associated with construction activities (see **paragraphs 1.4.2.4** to **1.4.2.6**). No European site designated for Annex I habitats directly overlaps with the Offshore Order Limits and Intertidal Infrastructure Area (see Volume 1, Chapter 4: Site selection and consideration of alternatives of the ES for more details about the site selection process; document reference: F1.4).

1.4.3.4 For Annex I habitats, the potential for LSE alone is identified for the following potential impact from the Transmission Assets acting alone.

- Increased SSCs and associated deposition.

1.4.3.5 Therefore, this potential impact outlined above will also be considered for the Transmission Assets acting in-combination with other plans/projects at the Appropriate Assessment stage for the sandbanks which are slightly covered by sea water all the time feature of the Shell Flat and Lune Deep SAC. The in-combination assessment for this impact is presented in **section 1.6.4**.

1.4.3.6 For potential impacts discounted for LSE alone, there is either no pathway to effect, or the Transmission 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 an impact has been screened out for LSE alone, it has also been screened out for in-combination effects.

LSE in-combination for Annex II diadromous fish species

1.4.3.7 A precautionary approach to the selection of relevant sites for Annex II diadromous fish was adopted in the HRA Stage 1 Screening Report (document reference: E3) in order to capture all sites with the potential for connectivity with the Transmission Assets and in particular to consider the potential for disruption to migration (i.e., barriers to migration) of diadromous fish (including but not limited to Atlantic salmon) to/from natal rivers (river of origin). For the purposes of LSE screening, a precautionary approach was adopted using a preliminary buffer of 100 km from the Offshore Order Limits for all Annex II diadromous fish species except Atlantic salmon and freshwater pearl mussel *Margaritifera margaritifera* where the regional area has been considered. These screening buffers take into account the likely migratory routes and distances for anadromous fish (i.e., Atlantic salmon) as outlined in ABPmer (2014) and follow the methodology outlined in the Plan Level HRA (The Crown Estate, 2022), in line with feedback from stakeholders.

1.4.3.8 For Annex II diadromous fish species, the potential for LSE is identified for the following impacts from the Transmission Assets acting alone.

- Underwater sound from UXO clearance impacting fish and shellfish receptors.
- Electric and Magnetic Fields (EMF) from subsea electrical cabling.

1.4.3.9 No potential impact pathways were identified between the Transmission Assets and any other SACs designated for Annex II diadromous fish beyond those identified in **Table 1.2**. Therefore, the potential for in-combination effects at sites designated for Annex II diadromous fish will be considered only for those sites which are screened in for the project alone (see **paragraph 1.4.2.8**).

1.4.3.10 For potential impacts discounted for LSE alone, there is either no pathway to effect, or the Transmission 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. The in-combination assessment for Annex II diadromous fish is presented in **section 1.7.4**.

LSE in-combination for Annex II marine mammals

1.4.3.11 A precautionary approach to selection of relevant sites for Annex II marine mammals was adopted in the HRA Stage 1 Screening Report (document reference: E3). 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 Transmission Assets were considered.

1.4.3.12 For Annex II cetaceans (harbour porpoise and bottlenose dolphin), the search area extended to the relevant MU for each species, as defined by the Inter Agency Marine Mammal Working Group (IAMMWG) (IAMMWG, 2015). For harbour seal and grey seal, SACs located within the same seal MU

(Special Committee on Seals (SCOS), 2021), in parallel with the OSPAR Region III MU, as well as recent sources on seal foraging ranges (Carter *et al.*, 2022) and telemetry data presented in Volume 2, Annex 4.1: Marine mammal technical report of the ES (document reference: F2.4.1), (Wright and Sinclair, 2022) were considered, alongside project specific information on the scale of underwater noise impacts to identify sites and features where LSE could not be excluded. The approach taken is in line with feedback from stakeholders via the marine mammals EWG and the final list of sites and features screened in at LSE were agreed with the EWG (see **Table 1.1**)

1.4.3.13 For Annex II marine mammals, the potential for LSE alone was identified for the following impact from the Transmission Assets acting alone.

- Injury and disturbance from underwater sound generation from UXO clearance.

1.4.3.14 Potential for LSE alone has been identified for all sites within species' range, therefore in-combination effects for these sites are assessed in this HRA Stage 2 ISAA – Part 2 SAC Assessments. The in-combination assessment for Annex II marine mammals is presented in **section 1.8.5.**

1.4.3.15 For potential impacts discounted for LSE alone, there is either no pathway to effect, or the Transmission 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.

1.4.4 Summary table of HRA Stage 1 Screening Report outcomes

1.4.4.1 **Table 1.4** 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 1.4: A summary of all SACs for which the potential for LSE could not be discounted in the HRA Stage 1 Screening Report and for which an Appropriate Assessment is required (C = construction, O = operation and maintenance, D = decommissioning)

European site	Distance to Offshore Order Limits (km)	Relevant qualifying features	Impact	Project phase		
				C	O	D
Annex I habitats (offshore and coastal)						
Shell Flat and Lune Deep SAC	5.7	Sandbanks which are slightly covered by sea water all the time	SSCs and associated sediment deposition	✓	✓	✓
Annex II diadromous fish species						
River Ehen SAC	62.5	Atlantic salmon Freshwater pearl mussel	Underwater sound from UXO clearance impacting fish and shellfish receptors	✓		
			EMF from subsea electrical cabling		✓	
Dee Estuary/Aber Dyfrdwy SAC	32.8	Sea lamprey River lamprey	Underwater sound UXO clearance impacting fish and shellfish receptors	✓		
			EMF from subsea electrical cabling		✓	
River Derwent and Bassenthwaite Lake SAC	72.3	Sea lamprey River lamprey Atlantic salmon	Underwater sound from UXO clearance impacting fish and shellfish receptors	✓		
			EMF from subsea electrical cabling		✓	
River Kent SAC	65.2	Freshwater pearl mussel	Underwater sound from UXO clearance impacting fish and shellfish receptors	✓		
			EMF from subsea electrical cabling		✓	
Solway Firth SAC	85.7	Sea lamprey River lamprey	Underwater sound from UXO clearance impacting fish and shellfish receptors	✓		
			EMF from subsea electrical cabling		✓	

European site	Distance to Offshore Order Limits (km)	Relevant qualifying features	Impact	Project phase		
				C	O	D
River Bladnoch SAC	89.5	Atlantic salmon	Underwater sound from UXO clearance impacting fish and shellfish receptors	✓		
			EMF from subsea electrical cabling		✓	
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	59.1	Atlantic salmon Sea lamprey River lamprey	Underwater sound from UXO clearance impacting fish and shellfish receptors	✓		
			EMF from subsea electrical cabling		✓	
Afon Gwyrfai a Llyn Cwellyn SAC	87.3	Atlantic salmon	Underwater sound from UXO clearance impacting fish and shellfish receptors	✓		
			EMF from subsea electrical cabling		✓	
River Eden SAC	127.7	Sea lamprey River lamprey	Underwater sound from UXO clearance impacting fish and shellfish receptors	✓		
			EMF from subsea electrical cabling		✓	
		Atlantic salmon	Underwater sound from UXO clearance impacting fish and shellfish receptors	✓		
			EMF from subsea electrical cabling		✓	
Annex II marine mammals						
North Anglesey Marine/Gogledd Môn Forol SAC	28.5	Harbour porpoise	Injury and disturbance from elevated underwater sound during UXO clearance	✓		
North Channel SAC	62.7	Harbour porpoise	Injury and disturbance from elevated underwater sound during UXO clearance	✓		

European site	Distance to Offshore Order Limits (km)	Relevant qualifying features	Impact	Project phase		
				C	O	D
Pen Llŷn a`r Sarnau/Lleyn Peninsula and the Sarnau SAC	111.2	Grey seal	Injury and disturbance from elevated underwater sound during UXO clearance	✓		
West Wales Marine/Gorllewin Cymru Forol SAC	111.4	Harbour porpoise	Injury and disturbance from elevated underwater sound during UXO clearance	✓		
Cardigan Bay/Bae Ceredigion SAC	183.4	Grey seal	Injury and disturbance from elevated underwater sound during UXO clearance	✓		
Lambay Island SAC	130.4	Grey seal	Injury and disturbance from elevated underwater sound during UXO clearance	✓		
Pembrokeshire Marine/Sir Benfro Forol SAC	233.7	Grey seal	Injury and disturbance from elevated underwater sound during UXO clearance	✓		
Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	296.9	Harbour porpoise	Injury and disturbance from elevated underwater sound during UXO clearance	✓		
Rockabill to Dalkey Island SAC	123.6	Harbour porpoise	Injury and disturbance from elevated underwater sound during UXO clearance	✓		
Saltee Islands SAC	259.3	Grey seal	Injury and disturbance from elevated underwater sound during UXO clearance	✓		

1.5 Information to support the Appropriate Assessment

1.5.1 Maximum Design Scenarios

1.5.1.1 For all European sites considered in this HRA Stage 2 ISAA – Part 2 SAC Assessments, the assessments have been based on a realistic MDS. Each MDS has been derived from the project design for the Transmission Assets and is presented within the relevant receptor chapters. Volume 1, Chapter 3: Project description of the ES (document reference: F1.3) describes the Transmission Assets design and identifies the range of potential parameters for all relevant components. The MDS have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. By identifying the MDS for any given impact, it can be concluded that the impact (and therefore the resulting effect) would be no greater for any other design scenario.

1.5.1.2 The Project Design Envelope approach (also known as the Rochdale Envelope approach) defines a maximum design envelope and maximum parameters within which the final design will sit. Thus, it allows flexibility for elements that are likely to require more detailed design subsequent to submission of a consent application, such as siting of infrastructure and construction methods. It also allows the findings of the consultation process and feedback from statutory and non-statutory stakeholders to be considered during the design process, where appropriate.

1.5.1.3 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 - Part 2 SAC Assessments according to the effect-pathway under consideration. The assessment scenarios are consistent with those used for assessment in relevant chapters of the ES.

1.5.1.4 The MDS for each of the potential impacts for each receptor group considers the relevant construction scenario (i.e. sequential or concurrent) that equate to the MDS for that impact pathway and receptor. For example, for the impact 'increases in SSC and sediment deposition' assessed in regard to the Shell Flat and Lune Deep SAC in **section 1.6.3**, the MDS is for activities to be carried out concurrently. For impacts such as 'Underwater sound from UXO clearance impacting fish and shellfish receptors' assessed in regard to SACs designated for Annex II fish species (**section 1.7.3**), the MDS is for the sequential construction scenario (i.e. construction will take place over a maximum of 30 months, noting that there is potential for a gap between the construction periods for Morgan and Morecambe) as this equates to the greatest time over which impacts to fish and shellfish receptors may occur.

1.5.2 Measures adopted as part of the Transmission Assets

1.5.2.1 For the purposes of this HRA Stage 2 ISAA – Part 2 SAC Assessments, the term 'measures adopted as part of the Transmission Assets' is used to include the following two types of mitigation measures (adapted from Institute for Environmental Management and Assessment (IEMA), 2016). These

measures are set out in Volume 1, Appendix 5.3: Commitments Register of the ES (document reference: F1.5.3).

- Embedded mitigation. This includes the following.
  - Primary (inherent) mitigation - measures included as part of the project design. IEMA describes these as 'modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project and do not require additional action to be taken'. This includes modifications arising through the iterative design process. These measures will be secured through the consent itself through the description of the project and the parameters secured in the DCO and/or marine licences. For example, a reduction in footprint or height.
  - Tertiary (inexorable) mitigation. IEMA describes these as '*actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects*'. It may be helpful to secure such measures through a Code of Construction Practice or similar.
- Secondary (foreseeable) mitigation. IEMA describes these as '*actions that will require further activity in order to achieve the anticipated outcome'*. These include measures required to reduce the significance of environmental effects (such as lighting limits) and may be secured through environmental management plan.

1.5.2.2 Embedded measures that will form part of the final design (and/or are established legislative requirements/good practice) have been taken into account as part of the assessment presented in **sections 1.6** to **1.8** (i.e., the initial determination of impact magnitude and significance of effects assumes implementation of these measures). This ensures that the measures to which the Applicants are committed are taken into account in the assessment of effects.

1.5.2.3 Where an assessment identifies likely significant adverse effects, further or secondary mitigation measures may be applied. These are measures that could further prevent, reduce and, where possible, offset these effects. They are defined by IEMA as actions that will require further activity in order to achieve the anticipated outcome and may be imposed as part of the planning consent, or through inclusion in the ES (referred to as secondary mitigation measures in IEMA, 2016). For further or secondary measures both pre-mitigation and residual effects are presented.

1.5.3 Baseline information

1.5.3.1 Baseline information on the European sites identified for further assessment within this HRA Stage 2 ISAA Part 2 - SAC Assessments 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 ES. Any additional

sources of information used in this HRA Stage 2 ISAA - Part 2 SAC Assessments are also summarised. The key baseline data sources, for each receptor, are outlined below.

- Annex I habitats (offshore and coastal) informed by:
  - benthic site-specific surveys presented in Volume 2, Annex 2.1: Benthic subtidal and intertidal ecology technical report of the ES (document reference: F2.2.1);
  - Volume 2, Chapter 1: Physical processes of the ES (document reference: F2.1); and
  - Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the ES (document reference: F2.2).
- Annex II diadromous fish – informed by:
  - Volume 2, Annex 3.1: Fish and shellfish ecology technical report of the ES (document reference: F2.3.1); and
  - Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3) .
- Annex II marine mammals – informed by:
  - Volume 1, Annex 5.2: Underwater sound technical report of the ES (document reference: F1.5.2);
  - Volume 2, Annex 4.1: Marine mammal technical report of the ES (document reference: F2.4.1) including data from site-specific aerial digital surveys that overlap with the Transmission Assets;
    - one across the Scoping Boundary for the Morgan Offshore Wind Project: Generation Assets plus 10 km buffer (Appendix A of Volume 2, Annex 4.1, Marine mammal technical report of the ES; document reference: F2.4.1); and
    - one across the Morecambe Offshore Windfarm: Generation Assets plus 4-10 km buffer (Appendix B of Volume 2, Annex 4.1, Marine mammal technical report of the ES; document reference: F2.4.1); and
  - Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4).

1.5.3.2 For brevity, information on the European sites is summarised within the main body of this HRA Stage 2 ISAA – Part 2 SAC Assessments in the baseline information sections for the designated features (**sections 1.6.2, 1.7.2** and **1.8.2**).

1.5.4 Conservation objectives and advice

1.5.4.1 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.

1.5.4.2 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 will be avoided.

1.5.4.3 In this HRA Stage 2 ISAA - Part 2 SAC Assessments, the Applicants have 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.

1.5.4.4 Due to the location and scale of the Transmission Assets, European sites with the potential to be impacted fall variously under the remit of NRW, Natural England, NatureScot, National Parks and Wildlife Service and the JNCC.

1.5.4.5 Natural England has published a suite of 'European Site Conservation Objectives: Supplementary advice on conserving and restoring features' documents (Natural England, 2023). These documents present attributes which are ecological characteristics of the designated species and habitats within a site and are available online for a number of European protected sites. 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.

1.5.4.6 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' (NRW, 2023b).

1.5.4.7 For some European sites under the statutory remit of NatureScot, NRW and/or Natural England, a Conservation Advice Package (CAP) document has been produced (Natural England, 2024; NatureScot, 2024; NRW, 2023b). Of the European sites screened into this HRA Stage 2 ISAA - Part 2 SAC Assessments, a CAP document has only been produced for the River Bladnoch SAC; CAP documents for other European sites have not yet been produced. This CAP 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.

1.5.4.8 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 - Part 2 SAC Assessments.

1.5.4.9 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 - Part 2 SAC Assessments, the most recently published conservation objectives have been used.

1.5.5 Approach to the in-combination assessments

1.5.5.1 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.

1.5.5.2 When undertaking an in-combination assessment, projects, plans or activities with which the Transmission Assets may interact to produce an in-combination effect must be identified. These interactions may arise within the construction, operation 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’.

1.5.5.3 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 Transmission 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.

1.5.5.4 The projects, plans and activities screened into the in-combination assessment within this HRA Stage 2 ISAA – Part 2 SAC Assessments have been selected as relevant based upon the results of screening exercises completed for each chapter topic (e.g. benthic ecology, fish and shellfish ecology and marine mammals; see Volume 1, Annex 5.5: Cumulative screening matrix and location plan of the ES; document reference F1.5.5) and relevant impacts. These have been consulted upon with the SNCBs throughout the assessment to seek agreement on the projects, plans and activities to be considered in the in-combination assessment.

1.5.5.5 The Transmission Assets in-combination assessment considers four scenarios as presented in a series of tables (one for each potential in-combination effect).

- Scenario 1: Transmission Assets together with Morecambe Offshore Windfarm: Generation Assets.
- Scenario 2: Transmission Assets together with Morgan Offshore Wind Project: Generation Assets.
- Scenario 3: Transmission Assets together with Morgan Offshore Wind Project: Generation Assets and Morecambe Offshore Windfarm: Generation Assets.

- Scenario 4: Scenario 3 (Transmission Assets and Generation Assets) together with Tier 1, Tier 2 and Tier 3 projects, plans and activities, with allocation into 'tiers' reflecting their current stage within the planning and development process. This tiered approach is adopted to provide a clear assessment of the Transmission Asses alongside other projects, plans and activities as follows:
  - Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) and Tier 1 projects, plans and activities which are:
    - under construction;
    - permitted application;
    - submitted application; or
    - those currently operational that were not operational when baseline data were collected, and/or those that are operational but have an ongoing impact.
  - Scenario 4b: Scenario 4a and Tier 2 projects, plans and activities which a scoping report has been submitted in the public domain.
  - Scenario 4c: Scenario 4b and Tier 3 projects, plans and activities which are:
    - where a scoping report has not been submitted and it is not in the public domain;
    - identified in the relevant Development Plan; or
    - identified in other plans and programmes.

1.5.5.6 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.

1.6 Assessment of potential adverse effect on integrity: Annex I habitats (offshore and coastal)

1.6.1 Introduction

1.6.1.1 The HRA Stage 1 Screening Report (document reference: E3) identified the potential for LSEs on the following European site for the Annex I habitat feature, sandbanks which are slightly covered by sea water all the time only (**section 1.4.2**) as shown in **Figure 1.1.** The Annex I reef feature of this SAC is located approximately 16 km from the Offshore Order Limits and so was not screened into this HRA Stage 2 ISAA – Part 2 SAC Assessments, as it is located further outside the ZOI for this impact (see HRA Stage 1 Screening report; document reference: E3).

- Shell Flat and Lune Deep SAC.

1.6.1.2 LSEs on this European site were identified for the following potential impacts.

- During the construction and decommissioning phases:
  - increased SSCs and associated deposition; and

  - in-combination effects.
- During the operation and maintenance phase:
  - increased SSCs and associated deposition; and
  - in-combination effects.

1.6.1.3 This section presents the information required for the competent authority to undertake HRA Stage 2 Appropriate Assessments (considering effects both alone and in-combination) for this site. A summary of all Appropriate Assessments undertaken within this report is provided in the concluding section of this report (**section 1.9**).

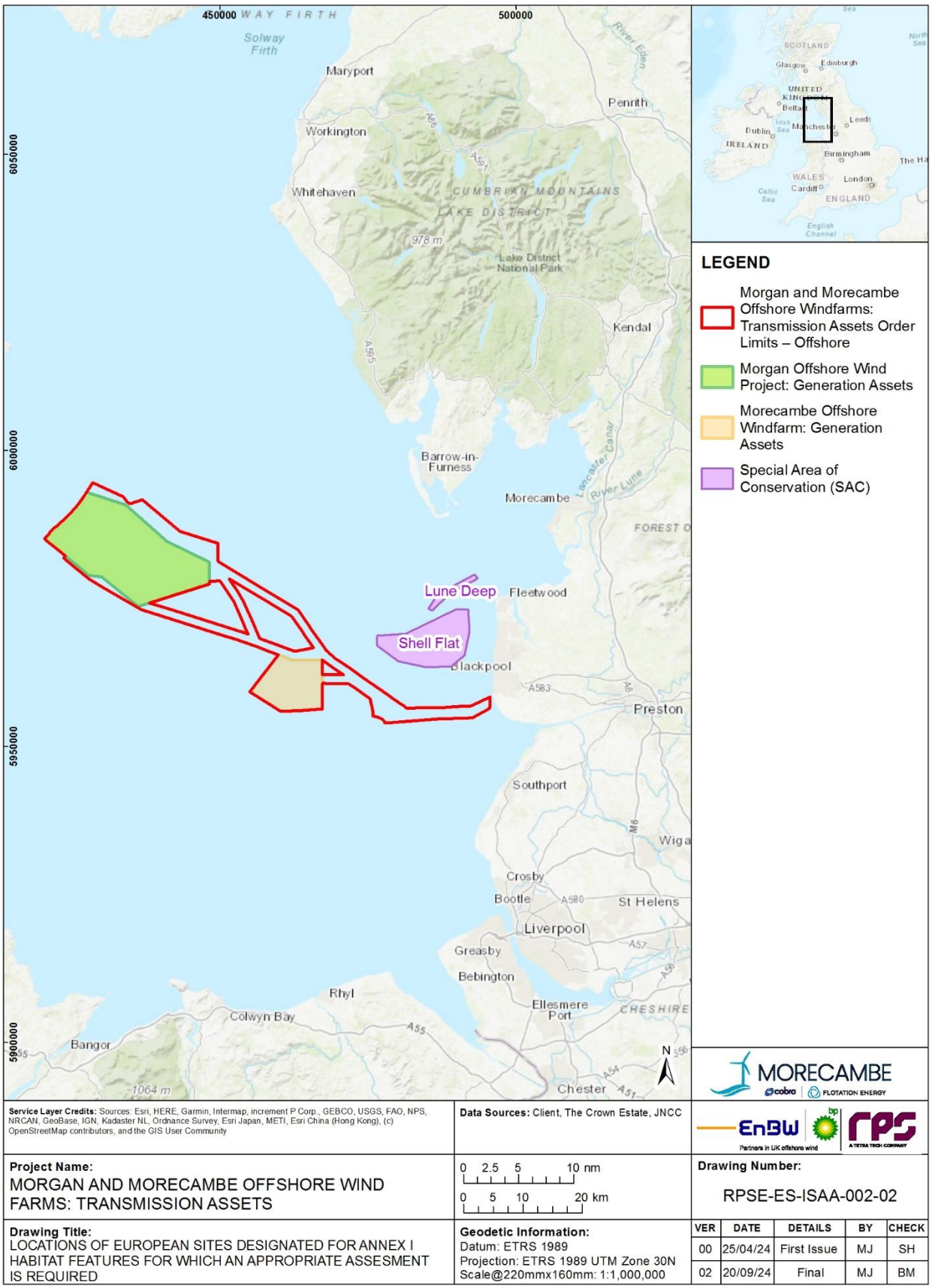

Figure 1.1: Locations of European sites with Annex I habitat features for which an Appropriate Assessment is required (not to scale)

1.6.2 Baseline information

1.6.2.1 Baseline information on the Annex I habitat features of the European site identified for further assessment within the HRA process has been gathered through a comprehensive desktop study of existing studies and datasets, full details of which are presented within Volume 2, Chapter 1: Physical processes of the ES (document reference: F2.1) and Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the ES (document reference: F2.2). Site-specific surveys were undertaken in 2022 to characterise the benthic habitats within the Offshore Order Limits, including the area in proximity to the Shell Flat and Lune Deep SAC.

Shell Flat and Lune Deep SAC

Site description

1.6.2.2 The Shell Flat and Lune Deep SAC is located west of England, off the Lancashire coast, approximately 5.7 km north of the Offshore Order Limits (**Figure 1.1**). The Shell Flat and Lune Deep SAC encompasses a water channel (i.e., the Lune Deep), a large sandbank feature (i.e., the Shell Flat) and shallower zones both to the north and south of the site. The Shell Flat and Lune Deep SAC covers an area of 105.65 km^2. The Shell Flat is composed of a range of mud and sand sediments and hosts a biological community typically found on sandy substrates (Natural England, 2012). The Shell Flat also provides important habitat for commercially important fish species and for bird populations. The reef habitat of the Lune Deep supports mixed faunal turf communities over cobble/rock substrates and provides a contrasting habitat to the surrounding muddy habitats and associated biological communities (Natural England, 2012). A description of the Annex I habitat qualifying feature; sandbanks which are slightly covered by sea water all the time, of the Shell Flat and Lune Deep SAC is provided in **paragraphs 1.6.2.3** and **1.6.2.5** and is considered further in this HRA Stage 2 ISAA – Part 2 SAC Assessments. No feature account has been included for the Annex I reef feature of this SAC, as this feature was not screened into this HRA Stage 2 ISAA – Part 2 SAC Assessments, as it is located outside the ZOI for this impact (see **paragraph 1.6.2.1**).

Feature accounts

Sandbanks which are slightly covered by sea water all the time

1.6.2.3 This habitat feature consists of elevated, elongated, rounded or irregular topographic features which are permanently covered by shallow sea water generally at depths less than 20 m below chart datum. They consist mainly of sandy sediments, but larger grain sizes, including boulders and cobbles, or smaller grain sizes including mud may also be present on a sandbank. The Shell Flat covers approximately 89 km^2 within the Shell Flat and Lune Deep SAC, equivalent to 0.52% of the UK total resources, with an additional 8 km^2 extending beyond the site boundaries (Natural England, 2012). The Shell Flat sandbank, which is located 5.7 km from the Offshore Order Limits, is a good

example of a Banner Bank. A Banner Bank is usually a short bank (i.e., generally only a few kilometres in length) with an elongated pear shape. The types of community associated with the habitat are influenced by location, exposure, topography, depth, turbidity and salinity of the surrounding water.

1.6.2.4 The communities found at the Shell Flat are characterised by high abundances of a limited number of species. A survey in 2008 identified repetitively bivalve molluscs such as *Nucula nitidosa*, *Abra alba* and *Fabulina fabula* as well as the bristle worms *Magelona johnstoni*, *Glycera alba* and *Magelona filiformis* which are all typical species found on sandy substrates (Royal Haskoning, 2008). The presence of high biomass of large soft-bodied species suggests that the sandbank is relatively unpolluted (Warwick Energy Ltd., 2002).

1.6.2.5 The Shell Flat has been identified as an important foraging ground for many overwintering bird species, notably the common scoter *Melanitta nigra* with over 50,000 individuals feeding on the submerged sandbanks (Natural England, 2012).

Condition assessment

1.6.2.6 There is no condition assessment available for the sandbanks which are slightly covered by sea water all the time feature of the Shell Flat and Lune Deep SAC.

Conservation objectives

1.6.2.7 The conservation objectives are set with regard to the Shell Flat and Lune Deep SAC and the natural habitats and/or species for which the site has been designated, and subject to natural change. It should be ensured that the integrity of the site is maintained or restored as appropriate and ensured that the site contributes to achieving the Favourable Conservation Status (FCS) of its Qualifying Features, by maintaining or restoring:

- the extent and distribution of qualifying natural habitats;
- the structure and function (including typical species) of qualifying natural habitats; and
- the supporting processes on which the qualifying natural habitats rely.

1.6.3 Assessment of adverse effects alone

Increased SSCs and associated deposition

1.6.3.1 Increased SSCs and associated deposition are predicted to occur during the construction, operation and maintenance, and decommissioning phases as a result of sandwave clearance activities and the installation, repair and removal of export cables. These activities may result in temporary changes to water clarity, smothering and siltation rate changes.

1.6.3.2 One European site was screened in for further consideration and advanced to this HRA Stage 2 ISAA Part 2 – SAC Assessments on a precautionary basis following statutory consultation (see **paragraphs 1.4.2.5** and **1.4.2.6**)

for the potential impact of increase SSCs and associated deposition during construction, operation and maintenance and decommissioning activities. As such, on a precautionary basis, there is considered to be potential for LSE on the Annex I habitat feature, sandbanks which are slightly covered by sea water at all times of this site.

1.6.3.3 The MDS considered for the assessment of potential impacts on Annex I habitat feature from the increased SSCs and associated deposition is presented in **Table 1.5.** The MDS has been selected as the one which has the potential to result in the greatest effect on the identified receptor and considers the activities to be carried out sequentially. These scenarios have been selected from the project design provided in Volume 1, Chapter 3: Project description of the ES (document reference: F2.3). Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project design (e.g., different infrastructure layout), to that assessed here, be taken forward in the final design.

Table 1.5: Maximum design scenario for the assessment of potential impacts on Annex I habitats (offshore and coastal) from increased SSCs and associated deposition during the construction, operation and maintenance and decommissioning phases

Phase	Maximum design scenario	Justification
Construction phase	**Site preparation**: Sandwave clearance of up to 1,426,800 m^3 undertaken sequentially over an approximate 21-month duration (Morgan offshore export cables: three months site preparation + 18 months construction, Morecambe offshore export cables: three months site preparation + six months construction). • Morgan export cable: sandwave clearance along 9% of 400 km of export cable length with a width of 60 m. This equates to a total spoil volume of 1,080,000 m^3 associated with the cable corridor. • Morecambe export cable: sandwave clearance along 9% of 84 km of export cable length, with a width of 48 m. This equates to a total spoil volume of 346,800 m^3. • Removal of up to 28 km of disused cables. **Cable installation**. Total spoil volume of up to 2,178,000 m^3 for cable installation of 484 km of cable, with a trench width of up to 3 m and a depth of up to 3 m. Total spoil volume of 2,178,000 m^3 installed sequentially over approximately 21 month	**Site preparation.** • The volume of material to be cleared from individual sandwaves will vary according to the local dimensions of the sandwave (height, length, and shape) and the level to which the sandwave must be reduced. This is shown in Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the ES (document reference: F2.2). Sandwaves are most prevalent within the westerly extents of the Transmission Assets (in and around the Morgan Offshore Wind Project: Generation Assets) where sandwave heights can be as great as 5 m at the bedforms crest. Given updated analysis of bedforms and morphology within the Offshore Order Limits, sandwave clearance values used within the ES have been significantly reduced from those used in PEIR from 60% (Morgan) and 30% (Morecambe) to 9%. • Site clearance activities may be undertaken using a range of techniques, the suction hopper dredger will result in the greatest increase in suspended sediment and largest plume extent as material is released near the water surface during the disposal of material. • Boulder clearance activities will result in minimal increased SSCs and have

Phase	Maximum design scenario	Justification
	construction period (concurrent scenario; Morgan offshore export cables: three months site preparation + 18 months construction, Morecambe offshore export cables: three months site preparation + six months construction). • Offshore export cables: Installation via trenching of up to 1,800,000 m^3 for the 400 km of the Morgan Offshore Wind Project: Transmission Assets • Offshore export cables: Installation via trenching of up to 378,000 m^3 for the 84 km of the Morecambe Offshore Windfarm: Transmission Assets.	therefore not been considered in the assessment. • The scenario assessed relates to the largest potential volume of material related to site preparation activities. **Cable Installation.** • Cable routes inevitably include a variety of seabed material and in some areas 3 m depth may not be achieved or may be of a coarser nature which settles in the vicinity of the cable route. The assessment therefore considers the upper bound in terms of suspended sediment and dispersion potential assuming a trench with "v" shape cross section. • Cables may be buried by ploughing, trenching, mechanical cutting or jetting with jetting mobilising the greatest volume of material to increase SSCs. • Open-cut trenching represents the MDS for cable installation within the intertidal area. The offshore export cables transitioning onshore will be installed using the direct pipe trenchless technique between the Transition Joint Bays (TJBs) at or near Blackpool Airport to the beach, with direct pipe under the dunes. The direct pipe installation is a fully cased system which reduces risks associated with frack out of drilling fluids. It is anticipated that the direct pipe will exit on the beach around MHWS with a minimum offset distance of 15 m from boundary of the Lytham St Annes Dunes SSSI (see CoT 44). Cofferdams may be required.. The offshore export cables will be buried between the direct pipe exit pits and MLWS via open trenching and marinised trencher. The trench is likely to be a stepped side trench to maintain stability with a top width of up to 10 m and a depth of approximately 3 m. Up to 300 m of open trenching may be required per cable. • The concurrent construction scenario is included as the maximum design scenario as this has the potential to result in the greatest increase in suspended sediments.
Operation and maintenance phase	• Operational life of 35 years. • Repair of Morgan subtidal export cables: up to 14 repair events (one	• The greatest foreseeable number of export cable reburial and repair events

Phase	Maximum design scenario	Justification
	repair event for each of the four export cables every 10 years) affecting up to 4 km per repair event. • Repair of the Morecambe subtidal export cables: up to seven repair events (one repair event for each of the two export cables every 10 years) affecting up to 4 km per repair event. • Reburial of Morgan subtidal export cables: one reburial event every five years (seven reburial events in total affecting up to 16 km of export cables per event). • Reburial of Morecambe subtidal export cables: one reburial event every five years (seven reburial events in total, affecting up to 3.4 km of export cables per event). • Jack-up events: up to two jack-up events per year for the Morgan export cables, and up to one jack-up event per year for the Morecambe export cables. Four legs per vessel, each with a 4 m^2 spud can affecting up to 16 m^2 per jack-up. • Intertidal repair of Morgan intertidal export cables: up to four repair events (one repair event every ten years) affecting up to 1 km of intertidal cables per event. • Intertidal repair of Morecambe intertidal export cables: up to four repair events (one repair event every 10 years) affecting up to 2.4 km of intertidal cables per repair event. • Reburial of Morgan intertidal export cables: up to seven reburial events (one every five years) affecting up to 1 km of intertidal cables per event • Reburial of Morecambe intertidal export cables: up to 14 reburial events (two every five years) affecting up to 500 m per reburial event	are considered to be the MDS for sediment dispersion.
Decommissioning phase	• All export cables (Morgan and Morecambe) will be removed and disposed of onshore. • Cable protection will remain *in situ* (however all external cable	• The removal of cables may be undertaken using similar techniques to those employed during installation, therefore the potential increases in SSC

Phase	Maximum design scenario	Justification
	protection used within the MCZ will be designed to be removable on decommissioning with the requirement for removal agreed with stakeholders and regulators in lines with best practice and guidance at the time of decommissioning as per CoT108 and CoT109; see Volume 1, Annex 5.3: Commitments Register (document reference: F1.5.3)).	and deposition would be in-line with the construction phase. • Although specific techniques relating to the removal of cables may be development during the project lifetime, the MDS assumes as a worst case that techniques similar to construction will be employed during the decommissioning phase. •

Measures adopted as part of the Transmission Assets (Commitments)

1.6.3.4 Measures adopted as part of the Transmission Assets which are of relevance to the assessment of potential impacts on Annex I habitat features from increased SSCs and associated deposition are presented in **Table 1.6.**

Table 1.6: Measures (commitments) adopted as part of the Transmission Assets relevant to the assessment of adverse effect on European sites designated for Annex I habitat features from increased SSCs and associated deposition

Commitment number	Measure adopted	How the measure will be secured
Embedded measures		
CoT45	The Outline Offshore Cable Specification and Installation Plan (CSIP) for the Fylde MCZ includes: details of cable burial depths, cable protection, and cable monitoring. The Outline CSIP also includes an Outline Cable Burial Risk Assessment (CBRA). Detailed CSIP(s) and CBRA(s) will be prepared by the Applicants covering the full extent of their respective offshore export cable corridors. Detailed CSIPs will be developed in accordance with the Outline CSIP and will ensure safe navigation is not compromised including consideration of under keel clearance. No more than 5% reduction in water depth (referenced to Chart Datum) will occur at any point on the offshore export cable corridor route without prior written approval from the MCA.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(e) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Windfarm Transmission Assets), Part 2 - Condition 18(1)(e) (Pre-construction plans and documentation)
CoT47	The Outline Offshore Cable Specification and Installation Plan (CSIP) includes measures to limit the extent of cable protection to 3% of the offshore export cable route within the Fylde (Marine Conservation Zone) MCZ (excluding cable crossings). Within the Fylde MCZ, external cable protection will only be used where deemed to be essential, e.g. for cable crossings or in the instance that adequate burial / reburial is not possible for any section of the route through the Fylde MCZ. The Outline CSIP also includes measures to limit sandwave clearance to up to 5% of the offshore export cable corridor route within the Fylde MCZ. Material arising from sandwave clearance in the Fylde MCZ will be deposited within the Fylde MCZ. The requirements for cable protection and sandwave clearance will be informed through the undertaking of survey works pre-construction. Detailed CSIP(s) will be developed in accordance with the Outline CSIP.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(e) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Windfarm Transmission Assets), Part 2 - Condition 18(1)(e) (Pre-construction plans and documentation)
CoT49	Construction Method Statement(s) (CMSs) including Offshore Cable Specification and Installation Plan(s), will be produced and implemented prior to construction. These will contain: - details of cable installation and methodology; and - details of foundation installation methodology covering scour protection and the deposition of	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(e) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Windfarm Transmission Assets), Part 2 - Condition 18(1)(e) (Pre-construction plans and documentation)

Commitment number	Measure adopted	How the measure will be secured
	material arising from drilling, dredging, and/or sandwave clearance.	
CoT54	An Outline Offshore Cable Specification and Installation Plan (CSIP) includes for cable burial to be the preferred option for cable protection, where practicable. Detailed CSIP(s) will be developed in accordance with the Outline CSIP.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(e) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Windfarm Transmission Assets), Part 2 - Condition 18(1)(e) (Pre-construction plans and documentation)
CoT65	Offshore Environmental Management Plan(s) (EMPs) will be developed and will include details of: - a marine pollution contingency plan to address the risks, methods and procedures to deal with any spills and collision incidents during construction and operation of the authorised scheme for activities carried out below MHWS; - a chemical risk review to include information regarding how and when chemicals are to be used, stored and transported in accordance with recognised best practice guidance; - waste management and disposal arrangements; - the appointment and responsibilities of a fisheries liaison officer; - a fisheries liaison and coexistence plan (which accords with the outline fisheries liaison and co-existence plan) to ensure relevant fishing fleets are notified of commencement of licensed activities pursuant to condition and to address the interaction of the licensed activities with fishing activities; - measures to minimise disturbance to marine mammals and rafting birds from vessels; and - measures to minimise the potential spread of invasive non-native species, including adherance to IMO ballast water management guidelines.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(f) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Windfarm Transmission Assets), Part 2 - Condition18(1)(f) (Pre-construction plans and documentation)
CoT116	Any material arising from sandwave clearance within the Transmission Assets Order Limits will be deposited in close proximity to the works and within the licensed disposal sites within the Order Limits, as detailed in the Dredging and Disposal - Site Characterisation Plan prepared and submitted as part of the application for development consent	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 1 - Condition 2(f) (Design Parameters) and Part 2 – Condition16(4) (Chemicals, drilling and debris); and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Windfarm Transmission Assets) Part 1 - Condition 2(f) (Design Parameters) and Part 2 – Condition16(4) (Chemicals, drilling and debris)

Construction and decommissioning phases

Information to support assessment

1.6.3.5 The Shell Flat of the Shell Flat and Lune Deep SAC is located 5.7 km from the Offshore Order Limits which is outside of the ZOI for changes in physical processes (5 km for sediment plumes associated with cable installation activities, see **paragraph 1.4.2.5**). However, Natural England requested its inclusion as part of S42 Consultation (**Table 1.1**) due to the volume of sandwave clearance at PEIR and the subsequent potential effects on the SAC, noting that sandwave clearance volumes have subsequently been reduced from up to 60% and 30% (Morgan Offshore Wind Project and Morecambe Offshore Windfarm, respectively) to 9% (**Table 1.5**). Therefore, on a precautionary basis an assessment of the potential for LSE on Annex I habitats are included for the SAC from the impact increased SSCs and associated deposition as a result of construction activities or from changes to the hydrodynamic regime as a result of the presence of offshore infrastructure associated with the Transmission Assets.

1.6.3.6 The physical processes modelling and assessment has been used to inform this assessment with full details presented in full in Volume 2, Chapter 1: Physical processes of the ES (document reference: F2.1). The assessment was informed by the modelling studies undertaken for the Morgan Offshore Wind Project: Generation Assets and other offshore wind project assessments (e.g. the Mona Offshore Wind Project). For the purposes of this assessment, site preparation sandwave clearance and cable installation have been considered.

1.6.3.7 Site clearance activities may be undertaken using a range of techniques. In practice, plough dredging mobilises a much smaller amount of sediment into suspension at the seabed and has reduced sediment plume concentrations and extents compared to other types of dredging activities which may be undertaken. However, the assessment simulated the MDS and is undertaken applying modelling carried out for the Morgan Offshore Wind Project: Generation Assets ES and modelling carried out for the Mona Offshore Wind Project ES, which simulated the use of a suction hopper dredger with a phasing representative of the scale of the sandwaves; dredging, and then depositing material by side casting within the cable corridor as it progressed along the route, resulting in higher SSC and dispersion plumes compared to plough dredging (see Volume 2, Chapter 1: Physical processes of the ES and Volume 2, Annex 1.1: Physical processes associated modelling studies; document references: F2.1, F2.1.1). This approach to the assessment is highly precautionary, as suction hopper dredging would result in the greatest increased SSCs and largest plume extent as material is released near the water surface during the disposal of material. Further, the methods/tools proposed for the Transmission Assets project (e.g. plough, trenching, jetting or mechanical cutting) are expected to result in considerably reduced effects in terms of mobilisation of sediments and consequent increases in SSCs than that modelled for suction hopper dredging.

1.6.3.8 Sandwave clearance modelling along the north east corner of the Offshore Order Limits (in the vicinity of the Offshore Wind Project: Generation Assets)

showed that the sediment plume extends circa 5 km in a principally east/west orientation. SSCs are at their greatest at the dredging site and where they are remobilised following slack tide and may reach up to 1,000 mg/l. However average concentrations are typically one tenth of this value and near background levels at the edge of the plume extent. Sedimentation following the operation is in the order of 3 mm to 5 mm across the region where material is redistributed and <0.1 mm at the extent of the plume. However, due to the nature of the site as an active bedform and its natural exposure to sediment redistribution, it is likely that the clearance site would recover quickly.

1.6.3.9 The installation of cabling relating to the Transmission Assets may lead to increased SSC and associated deposition. Cable burial is the preferred option where practical, with an Outline Offshore CSIP being produced in line with the project commitments (CoT45; document reference: J15) as outlined in **Table 1.6.**

1.6.3.10 The installation of offshore export cables were modelled as part of the Mona Offshore Wind Project ES, the outputs of which can be seen in Volume 2, Annex 1.1: Physical processes associated modelling studies of the ES (document reference: F2.1.1). As with the sandwave clearance, it is expected that cable installation activities will create a suspended sediment plume extending up to a maximum 5 km from the trenching operation. In the direct vicinity of the trenching (i.e. within a few metres), increases in SSC were typically 500 mg/l whilst at the extents of the plume levels were predicted to be considerably lower at 0.5 mg/l, which is in the order of background level variation. Sedimentation levels beyond the immediate vicinity of the trench were approximately 50 mm and reducing to <0.5 mm within 2 km. Much of the displaced material would, in reality, be used to backfill the trench.

1.6.3.11 It should be noted that whilst the MDS considers the proposed activities across the entire Offshore Order Limits, for the Shell Flat and Lune Deep SAC, the impact is largely only applicable to the activities in the immediate surrounding areas (i.e. at a range of hundreds of metres from cable installation, but to a maximum possible range of up to 5 km).

1.6.3.12 The impact of the removal of export cables as part of the decommissioning phase is not expected to be greater than the construction phase of the Transmission Assets. The primary source of SSC increase would be through the removal of cabling through similar trenching techniques as implemented during installation. Plumes relating to removal of export cables during the decommissioning phase would not extend to the Shell Flat and Lune Deep SAC.

Shell Flat and Lune Deep SAC

1.6.3.13 Seabed preparation (sandwave clearance) and installation of the export cables may lead to increased SSCs and associated deposition, which in turn may result in adverse effects on the Annex I designated features of the Shell Flat and Lune Deep SAC through reduced water clarity and smothering.

Sandbanks which are slightly covered by seawater all the time

1.6.3.14 The Marine Evidence based Sensitivity Assessment determined that the communities associated with the Annex I habitat qualifying feature of the Shell Flat and Lune Deep SAC, sandbanks slightly covered by water all the time are of medium vulnerability and high recoverability to this impact (Tyler-Walters, *et al.,* 2018). The sensitivity of the receptor to increased SSCs and associated deposition is therefore, considered to be low. The associated biotopes (*Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment (SS.SSa.CmuSa.AalbNuc), *Fabulina fabula* and *Magelona mirabilis* with venerid bivalves and amphipods in infralittoral compacted fine muddy sand (SS.SSa.IMuSa.FfabMag) and *Kurtiella bidentata* and *Abra* spp. in infralittoral sandy mud (SS.SMu.ISaMu.KurAbr))) are deemed not sensitive to smothering and siltation rate changes (light). A decrease in water quality at this site may lead to a decrease in primary production indirectly affecting food availability for filter feeders (Tillin and Rayment, 2022). Furthermore, the deposition of fine materials may reduce the suitability of this habitat for its key species as well as the clogging of feeding organs for species such as *K. bidentata*. These effects are however likely to be temporary and some species such as *K. bidentata* are able to change their feeding mode to accommodate this change in conditions (De-Bastos and Hill, 2016). Additionally, these characterising species are burrowing species highly capable of repositioning themselves to the seabed surface following light smothering. Essink (1999) indicated that the maximal overburden through which *Echinocardium cordatum* could migrate was approximately 30 cm in sand and bivalves have been found to burrow to the surface following the deposition of up to 41 cm of sediment (Powilleit *et al*., 2009).

1.6.3.15 As outlined in **paragraphs 1.6.3.8** to **1.6.3.10**, the impact of increased SSCs and associated deposition is predicted to be of local spatial extent and spatially restricted to within the immediate vicinity of the Offshore Order Limits (i.e., sediment plume extends in the region of 5 km, depending on the location and tidal conditions). Furthermore, given that the impact will be temporary, these activities are unlikely to result in an adverse impact on primary production at the site.

1.6.3.16 Construction activities will not occur within the Shell Flat and Lune Deep SAC and so the designated features will not be directly affected. However, this designated site is within one spring tidal excursion of the Transmission Assets. Sandwave clearance operations mobilise the greatest volume of material when compared to the range of construction activities. Whilst it is predicted that the extent of the plume during a spring tide (in the region of 5 km) could reach the Shell Flat and Lune Deep SAC, it is predicted that concentrations will be near background levels at the edge of the plume's extent. Material remobilised and redistributed following any type of tidal excursion as a result of sandwave clearance activities for the Transmission Assets may reach the south edges the Shell Flat and Lune Deep SAC, however, as for the material at the edge of the plume's extent within the first tidal excursion, the levels of material would be indistinguishable from background levels.

1.6.3.17 Cabling associated with the export cables along routes located to the south of the Morgan Offshore Wind Project: Generation Assets and extending to the east of the Morecambe Offshore Windfarm: Generation Assets where the offshore cables become co-ordinated routes would not impact on the Shell Flat and Lune Deep SAC because their location is far greater than the 5 km plume. Trenching undertaken from the east edge of the Morecambe Offshore Windfarm: Generation Assets site towards the shore would pass through areas where the tidal currents are of a similar magnitude but are orientated north to south, parallel to the coastline. Remobilised and redistributed sediment following one tidal excursion, may reach the south edges of Shell Flat and Lune Deep SAC but as for sandwave clearance, the material would be at levels which would be indistinguishable from background sediment.

Conclusions

1.6.3.18 Adverse effects on the Annex I habitat qualifying feature, sandbanks which are slightly covered by seawater all the time, which undermine the conservation objectives of the Shell Flat and Lune Deep SAC will not occur as a result of increased SSCs and associated deposition during construction and decommissioning phases. An assessment of the potential impact 'increased SSCs and associated deposition' against each relevant conservation objective (as presented in **paragraph 1.6.2.7**) is presented in **Table 1.7**. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.7: Conclusions against the conservation objectives of the Shell Flat and Lune Deep SAC for increased SSCs and associated deposition during the construction and decommissioning phase

Conservation objective	Conclusion
The extent and distribution of qualifying natural habitats are maintained or restored	All increased SSCs and associated deposition associated with site preparation (sandwave clearance) and installation/removal of export cables during construction and decommissioning activities will be limited in spatial extent, temporary in nature, intermittent, reversible. SSCs from sandwave clearance and trenching activities may reach the south edges of Shell Flat and Lune Deep SAC, located 5.7 km from the Offshore Order Limits, either if the works occur during a spring tide (where the plume is predicted to extend in the region of 5 km) or as a result of the remobilisation and redeposition of the deposited plume following the first tidal excursion. However, it is predicted that at the edge of the plume extent and where material from the deposited plume sediment is carried further through remobilisation and redeposition, the depths of associated deposition would be indistinguishable from background levels. Therefore, increased SSCs and associated deposition associated with the Transmission Assets will not prevent the extent, distribution, structure and function (including typical species) of the Annex I habitat qualifying feature, sandbanks which are slightly covered by seawater all the time, from being maintained or restored or prevent the supporting processes on which the Annex I sandbanks which are slightly covered by seawater all the time feature rely from being maintained or restored.
The structure and function (including typical species) of qualifying natural habitats are maintained or restored	
The supporting processes on which the qualifying natural habitats rely are maintained or restored	

1.6.3.19 Therefore, it can be concluded that there is **no risk of an adverse effect on the integrity** of the Shell Flat and Lune Deep SAC as a result of increased SSCs and associated deposition with respect to the construction and decommissioning phases of the Transmission Assets alone.

Operation and maintenance

Information to support assessment

1.6.3.20 An overview of the potential impact of increased SSCs and associated deposition on Annex I habitat and the potential responses is described in **paragraphs 1.6.3.14** to **1.6.3.19** for the construction and decommissioning phases and have not been reiterated here for the operation and maintenance phase. The potential impacts are predicted to be of similar or lower impact ranges than during the construction phase and will be of local spatial extent, long term duration and intermittent.

Shell Flat and Lune Deep SAC

Sandbanks which are slightly covered by seawater all the time

1.6.3.21 The impact of increased SSCs and associated deposition on the Annex I sandbanks which are slightly covered by seawater all the time feature of the Shell Flat and Lune Deep SAC will be the same or less than those predicted for the construction and decommissioning phase (see **paragraph 1.6.3.14** and **1.6.3.15**). The sensitivity of the Annex I sandbanks which are slightly covered by seawater all the time is outlined in **paragraph 1.6.3.14.**

Conclusions

1.6.3.22 Adverse effects on the qualifying Annex I sandbanks, which are slightly covered by seawater all the time, which undermine the conservation objectives of the Shell Flat and Lune Deep SAC will not occur as a result of increased SSCs and associated deposition during the operation and maintenance phase. An assessment of the potential impact 'increased SSCs and associated deposition' against each relevant conservation objective (as presented in **paragraph 1.6.2.7**) is presented in **Table 1.8**. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.8: Conclusions against the conservation objectives of the Shell Flat and Lune Deep SAC for increased SSCs and associated deposition during the operation and maintenance phase

Conservation objective	Conclusion
The extent and distribution of qualifying natural habitats are maintained or restored	All increased SSCs and associated deposition associated with cables repair and reburial during operation and maintenance activities will be limited in spatial extent, temporary in nature, intermittent and reversible. SSCs from operation and

Conservation objective	Conclusion
The structure and function (including typical species) of qualifying natural habitats are maintained or restored	maintenance activities may reach the south edges of Shell Flat and Lune Deep SAC, located 5.7 km from the Offshore Order Limits, either if the works occur during a spring tide (where the plume is predicted to extend in the region of 5 km) or as a result of the remobilisation and redeposition of the deposited plume following the first tidal excursion. However, it is predicted that at the edge of the plume extent and where material from the deposited plume sediment is carried further through remobilisation and redeposition, the depths of associated deposition would be indistinguishable from background levels. Therefore, increased SSCs and associated deposition associated with the Transmission Assets will not prevent the extent, distribution, structure and function (including typical species) of the Annex I sandbanks which are slightly covered by seawater all the time feature from being maintained or restored or prevent the supporting processes on which the Annex I sandbanks which are slightly covered by seawater all the time feature rely from being maintained or restored.
The supporting processes on which the qualifying natural habitats rely are maintained or restored	

1.6.3.23 Therefore, it can be concluded that there is **no risk of an adverse effect on the integrity** of the Shell Flat and Lune Deep SAC as a result of increased SSCs and associated deposition with respect to the operation and maintenance phase of the Transmission Assets alone.

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

1.6.4.1 The other developments (projects/plans) that could result in in-combination effects associated with the Transmission Assets on Annex I habitat features of the Shell Flat and Lune Deep SAC have been summarised in **Table 1.9** and shown in **Figure 1.2**.

1.6.4.2 As outlined in the HRA Stage 1 Screening Report (document reference: E3), where the potential for LSE has been concluded alone, the potential for LSE has also been concluded in-combination. For potential impacts where LSE has been ruled out with respect to the Transmission Assets alone, there is either no pathway to effect, or the Transmission 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 have been taken forward to the in-combination assessment.

1.6.4.3 On this basis, the potential impact identified for assessment as part of Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the ES (document reference: F2.2) and which has been brought forward for consideration in the in-combination assessment of this HRA Stage 2 ISAA - Part 2 SAC Assessments is:

- in-combination increased SSCs and associated deposition.

1.6.4.4 The following assessments of the effects of the Transmission Assets, acting in-combination with other relevant plans and projects (see **section 1.5.5** for more information on the approach to the in-combination assessment), on

Annex I habitats have been informed by the detailed technical assessments presented in Volume 2, Chapter 1: Physical processes of the ES (document reference: F2.1) and Volume 2, Chapter 2: Benthic subtidal and intertidal ecology of the ES (document reference: F2.2). The Applicants have also made all reasonable efforts to ensure that the information included in the assessment relating to other projects is correct and sufficiently detailed, with any limitations on the information available acknowledged. The assessments have also drawn upon the sensitivity assessments of the relevant Annex I habitats, and their component biotopes, which reference the best available literature and evidence with regards to sensitivity. In this regard, the Applicants are confident that the conclusions made on whether an adverse effect on integrity on a European site(s) and qualifying features can or cannot be ruled out as a result of the Transmission Assets in-combination with other plans and projects have been identified in light of the best scientific knowledge in the field and all reasonable scientific doubt can be ruled out.

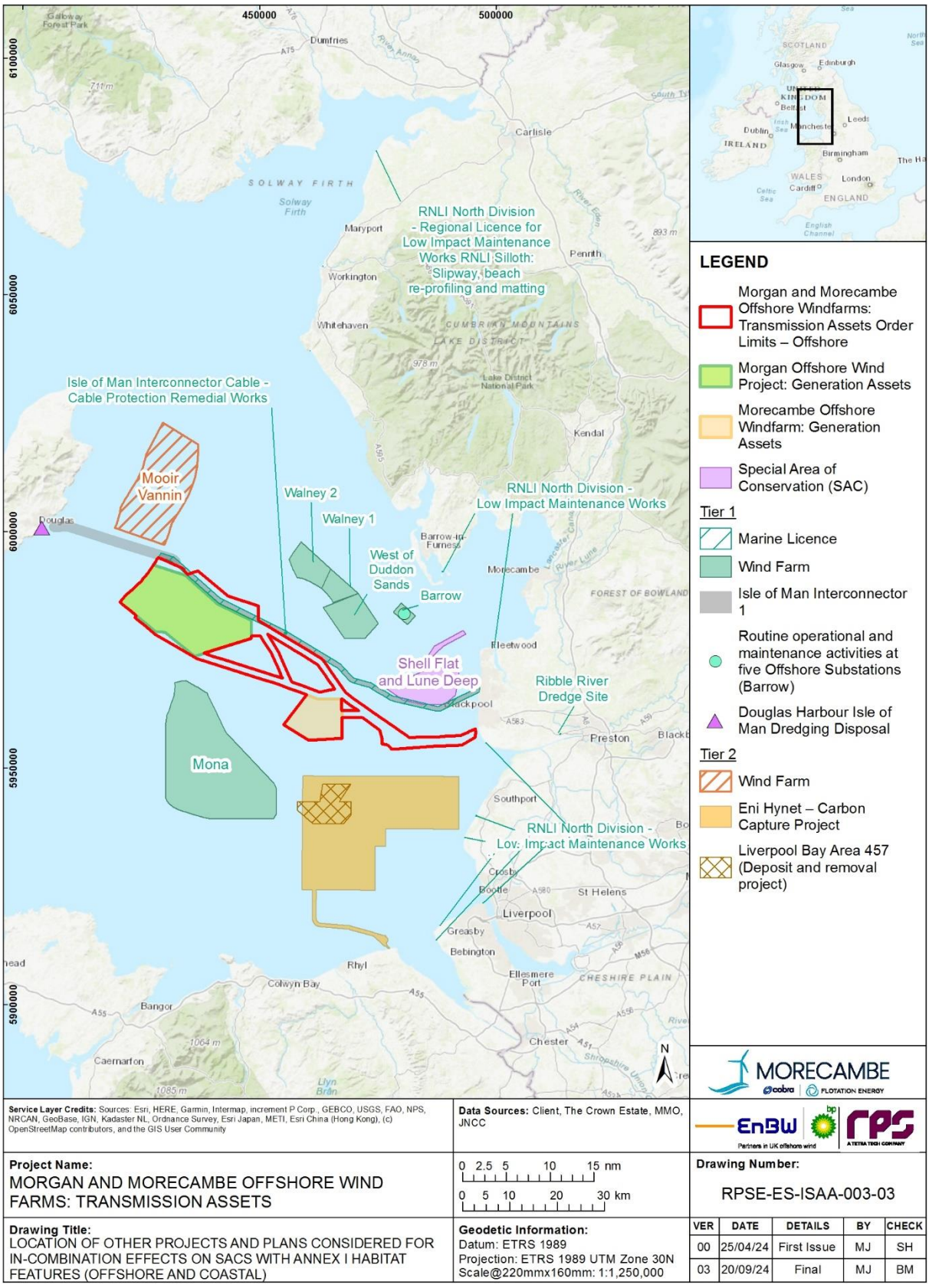

Figure 1.2: Location of other projects and plans considered for in-combination effects on SACs with Annex I habitat features (offshore and coastal) (not to scale)

Table 1.9: List of other projects and plans with potential for in-combination effects on Annex I habitat features (offshore and coastal)

Project/Plan	Status	Approximate Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Transmission Assets	-	-	-	2027 to 2030	2030 to 2065	
Morecambe Offshore Windfarm: Generation Assets	Submitted	0 km	480 MW Offshore Wind Farm (generating assets)	2026 to 2029	2030 to 2065	The construction, operation and maintenance and decommissioning phases of this project will overlap with the construction, operation and maintenance and decommissioning phases of the Transmission Assets. Considered alongside the Transmission Assets in Scenarios 1, 3, 4a, 4b and 4c.
Morgan Offshore Wind Project: Generation Assets	Submitted	0 km	1.5 GW Offshore Wind Farm (generating assets)	2026 to 2030	2030 to 2065	The construction, operation and maintenance and decommissioning phases of this project will overlap with the construction, operation and maintenance and decommissioning phases of the Transmission Assets. Considered alongside the Transmission Assets in Scenarios 2, 3, 4a, 4b and 4c.

Project/Plan	Status	Approximate Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Tier 1						
Offshore Renewable Projects						
West of Duddon Sands Offshore Wind Farm	Operational (with ongoing activities)	6.47	Up to 389 MW (108 wind turbines).	Constructed	2014 – 2034	The operation and maintenance and decommissioning phases of this project will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
West of Duddon Sands Offshore Wind Farm Operational Marine Licence operations and maintenance activities (MLA/2016/00150/3)	Operational	6.47	Covers licensable operations and maintenance activities to be carried out as and when required over the lifetime of the wind farm.	N/A	2016 – 2037	These maintenance activities will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Mona Offshore Wind Project	Submitted	9.73	Offshore wind farm (generating assets, up to 1.5 GW) and offshore export cable (transmission assets)	2026 to 2030	2030 to 2065	The construction, operation and maintenance and decommissioning phases of this project will overlap with the construction, operation and maintenance and decommissioning phases of the Transmission Assets.

Project/Plan	Status	Approximate Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Walney 2 Offshore Wind Farm	Operational (with ongoing activities)	10.17	Up to 367 MW (51 wind turbines).	Constructed	2012 – 2032	The operation and maintenance and decommissioning phases of this project will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Walney 1 and 2 Offshore Wind Farms Operational Marine Licence – operations and maintenance activities (MLA/2016/00151/3)	Operational	10.17	Covers licensable operations and maintenance activities to be carried out as and when required over the lifetime of the wind farms.	N/A	2016 – 2032	These maintenance activities will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Walney Offshore Wind Farm Operational Marine Licence – inter array cable repair (MLA/2013/00426/2)	Operational	10.17	Emergency inter-array cable repairs over the operational life time of the Walney Offshore Wind Farm (1 and 2). To ensure adequate contingency plans are in place to react to a major breakage/fault in an inter array cable.	N/A	2018 – 2032	These maintenance activities will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Walney 2 Offshore Wind Farm, Composite Operational and Maintenance	Operational	10.17	Operations and maintenance events including removal of marine growth and/or guano from substation, export cable repair events, with associated	N/A	2018 – 2038	These maintenance activities will temporally overlap with the construction and operation and maintenance

Project/Plan	Status	Approximate Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
(O&M) Marine Licence Application			anchoring/jacking-up/vessel beaching, remediation events (via jetting and/or mass flow excavator) of up to 7 km length per event, potential jacking-up to and removal and/or replacement of cable/scour protection and deployment of additional cable protection adjacent to existing cable protection to resolve secondary scour issues.			phases of the Transmission Assets.
Walney 1 Offshore Wind Farm	Operational	11.40	Up to 367 MW (51 wind turbines)	Constructed	2011 – 2031	The operation and maintenance and decommissioning phases of this project will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Walney Offshore Wind Farm Operational Marine Licence – phase 2 export cable (MLA/2014/00027/7)	Operational	11.91	Emergency export cable repairs over the operational life time of the Walney Offshore Wind Farm export cables (2) to ensure adequate contingency plans are in place to react to a major breakage/fault within a reasonable period of time	N/A	2014 – 2027	These maintenance activities will temporally overlap with the construction phase of the Transmission Assets.
Walney Offshore Wind Farm Operational Marine	Operational	15.32	For future cable repair/remediation/protection works on the Walney 1 export	N/A	2017 – 2037	These maintenance activities will temporally overlap with the construction and

Project/Plan	Status	Approximate Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Licence – composite operations and maintenance activities (MLA/2017/00081/2)			cable and also for potential repair works on the Walney 1 OSP.			operation and maintenance phases of the Transmission Assets.
Walney Offshore Wind Farm Operational Marine Licence – phase 1 export cable (MLA/2014/00028/5)	Operational	15.32	Emergency export cable repairs over the operational life time of the Walney Offshore Wind Farm export cables (2) to ensure adequate contingency plans are in place to react to a major breakage/fault in a reasonable period of time.	N/A	2014 – 2027	These maintenance activities will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Barrow Offshore Wind Farm	Operational (with ongoing activities)	18.03	Up to 90 MW (30 wind turbines).	Constructed	2006 – 2026	The operation and maintenance and decommissioning phases of this project will temporally overlap with the construction phase of the Transmission Assets.
Barrow Offshore Wind Farm Operational Marine Licence – operations and maintenance (MLA/2016/00149/3)	Operational	18.03	This licence permits a number of operations and maintenance activities including: - Removal of marine growth and/or guano - Replacement of access ladders	N/A	2016 – 2026	These maintenance activities will temporally overlap with the construction phase of the Transmission Assets.

Project/Plan	Status	Approximate Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Routine operations and maintenance activities (OSP at Barrow) (MLA/2017/00100/1)	Operational	19.66	Repainting of offshore structures, removal of algal growth/bird guano and removal of growth around J Tubes.	N/A	2017 – 2038	These maintenance activities will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Barrow Offshore Wind Farm Operational Marine Licence – export cable repair and remediation (MLA/2015/00077)	Operational	20.52	5 x cable repair events, with associated jacking-up; and 10 x cable remediation events (via jetting).	N/A	2015 – 2030	These maintenance activities will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Dredging activities and dredge disposal sites						
Ribble River Dredge Site	Operational (with ongoing activities)	0	Maintenance harbour dredging, and sea disposal.	N/A	2022-2037	The aggregate extraction activities associated with this site will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
RNLI North Division – Regional Licence for Low Impact Maintenance Works	Operational	14.45	Maintenance activities including minor beach reprofiling at Lytham St. Annes	N/A	2017 to 2027	The maintenance activities associated with this project will overlap with the construction and operation and maintenance phases of the Transmission Assets.

Project/Plan	Status	Approximate Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Douglas Harbour, Isle of Man Dredging Disposal	Operational (with ongoing activities)	22.74	Douglas outer harbour, basin and fairway are plough dredged annually, normally in January/February. The inner harbour/marina is also dredged annually, and silt is deposited at a licensed site off Douglas Head.	N/A	2016 to 2031	The dredging activities associated with this site will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Remedial works						
Isle of Man to UK Interconnector Cable – maintenance and repair (MLA/2016/00211)	Operational	0	This licence is for depositing additional armouring or protection whilst carrying out contingency repair and maintenance works on the Isle of Man interconnector cable.	N/A	2018 – 2033	The maintenance activities associated with this project will overlap with the construction and operation and maintenance phases of the Transmission Assets.
Isle of Man Interconnector Cable – Cable Protection Remedial Works (MLA/2014/00201)	Operational	0.63	Maintenance works on the Isle of Man Interconnector cable protection.	N/A	2014 – 2065	The maintenance activities associated with this project will overlap with the construction and operation and maintenance phases of the Transmission Assets.
Tier 2						
Offshore Renewable Projects						
Mooir Vannin Offshore Windfarm	Pre-application	2.59	Ørsted have signed an agreement for lease to develop a 700 MW (annual output 3,000 GWh) wind farm on the	2030 to 2032	Operational in 2032 with end date unknown	This project will overlap with the operation and maintenance and decommissioning phase of the Transmission Assets.

Project/Plan	Status	Approximate Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
			east coast and have undertaken initial surveys since 2016.			
Carbon Capture and Storage						
Eni Hynet – Carbon Capture Project – offshore	Pre-application (for offshore elements of the project)	5.74	CCS project in the east Irish Sea. Works will include installation of a new cable, a new Douglas CCS platform and work on the existing Hamilton, Hamilton North and Lennox wellhead platforms.	Unknown	Unknown	This project will likely overlap with the construction and operations and maintenance phases of the Transmission Assets.
Deposit and removal						
Liverpool Bay Area 457	Pre-application	2.43	Proposed extraction of 18 Mt of marine aggregate from this site.	n/a	2026 to 2041	The aggregate extraction activities associated with this site will temporally overlap with the construction and operations and maintenance phases of the Transmission Assets.
Tier 3						
Cables and pipelines						
Isle of Man – UK Interconnector 2	Pre-application	N/A	A new 70 MW to 100 MW High Voltage Alternating Current (HVAC) interconnector to be operational by 2030 between the Isle of Man and north west England.	2024 to 2030	2030 onwards	The construction, operation and maintenance, and decommissioning phases of this project will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.

Project/Plan	Status	Approximate Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Mooir Vannin - UK Transmission Assets	Pre-application	N/A	Comprising of offshore export cables and a booster station to connect the Mooir Vannin Offshore Wind Farm to the UK.	Unknown	Unknown	The construction and operation and maintenance phases of this project may temporally overlap with the operation and maintenance and decommissioning phases of the Transmission Assets.

In-combination increased SSCs and associated deposition

1.6.4.5 The assessment of LSE (in HRA Stage 1 Screening Report; document reference: E3) identified that LSE could not be ruled out for the potential in-combination impacts of increased SSCs and associated deposition during construction, operation and maintenance, and decommissioning phases of the Transmission Assets. This relates to the Shell Flat and Lune Deep SAC and the relevant Annex I habitat feature sandbanks which are slightly covered by sea water all the time.

1.6.4.6 The in-combination effects assessment follows the methodology set out in **section 1.5.5** and is presented in a series of tables (one for each potential in-combination effect). These tables (**Table 1.10** and **Table 1.11**) present a summary of the in-combination assessment, with the full detailed in-combination assessment presented in **paragraphs 1.6.4.9** *et seq*.

1.6.4.7 Increased SSCs and associated sediment deposition is expected to occur in relation to the construction, operation and maintenance, and decommissioning phases of the Transmission Assets, which was assessed for the Transmission Assets project alone in **section 1.6.3**. This may occur alongside the construction and maintenance activities of nearby offshore wind farms, interconnector cables and dredging and dredge disposal activities (see **Table 1.9**).

1.6.4.8 It should be noted that, the Shell Flat and Lune Deep SAC is located 5.7 km from the Offshore Order Limits which is outside of the ZOI for changes in physical processes (see **paragraph 1.4.2.5**). Therefore, since it is unlikely any increases in SSC and associated deposition from the Transmission Assets will impact the qualifying feature of the Shell Flat and Lune Deep SAC, the Transmission Assets is unlikely to contribute to an in-combination impact. However, this impact has been considered on a precautionary basis following consultation with Natural England (see **paragraph 1.6.3.5**; **Table 1.1**).

Construction and decommissioning phases

Information to support assessment

Scenario 1

1.6.4.9 The in-combination effects assessment for Scenario 1 considers:

- the Transmission Assets; and
- the Morecambe Offshore Windfarm: Generation Assets.

1.6.4.10 During the construction and decommissioning phases of the Transmission Assets, there is the potential for increased SSCs and associated deposition to occur in-combination with the Morecambe Offshore Windfarm: Generation Assets, which is located within the Offshore Order Limits. The construction phases of these projects include activities which will give rise to increased SSC, namely site preparation/ sandwave clearance and cable installation.

1.6.4.11 The MDS for the Morecambe Offshore Windfarm: Generation Assets includes seabed preparation for 35 conical gravity bases, two conical gravity base OSPs, up to 8 km of sandwave clearance, foundation installation of 30 monopile wind turbine structures, two monopile OSPs and 80 km of cable trenching. Disturbance activities, such as excavation during seabed preparation to create a suitable base for WTG and OSP foundations, and the installation of inter-array and platform link cables, would result in a modest concentration plume advected to a distance of up to 1 km along the tidal axis. Beyond this distance any increases in SSCs would become low and indistinguishable from background levels. Deposition levels would decrease rapidly with distance from the release point and sediment transport and deposition of finer (i.e. mud) material would occur at a maximum distance of a tidal spring excursion (approximately 10 km). In terms of sedimentation, 'light' deposition is anticipated to deposit on a small proportion of the Shell Flat and Lune Deep SAC Annex I sandbanks, which are located approximately 9.5 km east of the Morecambe Offshore Windfarm: Generation Assets.

1.6.4.12 Therefore, remobilised and redistributed material may reach the south edges of the Shell Flat feature of the Shell Flat and Lune Deep SAC but in depths indistinguishable from background levels (as the Shell Flat and Lune Deep SAC is located 9.5 km east of the Morecambe Offshore Windfarm: Generation Assets). As such, no AEoI on this SAC was concluded in the Morecambe Offshore Windfarm: Generation Assets Report to Inform Appropriate Assessment from increases in SSCs from the project alone (Morecambe Offshore Windfarm Ltd., 2024b)

1.6.4.13 It is noted that given the relationship of these projects (i.e. that the Applicants of the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets (Morgan OWL and Morgan OWL) are jointly seeking consent for the Transmission Assets; see HRA Stage 2 ISAA – Part 1: Introduction; document reference E2.1), site preparation and installation of infrastructure would be phased and increased SSCs are unlikely to occur concurrently. However should multiple operations be undertaken, plumes would be advected on the tide and not towards one another and these activities would be of limited spatial extent and frequency with plume interactions likely to be of a low magnitude and short duration. In both cases, the majority of sedimentation would occur within close proximity to each installation however, given the active sediment transport regime, deposited material would be redistributed across the vicinity. As noted above, these would be indistinguishable from background levels in the vicinity of the Shell Flat and Lune Deep SAC (given both the distance of the SAC from the Morecambe Offshore Windfarm: Generation Assets, and the limited potential for plume interactions).

1.6.4.14 Therefore, the in-combiantion effect from Scenario 1 is predicted to be of local spatial extent, short term duration, intermittent and of high reversibility.

1.6.4.15 Decommissioning of the Morecambe Offshore Windfarm: Generation Assets will most likely occur on the same projected timeline as the Transmission Assets. The in-combination effects are, at worst, likely to be of equal magnitude to the construction phase described above. Therefore, the in-

combination effect during the decomissioning phase is also predicted to be of local spatial extent, short term duration, intermittent and high reversibility.

Scenario 2

1.6.4.16 The in-combination effects assessment for Scenario 2 considers:

- the Transmission Assets; and
- the Morgan Offshore Wind Project: Generation Assets.

1.6.4.17 During the construction and decommissioning phases of the Transmission Assets, there is the potential for in-combination increased SSCs and associated deposition with the Morgan Offshore Wind Project: Generation Assets, which is located within the Offshore Order Limits. The construction phases of these projects include activities which will give rise to increased SSC, namely site preparation/ sandwave clearance and cable installation.

1.6.4.18 Construction activities for the MDS of the Morgan Offshore Wind Project: Generation Assets for SSC include site preparation with sandwave clearance along 286 km inter-array and interconnector cables, installation of up to 45 three-legged jacket piles, 23 conical gravity base foundations, a six-legged OSP with three piles per leg and trenching for 450 km of inter-array and interconnector cables. Sedimentation depth is typically <50 mm beyond the immediate vicinity of the installation and less than one tenth of this value in the wider domain and is generally limited to the Morgan Offshore Wind Project: Generation Assets. The SSC plumes from the Morgan Offshore Wind Project: Generation Assets are unlikely to extend to the Shell Flat and Lune Deep SAC, given that it is located 29.6 km from the Morgan Offshore Wind Project: Generation Assets, and therefore well outside of the ZOI defined for physical processes (Morgan Offshore Wind Project Ltd, 2024).

1.6.4.19 It is noted that given the relationship of these projects (i.e. that the Applicants of the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets (Morgan OWL and Morgan OWL) are jointly seeking consent for the Transmission Assets; see HRA Stage 2 ISAA – Part 1: Introduction; document reference E2.1), site preparation and installation of infrastructure would be phased and SSC increases are unlikely to occur concurrently. However, should multiple operations be undertaken concurrently, plumes would be advected on the tide and not towards one another and these activities would be of limited spatial extent and frequency and any plume interactions likely of a low magnitude and short duration.

1.6.4.20 Therefore, for Scenario 2, the in-combination effect is predicted to be of local spatial extent, short term duration, intermittent and high reversibility.

1.6.4.21 The primary source of SSC increase in the decommissioning phase of the Transmission Assets would be through the removal of cables through similar techniques as implemented during installation. Decommissioning of the Morgan Offshore Wind Project: Generation Assets will most likely occur on the same projected timeline as the Transmission Assets with in-combination effects of, at worst, the same magnitude as those described for the construction phase above. Therefore, the in-combination effect during

decomissioning is also predicted to be of local spatial extent, short term duration, intermittent and high reversibility.

Scenario 3

1.6.4.22 The in-combination effects assessment for Scenario 3 considers:

- the Transmission Assets;
- the Morecambe Offshore Windfarm: Generation Assets; and
- the Morgan Offshore Wind Project: Generation Assets.

1.6.4.23 The construction phases of these projects include activities which will give rise to increased SSC and associated deposition, namely site preparation/ sandwave clearance and cable installation.

1.6.4.24 These three projects do not represent a significant increase in SSC and associated deposition compared to each scenario separately. Due to the fact the two Generation Assets are separated by a distance of 16.76 km, the distance between the three projects and the Shell Flat and Lune Deep SAC (as outlined in Scenario 1 and Scenario 2) and owing to the principal orientation of the tidal currents, no increased in-combination effect between the three projects are predicted to occur.

1.6.4.25 Therefore, as for Scenario 1 and Scenario 2, the in-combination effect during the construction and decommissioning phases for the projects considered under Scenario 3 is predicted to be of local spatial extent, short term duration, intermittent and high reversibility.

Scenario 4a

1.6.4.26 The in-combination effects assessment for Scenario 4a considers:

- Scenario 3 (The Transmission Assets and Generation Assets); and
- the Tier 1 projects listed in **Table 1.9**.

1.6.4.27 The construction phase of the Transmission Assets coincides with the maintenance phases of the Barrow Offshore Wind Farm, Walney 1, Walney 2, Walney Extension 3 and Walney Extension 4 Offshore Wind Farm and associated export and inter array cables, and West of Duddon Sands Offshore Wind Farm. In each case, for the maintenance of offshore wind projects, activities are associated with repair and reburial of cables and would be characterised by short term intermittent mobilisation of sediment along relatively short sections of cables.

1.6.4.28 Should cable trenching operations, particularly on the north side of the Transmission Assets, coincide with these maintenance activities there is the potential for in-combination effects. It is noted that sediment plumes would be carried in concert with the tide, and not towards one another, therefore the in-combination effects would relate to potential sedimentation. It has been shown that sedimentation principally occurs at the site of operations. Therefore given the limited nature of the maintenance activities and the distance between the relevant projects (all sites are >6.47 km from the Offshore Order Limits; **Table 1.9**) it is unlikely that there would be an

interaction between suspended sediment plumes from the construction of the Transmission Assets and those produced by these plans/projects, given that the suspended sediment plume from the Transmission Assets will only extend up to 5 km from the trenching operation. Furthermore, all of these plans and projects are located >5 km from the Shell Flat and Lune Deep SAC, so any suspended sediment plumes from these projects are unlikely to extend to the Shell Flat and Lune Deep SAC (and any potential overlap would likely be indistinguishable from background levels).

1.6.4.29 The construction phase of the Transmission Assets also coincides with the maintenance and repair of cables and cable protection of the Isle of Man to UK Interconnector Cable. Additionally, maintenance works may involve the replacement of concrete mattressing cable protection with rock filled filter units. The route of the interconnector runs directly through the Offshore Order Limits and aligns with Morgan Route 1 (see Volume 1, Chapter 3: Project description of the ES; document reference F1.3, and Volume 1 Figures). Thus, if activities overlap it is likely that suspended sediment plumes could interact. The Isle of Man to UK Interconnector lies within and in close proximity to Shell Flat and Lune Deep SAC and so there is potential for an in-combination impact at this site. The magnitude of this impact would vary greatly depending on the location and scale of reburial operations and also the timing of the work relative to the Transmission Assets. However, as set out in **section 1.6.3**, due to the distance between the Offshore Order Limits and the Shell Flat and Lune Deep SAC, it is unlikely that increased SSC and deposition would measurably contribute to any potential in-combination impact on the Annex I sandbanks feature of this SAC.

1.6.4.30 The construction phase of the Transmission Assets and the Mona Offshore Wind Project align with those of the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets. As such, due to the large distance between the Mona Offshore Wind Project and the Shell Flat and Lune Deep SAC (31.0 km), this project would not contribute to any potential in-combination on the effects on the Annex I sandbanks feature of this SAC. The Mona Offshore Wind Project is also located 9.73 km from the Transmission Assets and so it is unlikely that there would be an interaction between suspended sediment plumes.

1.6.4.31 The disposal site associated with the dredging operations at Douglas Harbour is located over 20 km to the north west of the Offshore Order Limits. Due to distance of this project from the SAC (79.4 km), the orientation of tidal currents and the distance from the Transmission Assets it would not exhibit an in-combination effect with the Transmission Assets with respect to the Shell Flat and Lune Deep SAC.

1.6.4.32 The in-combination effects which may occur during the decommissioning phases have been assessed to be of the same or lower magnitude than those described above for the construction phase.

1.6.4.33 Therefore, for both the construction and decommissioning phases, the in-combination effect from Scenario 4a is predicted to be of local spatial extent, and of high reversibility.

Scenario 4b

1.6.4.34 The in-combination effects assessment for Scenario 4b considers:

- Scenario 4a; and
- the Tier 2 projects listed in **Table 1.9**.

1.6.4.35 There is also potential for in-combination impacts with the proposed development of the Mooir Vannin Offshore Wind Farm installation although as a Tier 2 there is limited data available on the project. Typical construction activities such as site preparation and cable trenching may result in increased SSCs. Given that the Mooir Vannin Offshore Windfarm is located 2.59 km from the Transmission Assets, there is potential for overlap between suspended sediment plumes between the two projects. However, due to the large distance between the Mooir Vannin Offshore Wind Farm and the Shell Flat and Lune Deep SAC (54.7 km), this project would be highly unlikely to contribute to any potential in-combination on the effects on the Annex I sandbanks feature of this SAC, although project specific assessments for the Mooir Vannin Offshore Windfarm are not available at this time.

1.6.4.36 There is potential for overlap with the proposed development of the Eni Hynet – Carbon Capture Project during the construction phase, although also as a Tier 2 project there is limited data available. Various activities may be undertaken and suspended sediments may arise from Eni Hynet – Carbon Capture Project during both cable installation, platform installation and wellhead drilling. However, given the distance between the development and the Transmission Assets/Generation Assets (5.74 km), and the fact it is located directly to the south, it is not expected that a cumulative increase in SSC or deposition will occur. With suspended sediments instead moving east – west in parallel with those of the Transmission Assets/Generation Assets. Furthermore given the Eni Hynet – Carbon Capture Project is located 15.1 km from the Shell Flat and Lune Deep SAC, this project would not contribute to any potential in-combination on the effects on the Annex I sandbanks feature of this SAC

1.6.4.37 There also remains the potential for the construction phase of the proposed development to overlap with the operation of the Westminster Gravels Aggregate Extraction Area 457 (located 2.43 km from the Offshore Order Limits). Both the installation of cables associated with the Transmission Assets and the processes of aggregate extraction will increase suspended sediment concentrations and thus if carried out simultaneously have the potential to create an in-combination impact; although the contribution from extraction activities will depend largely on the volume and method used to remove material. Given the nature of the activity generally spill levels are kept to a minimum c. 3% to provide cost efficient extraction. Additionally, the potential for in-combination impact with the Transmission Assets is further limited by the orientation of tidal currents within the East Irish Sea which run east to west, thus sediments would move in parallel and not towards each other. Therefore, no in-combination impact is predicted between these projects.

1.6.4.38 The in-combination effects which may occur during the decommissioning phases have been assessed to be of the same or lower magnitude than those described above for the construction phase.

1.6.4.39 Therefore, for both the construction and decommissioning phases, the in-combination effects from Scenario 4b are predicted to be of local spatial extent and high reversibility.

Scenario 4c

1.6.4.40 The in-combination effects assessment for Scenario 4c considers:

- Scenario 4b; and
- the relevant Tier 3 projects listed in **Table 1.9**.

1.6.4.41 The construction of a second interconnector cable between the Isle of Man and the UK may occur during the construction phase of the Transmission Assets as it is due to be operational in 2030. Interconnector cable installation activities would likely be of similar magnitude and extent as those associated with the Transmission Assets cable installation operations. Dependent on the detailed design and cable routing associated with the interconnector cable an in-combination impact may arise with the Transmission Assets. As a Tier 3 project there is limited information available in this respect, however it is anticipated that this impact would be temporary in nature and of limited scale.

1.6.4.42 Any in-combination effects from the Transmission Assets in combination with Tier 3 projects on the qualifying features of the Shell Flat and Lune Deep SAC during both the construction phase is predicted to be of local spatial extent, short term duration, intermittent and high reversibility.

1.6.4.43 There are no Tier 3 developments considered under Scenario 4c which have a temporal overlap with the decommissioning phase of the Transmission Assets. Therefore, there is no potential for further in-combination effects for any Tier 3 projects.

Shell Flat and Lune Deep SAC

Conclusions

1.6.4.44 Adverse effects on the qualifying Annex I feature sandbanks which are slightly covered by seawater all the time, which undermine the conservation objectives of the Shell Flat and Lune Deep SAC will not occur as a result of increased SSCs and associated deposition from the Transmission Assets in-combination with other plans/project during the construction and decommissioning phases. An assessment of the potential impact ‘in-combination increased SSCs and associated deposition’ against each relevant conservation objective (as presented in **paragraph 1.6.2.7**) is presented in **Table 1.10** (Scenarios 1-3) and **Table 1.11** (Scenarios 4a-4c). Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.10: Conclusions against the conservation objectives of the Shell Flat and Lune Deep SAC for in-combination increased SSCs and associated deposition during the construction and decommissioning phase for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of qualifying natural habitats are maintained or restored **The structure and function (including typical species) of qualifying natural habitats are maintained or restored** **The supporting processes on which the qualifying natural habitats rely are maintained or restored**	The in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.6.4.9** to **1.6.4.14**, any potential in-combination effects associated with increased SSC and associated sediment deposition during the construction and decommissioning phases (should they occur at all) will be of limited spatial extent, short term duration, intermittent in nature and high reversibility. As such, these activities will not restrict the distribution, extent, structure or function of the identified Annex I habitat feature from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitat relies on from being maintained or restored.	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.6.4.16** to **1.6.4.21**, any in-combination effects associated with increased SSC and associated sediment deposition during the construction and decommissioning phases (should they occur at all) will be of limited spatial extent, short term duration, intermittent in nature and high reversibility. As such, these activities will not restrict the distribution, extent, structure or function of identified Annex I habitat features from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitats rely from being maintained or restored.	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.6.4.22** to **1.6.4.25**, any in-combination effects associated with increased SSC and associated sediment deposition during the construction and decommissioning phases (should they occur at all) will be limited spatial extent, short term duration, intermittent in nature and high reversibility. As such, these activities will not restrict the distribution, extent, structure or function of identified Annex I habitat features from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitats rely from being maintained or restored.

Table 1.11: Conclusions against the conservation objectives of the Shell Flat and Lune Deep SAC for in-combination increased SSCs and associated deposition during the construction and decommissioning phase for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of qualifying natural habitats are maintained or restored **The structure and function (including typical species) of qualifying natural habitats are maintained or restored** **The supporting processes on which the qualifying natural habitats rely are maintained or restored**	The in-combination effects assessment for Scenario 4a considers: • Scenario 3 (Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **Table 1.9**. As outlined in detail in **paragraphs 1.6.4.26** to **1.6.4.33**, any in-combination effects associated with increased SSC and associated sediment deposition during the construction and decommissioning phases (should they occur at all) will be of local spatial extent and high reversibility. As such, for Scenario 4a, these activities will not restrict the distribution, extent, structure or function of identified Annex I habitat features from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitats rely from being maintained or restored.	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **Table 1.9**. As outlined in detail in **paragraphs 1.6.4.34** to **1.6.4.38**, any in-combination effects associated with increased SSC and associated sediment deposition during the construction and decommissioning phases (should they occur at all) will be of local spatial extent and high reversibility. As such, for Scenario 4b, these activities will not restrict the distribution, extent, structure or function of identified Annex I habitat features from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitats rely from being maintained or restored.	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the relevant Tier 3 project listed in **Table 1.9**. As outlined in detail in paragraphs **1.6.4.40** to **1.6.4.43**, any in-combination effects associated with increased SSC and associated sediment deposition during the construction phase (should they occur at all) will be of local spatial extent, short term duration, intermittent and high reversibility. Since no Tier 3 developments have a temporal overlap with the decommissioning phase of the Transmission Assets or Generation Assets, there is no further potential for in-combination effects for any Tier 3 projects in-combination. As such, for Scenario 4c, these activities will not restrict the distribution, extent, structure or function of identified Annex I habitat features from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitats rely from being maintained or restored.

1.6.4.45 Therefore, it can be concluded that there is **no risk of an adverse effect on the integrity** of the Shell Flat and Lune Deep SAC as a result of increased SSCs and associated deposition with respect to the construction and decommissioning phases of the Transmission Assets in-combination with other plans/projects.

Operation and maintenance phase

Information to support assessment

Scenario 1

1.6.4.46 The in-combination effects assessment for Scenario 1 considers:

- the Transmission Assets; and
- the Morecambe Offshore Windfarm: Generation Assets.

1.6.4.47 The operation and maintenance phases of these projects include activities which may result in increased SSC, including cable reburial and repair.

1.6.4.48 The Transmission Assets and the Morecambe Offshore Windfarm: Generation Assets are on the same projected timeline and will therefore both be in the operation and maintenance phase concurrently. Potential in-combination impacts may relate to repair/replacement of 200 m of inter-array cables and reburial of up to 100 m of inter-array cables per year at Morecambe Offshore Windfarm: Generation Assets. However, maintenance activities are both intermittent and a smaller scale than that of the construction phase described in **paragraphs 1.6.4.9** to **1.6.4.14** and therefore any potential in-combination impacts are less likely to occur and would be on a smaller scale.

1.6.4.49 Therefore, there is a lower risk to qualifying Annex I features than that described for the construction phase. Any in-combination effects from Scenario 1 are predicted to be of local spatial extent, short term duration, intermittent and high reversibility.

Scenario 2

1.6.4.50 The in-combination effects assessment for Scenario 2 considers:

- the Transmission Assets; and
- the Morgan Offshore Wind Project: Generation Assets.

1.6.4.51 The operation and maintenance phases of these projects include activities which may result in increased SSC, including cable reburial and repair.

1.6.4.52 The Transmission Assets and the Morgan Offshore Wind Project: Generation Assets are on the same projected timeline and will therefore both be in the operation and maintenance phase concurrently. Potential cumulative impacts may relate to cable repair and reburial activities for inter-array and interconnector cables in combination with the Transmission Assets export cables. The MDS for repair and reburial of inter-array cables is for up to 8 km in one event every five years and 20 km in one event every five years. Similarly, for the interconnector the MDS states three repair events of

19.6 km in 10 years and one reburial event of up to 3 km every five years. However, maintenance activities are both intermittent and a smaller scale than that of the construction phase described in **paragraphs 1.6.4.16** to **1.6.4.20** and therefore any potential in-combination impacts are less likely to occur and be on a smaller scale. Furthermore, as outlined above, given the Shell Flat and Lune Deep SAC is located 29.6 km from the Morgan Offshore Wind Project: Generation Assets (well outside of the ZOI defined for physical processes for Morgan Offshore Wind Project: Generation Assets (defined as a precautionary buffer of 12 km); Morgan Offshore Wind Project Ltd, 2024), this project would not contribute to any potential in-combination on the effects on the Annex I sandbanks feature of this SAC.

1.6.4.53 Therefore, there is a lower risk to qualifying Annex I features than that described for the construction phase. Any in-combination effects from Scenario 2 are predicted to be of local spatial extent, short term duration, intermittent and high reversibility (should they occur at all).

Scenario 3

1.6.4.54 The in-combination effects assessment for Scenario 3 considers:

- the Transmission Assets;
- the Morecambe Offshore Windfarm: Generation Assets; and
- the Morgan Offshore Wind Project: Generation Assets.

1.6.4.55 The operation and maintenance phases of these projects include activities which may result in increased SSC, including cable reburial and repair.

1.6.4.56 The magnitude of the in-combination effect to SSC and subsequent deposition from the Transmission Assets and both Generation Assets will be a combination of Scenario 1 and 2 in a spatial sense. However, in terms of impacts due to overlapping SSC and deposition the magnitude of impact will be no greater than the Scenario 1 or 2. This being due to the fact the two Generation Assets are separated by a distance of 16.76 km, the distance between the three projects and the Shell Flat and Lune Deep SAC (as outlined in Scenario 1 and Scenario 2 for the construction phase) and owing to the principal orientation of the tidal currents, no increased in-combination effect between the two projects are predicted to occur. Furthermore, maintenance activities are both intermittent and a smaller scale than that of the construction phase described in **paragraphs 1.6.4.22** to **1.6.4.25** and therefore any potential in-combination impacts are less likely to occur and would be on a smaller scale.

1.6.4.57 Therefore, as for Scenario 1 and Scenario 2, the in-combination effect for the projects considered under Scenario 3 is predicted to be of local spatial extent, short term duration, intermittent and high reversibility.

Scenario 4a

1.6.4.58 The in-combination effects assessment for Scenario 4a considers:

- Scenario 3 (The Transmission Assets and Generation Assets); and
- the Tier 1 projects listed in **Table 1.9**.

1.6.4.59 The operation and maintenance phase, of the Transmission Assets coincides with the operation/maintenance phases of the Walney 1, Walney 2, Walney Extension 3 and Walney Extension 4 Offshore Wind Farm and associated export and inter array cables, the West of Duddon Sands Offshore Wind Farm, the Isle of Man to UK Interconnector and Mona Offshore Wind Project. The magnitude of these impacts are the same or of smaller scale than those described for the construction phase in **paragraphs 1.6.4.26** to **1.6.4.31**, however the potential for in-combination impacts is greatly reduced due the limited and intermittent nature of the activities relating to the Transmission Assets maintenance and cable reburial.

1.6.4.60 Therefore, the in-combination effect from Scenario 4a is predicted to be of local spatial extent, short term duration, intermittent and high reversibility.

Scenario 4b

1.6.4.61 The in-combination effects assessment for Scenario 4b considers:

- Scenario 4a; and
- the Tier 2 projects listed in **Table 1.9**.

1.6.4.62 The operation and maintenance phase, of the Transmission Assets coincides with the operation/maintenance phases of the Mooir Vannin Offshore Wind Farm and the Eni Hynet – Carbon Capture Project. Maintenance activities are both intermittent and a smaller scale than that of the construction phase described in **paragraphs 1.6.4.34** to **1.6.4.39** and therefore any potential in-combination impacts are less likely to occur and be on a smaller scale.

1.6.4.63 As stated for the construction and decommissioning phases, due to the large distance between the Mooir Vannin Offshore Wind Farm and the Shell Flat and Lune Deep SAC (54.7 km), this project would be highly unlikely to contribute to any potential in-combination on the effects on the Annex I sandbanks feature of this SAC, although project specific assessments for the Mooir Vannin Offshore Windfarm are not available at this time.

1.6.4.64 As stated for the construction and decommissioning phases, given the distance between the Eni Hynet – Carbon Capture Project and the Transmission Assets and the fact it is located directly to the south, it is not expected that an in-combination increase in SSC or deposition will occur.

1.6.4.65 The operation and maintenance phase, of the Transmission Assets coincides with the operation/maintenance phases of the Westminster Gravels Aggregate Extraction site – Liverpool Bay Area 457. Maintenance activities are both intermittent and a smaller scale than that of the construction phase described in **paragraphs 1.6.4.34** to **1.6.4.39** and therefore any potential in-combination impacts are less likely to occur and be on a smaller scale. As previously stated for the construction and decommissioning phases, any in-combination impact with these projects is likely to be temporary in nature and of limited scale.

1.6.4.66 Therefore, the in-combination effects from Scenario 4b are predicted to be of local spatial extent, short term duration, intermittent and high reversibility.

Scenario 4c

1.6.4.67 The in-combination effects assessment for Scenario 4c considers:

- Scenario 4b; and
- the Tier 3 projects listed in **Table 1.9**.

1.6.4.68 The operation and maintenance phase, of the Transmission Assets coincides with the operation/maintenance phases of the Isle of Man to UK Interconnector Cable 2. Maintenance activities are both intermittent and a smaller scale than that of the construction phase described in **paragraphs 1.6.4.40** to **1.6.4.43** and therefore any potential in-combination impacts are less likely to occur and be on a smaller scale. As previously stated for the construction phase, any in-combination impact with these projects is likely to be temporary in nature and of limited scale.

1.6.4.69 The Mooir Vannin – UK Transmission Assets are likely to be constructed and become operational in the operation and maintenance phase of the Transmission Assets. Based on current information the Mooir Vannin – UK Transmission Assets is likely to comprise multiple HVAC or HVDC cables, with a landfall at Penwortham, and could potentially include a booster station if HVAC cables are utilised (Mooir Vannin Offshore Wind Farm Limited, 2024). There is limited information on this project in the public domain, but the seabed disturbance associated with this project is likely to be similar in both nature and magnitude to that arising from the maintenance of export cables for the Transmission Assets. As a Tier 3 project, there is limited information available in this respect, however it is anticipated that this impact would be temporary in nature and of limited scale.

1.6.4.70 Therefore, the in-combination effects from Scenario 4c are predicted to be of local spatial extent, short term duration, intermittent and high reversibility.

Shell Flat and Lune Deep SAC

Conclusions

1.6.4.71 Adverse effects on the qualifying Annex I sandbanks, which are slightly covered by seawater all the time, which undermine the conservation objectives of the Shell Flat and Lune Deep SAC will not occur as a result of increased SSCs and associated deposition from the Transmission Assets in-combination with other plans/project during the operation and maintenance phase. An assessment of the potential impact 'in-combination increased SSCs and associated deposition' against each relevant conservation objective (as presented in **paragraph 1.6.2.7**) is presented in **Table 1.12** (Scenarios 1-3) and **Table 1.13** (Scenarios 4a-4c). Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.12: Conclusions against the conservation objectives of the Shell Flat and Lune Deep SAC for in-combination increased SSCs and associated deposition during the operation and maintenance phase for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of qualifying natural habitats are maintained or restored **The structure and function (including typical species) of qualifying natural habitats are maintained or restored** **The supporting processes on which the qualifying natural habitats rely are maintained or restored**	The in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.6.4.46** to **1.6.4.49**, any in-combination effects associated with increased SSC and associated sediment deposition during the operation and maintenance phase will be of local spatial extent, short term duration, intermittent in nature and high reversibility. As such, these activities will not restrict the distribution, extent, structure or function of the identified Annex I habitat feature from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitat relies from being maintained or restored.	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.6.4.50** to **1.6.4.53**, any in-combination effects associated with increased SSC and associated sediment deposition during the operation and maintenance phase will be of local spatial extent, short term duration, intermittent in nature and high reversibility. As such, these activities will not restrict the distribution, extent, structure or function of identified Annex I habitat features from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitat relies from being maintained or restored.	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.6.4.54** to **1.6.4.57**, any in-combination effects associated with increased SSC and associated sediment deposition during the operation and maintenance phase will be local spatial extent, short term duration, intermittent in nature and high reversibility. As such, these activities will not restrict the distribution, extent, structure or function of identified Annex I habitat features from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitat relies from being maintained or restored.

Table 1.13: Conclusions against the conservation objectives of the Shell Flat and Lune Deep SAC for in-combination increased SSCs and associated deposition during the operation and maintenance phase for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of qualifying natural habitats are maintained or restored **The structure and function (including typical species) of qualifying natural habitats are maintained or restored** **The supporting processes on which the qualifying natural habitats rely are maintained or restored**	The in-combination effects assessment for Scenario 4a considers: • Scenario 3 (Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **Table 1.9**. As outlined in detail in paragraphs **1.6.4.60** to **1.6.4.33**, any in-combination effects associated with increased SSC and associated sediment deposition during the operation and maintenance phase will be of local spatial extent, short term duration, intermittent and high reversibility. As such, for Scenario 4a, these activities will not restrict the distribution, extent, structure or function of identified Annex I habitat features from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitats rely from being maintained or restored.	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **Table 1.9**. As outlined in detail in paragraphs **1.6.4.61** to **1.6.4.66**, any in-combination effects associated with increased SSC and associated sediment deposition during the operation and maintenance phase will be of local spatial extent, short term duration, intermittent and high reversibility. As such, for Scenario 4b and 4c, these activities will not restrict the distribution, extent, structure or function of identified Annex I habitat features from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitats rely from being maintained or restored.	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 project listed in **Table 1.9**. As outlined in detail in paragraphs **1.6.4.67** to **1.6.4.68**, any in-combination effects associated with increased SSC and associated sediment deposition during the construction phase (should they occur at all) will be of local spatial extent, short term duration, intermittent and high reversibility. As such, for Scenario 4c, these activities will not restrict the distribution, extent, structure or function of identified Annex I habitat features from being maintained or restored. In addition, these activities will not prevent the supporting processes on which the qualifying natural habitats rely from being maintained or restored.

1.6.4.72 Therefore, it can be concluded that there is **no risk of an adverse effect on the integrity** of the Shell Flat and Lune Deep SAC as a result of increased SSCs and associated deposition with respect to the operation and maintenance phase of the Transmission Assets in-combination with other plans/projects.

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

1.7.1 Introduction

1.7.1.1 The HRA Stage 1 Screening Report (document reference: E3) identified the potential for LSEs on the following European sites designated for Annex II fish features and freshwater pearl mussel listed in **Table 1.14** and shown in **Figure 1.3.**

Table 1.14: 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 - Part 2 SAC Assessments

SAC	Annex II diadromous fish features
Dee Estuary/Aber Dyfrdwy SAC	• Sea lamprey • River lamprey
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	• Atlantic salmon • Sea lamprey • River lamprey
River Ehen SAC	• Atlantic salmon • Freshwater pearl mussel
River Kent SAC	• Freshwater pearl mussel
River Derwent and Bassenthwaite Lake SAC	• Sea lamprey • River lamprey • Atlantic salmon
Solway Firth SAC	• Sea lamprey • River lamprey
Afon Gwyrfai a Llyn Cwellyn SAC	• Atlantic salmon
River Bladnoch 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 phase:
  - underwater sound from UXO clearance impacting fish and shellfish receptors; and

  - in-combination effects.
- During the operation and maintenance phase:
  - EMF from subsea electrical cabling; and
  - in-combination effects.

1.7.1.3 This section presents the information required for the competent authority to undertake HRA Stage 2 Appropriate Assessments (considering effects both alone and in-combination) for these sites. A summary of all assessments undertaken is provided in the concluding section of this report (**section 1.9**). 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 cycle is reliant on salmonid species such as Atlantic salmon and sea 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 sea trout, which are relevant host species for freshwater pearl mussel within the SACs assessed.

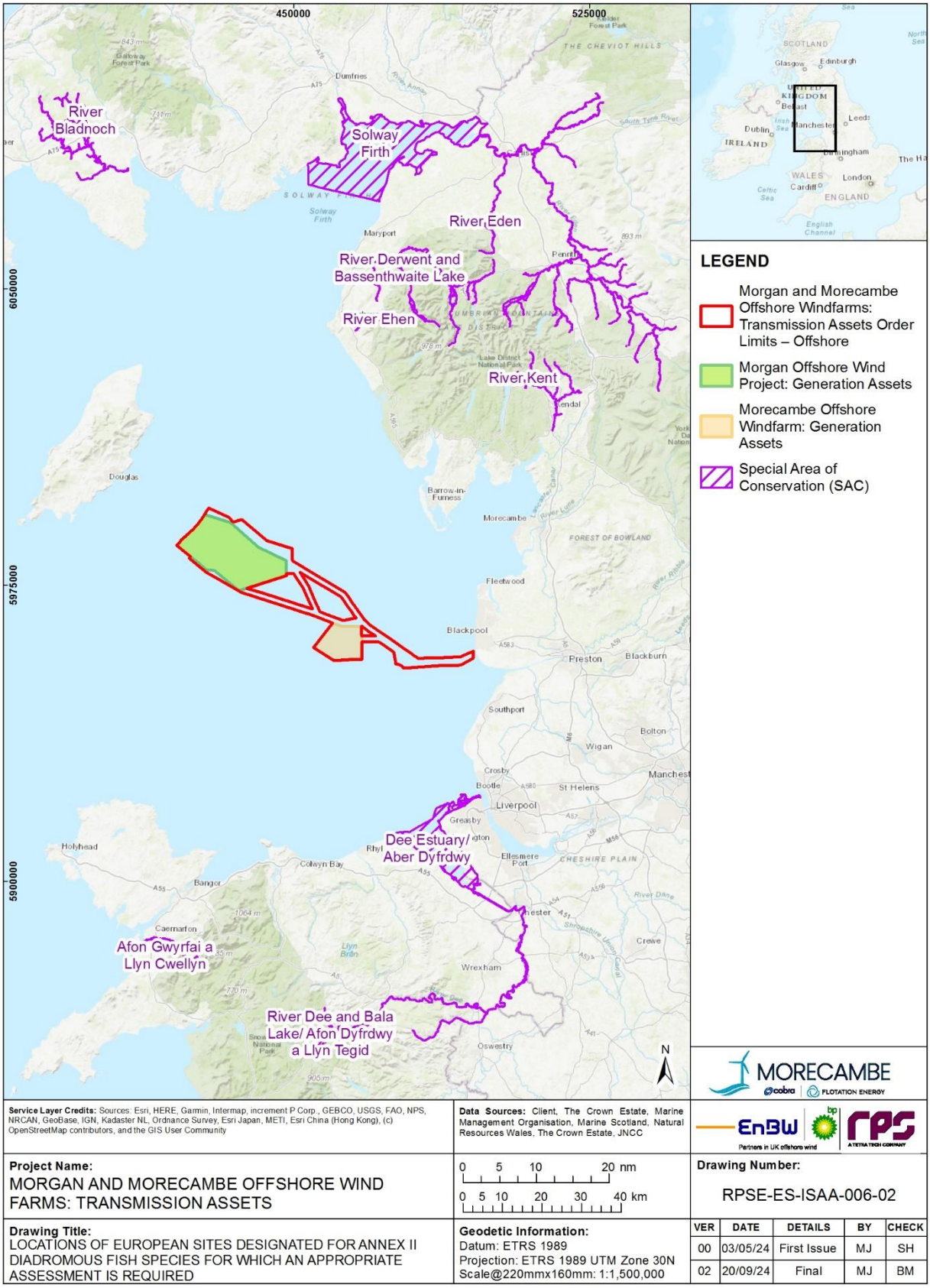

Figure 1.3: Location of European sites designated for Annex II diadromous fish species for which an Appropriate Assessment is required (not to scale)

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 and freshwater pearl mussel. Full details are presented within Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3) and Volume 2, Annex 3.1: Fish and shellfish ecology technical report of the ES (document reference: F2.3.1).

Dee Estuary/Aber Dyfrdwy SAC

Site description

1.7.2.2 The Dee Estuary/Aber Dyfrdwy SAC is located approximately 32.8 km south from the Offshore Order Limits (**Figure 1.3**). 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

1.7.2.3 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, 2023a).

1.7.2.4 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

1.7.2.5 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, 2023a). They live on hard bottoms or attached to larger fish such as cod *Gadus morhua* and herring *Clupea harengus* 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, the overlap of the river lamprey habitats with the Transmission Assets will be limited.

1.7.2.6 River lamprey are also present in the River Dee and must therefore use the Dee Estuary as part of their migratory route. Lamprey 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, sprat *Sprattus 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

1.7.2.7 **Table 1.15** 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, 2022e). The estuary was found to fail for chemical status according to Water Framework Directive data; the low water quality is likely to be a contributing factor to the condition of the lamprey features at this SAC (NRW, 2022e).

Table 1.15: 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

1.7.2.8 The conservation objective for the Dee Estuary/Aber Dyfrdwy SAC is to maintain the feature in a favourable condition, as defined below (Natural England and Countryside Council for Wales (CCW), 2010).

1.7.2.9 The river lamprey feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met.

- The migratory passage of both adult and juvenile river lamprey through the Dee Estuary between Liverpool Bay and the River Dee is unobstructed by physical barriers and/or poor water quality.
- The five year mean count of river lampreys recorded by the Chester Weir fish trap is no less than 55 under the monitoring regime in use prior to

notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000).

- The abundance of prey species forming the river lamprey's food resource within the estuary, is maintained.

1.7.2.10 The conservation objective for the sea lamprey feature of the Dee Estuary SAC is to maintain the feature in a favourable condition, as defined below.

1.7.2.11 The sea lamprey feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met.

- The migratory passage of both adult and juvenile sea lampreys through the Dee Estuary between Liverpool Bay and the River Dee is unobstructed by physical barriers and/or poor water quality.
- The five year mean count of sea lampreys recorded by the Chester Weir fish trap is no less than 18 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000).
- The abundance of prey species forming the sea lamprey's food resource within the estuary, is maintained.

1.7.2.12 Only conservation objectives relevant to Annex II diadromous fish qualifying features will be assessed in **sections 1.7.3** and **1.7.4**; 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; document reference: E3).

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

Site description

1.7.2.13 The River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC, which is located approximately 59.1 km south from the Offshore Order Limits (**Figure 1.3**), 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

1.7.2.14 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, 2022e).

1.7.2.15 **Figure 1.4** 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 1.14** in **sections 1.7.3** and **1.7.4**.

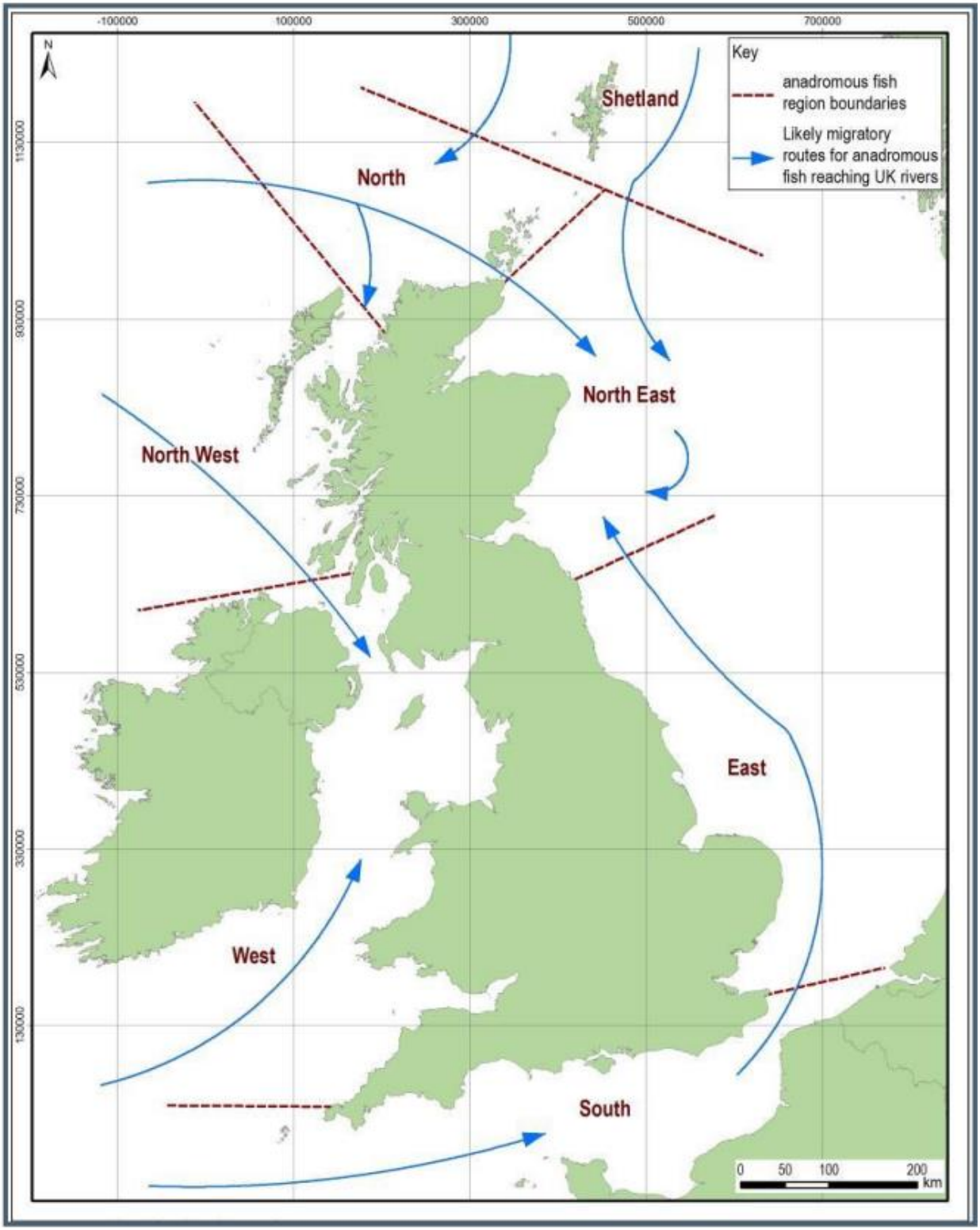

Figure 1.4: Likely migration routes for anadromous fish reaching UK rivers (ABPmer, 2014) (not to scale)

1.7.2.16 The Salmon stock status is assessed annually by NRW using 'Conservation Limits', which provide an objective reference point against which to assess

the status of salmon stocks in individual rivers. Based on current data, the stocks of salmon on the Dee are predicted to continue to decline (NRW, 2023a). There is no other site specific information available for this feature.

Sea lamprey

1.7.2.17 No site specific information is available for this feature. An overview of the ecology of the species is provided in **paragraph 1.7.2.3**.

River lamprey

1.7.2.18 No site specific information is available for this feature. An overview of the ecology of the species is provided in **paragraph 1.7.2.5**.

Condition assessment

1.7.2.19 **Table 1.16** 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 is not 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, 2022e).

Table 1.16: Condition assessment of relevant Annex II diadromous fish species of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC

Attribute	Condition Assessment	
Atlantic salmon		
Juvenile population densities	Pass	
Adult run		Fail
Overall assessment		Fail

Conservation objectives

1.7.2.20 The conservation objectives for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (NRW, 2022e) are outlined below.

Atlantic salmon

1.7.2.21 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 (2022a) 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 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

1.7.2.22 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 (2022a) 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.

1.7.2.23 Only conservation objectives relevant to Annex II diadromous fish qualifying features will be assessed in **sections 1.7.3** and **1.7.4**; 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; document reference: E3).

River Ehen SAC

Site description

1.7.2.24 The River Ehen forms the outfall from Ennerdale Water and flows 20 km to Sellafield where it meets the Irish Sea. The River Ehen SAC, which is approximately 62.5 km north from the Offshore Order Limits (**Figure 1.3**), 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 amounts of tree shade along the banks, which is thought to be of importance for mussel habitat (Natural England, 2018b). 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, 2018b).

Feature accounts

Freshwater pearl mussel

1.7.2.25 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, 2023b).

1.7.2.26 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 Transmission 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.

1.7.2.27 The River Ehen supports the largest freshwater pearl mussel population (>100,000) in England with high densities of greater than 100 per m^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, 2023b).

Atlantic salmon

1.7.2.28 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 to 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 into the River Ehen SAC (Natural England, 2022a).

Condition assessment

1.7.2.29 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).

Conservation objectives

1.7.2.30 The conservation objectives for the River Ehen SAC (Natural England, 2018c) are outlined below.

1.7.2.31 With regard to the SAC and the natural habitats and/or species for which the site has been designated and subject to natural change, site integrity should be ensured by maintaining or restoring as appropriate. The site should contribute 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; and
- the distribution of qualifying species within the site.

River Kent SAC

Site description

1.7.2.32 The River Kent SAC is located approximately 65.2 km north from the Offshore Order Limits (**Figure 1.3**). 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 south east 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

1.7.2.33 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). 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). 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, a purely freshwater species. However, in line with a precautionary approach for the basis of this assessment, Atlantic salmon, which is also present in the River Kent, is also considered to be a host species. Therefore, there is potential for indirect adverse effects upon the larval stage of freshwater pearl mussel if there are adverse effects on the host species to which they are attached.

Condition assessment

1.7.2.34 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).

Conservation objectives

1.7.2.35 The conservation objectives for the River Kent SAC (Natural England, 2018d) are outlined below.

1.7.2.36 With regard to the SAC and the natural habitats and/or species for which the site has been designated and subject to natural change, site integrity should be ensured by maintaining or restoring as appropriate. The site should contribute 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; and
- the distribution of qualifying species within the site.

1.7.2.37 Only conservation objectives relevant to the Annex II freshwater pearl mussel feature will be assessed in **sections 1.7.3** and **1.7.4**; 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; document reference: E3).

River Derwent and Bassenthwaite Lake SAC

Site description

1.7.2.38 The River Derwent and Bassenthwaite SAC, which is located approximately 72.3 km north from the Offshore Order Limits (**Figure 1.3**), consists of the River Derwent, a large oligotrophic river system with high water quality and a natural channel (Natural England, 2018e). The Derwent flows through two

lakes Derwentwater and Bassenthwaite which, with the presence of aquatic flora, are typical of oligotrophic/mesotrophic lakes. Designated fish species as primary reason for the selection of the SAC include Atlantic salmon, sea lamprey, river lamprey. The site encompasses various important salmon spawning areas as well as extensive sea and river lamprey nursery grounds (Natural England, 2018e).

Feature accounts

Atlantic salmon

1.7.2.39 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, 2018e). 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, 2023c).

Sea lamprey

1.7.2.40 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, 2018e; JNCC, 2023c).

River lamprey

1.7.2.41 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, 2018e; JNCC, 2023c).

Condition assessment

1.7.2.42 There is no condition assessment available for the Annex II diadromous fish features of the River Derwent and Bassenthwaite Lake SAC.

Conservation objectives

1.7.2.43 The conservation objectives for the River Derwent and Bassenthwaite Lake SAC (Natural England, 2018e) are outlined below.

1.7.2.44 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, site integrity should be ensured by maintaining or restoring as appropriate. The site should contribute 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; and
- the distribution of qualifying species within the site.

1.7.2.45 Only conservation objectives relevant to Annex II diadromous fish qualifying features will be assessed in **sections 1.7.3** and **1.7.4**; 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; document reference: E3).

Solway Firth SAC

Site description

1.7.2.46 The Solway Firth SAC is located approximately 85.7 km north from the Offshore Order Limits (**Figure 1.3**). River lamprey and sea lamprey are Annex II species present as qualifying features and are the 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

1.7.2.47 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, 2023d).

River lamprey

1.7.2.48 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, 2023d).

Condition assessment

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

Conservation objectives

1.7.2.50 The conservation objectives for the Solway Firth SAC (Natural England, 2018f) are outlined below.

1.7.2.51 With regard to the SAC and the natural habitats and/or species for which the site has been designated and subject to natural change site integrity should be ensured by maintaining or restoring as appropriate. The site should contribute 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; and
- the distribution of qualifying species within the site.

1.7.2.52 Only conservation objectives relevant to Annex II diadromous fish qualifying features will be assessed in **sections 1.7.3** and **1.7.4**; 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; document reference: E3).

Afon Gwyrfai a Llyn Cwellyn SAC

Site description

1.7.2.53 The Afon Gwyrfai a Llyn Cwellyn SAC which is located approximately 87.3 km south from the Offshore Order Limits (**Figure 1.3**), encompasses the Afon Gwyrfai and Llyn Cwellyn. The Gwyrfai flows out of Llyn y Gader near Rhyd Ddu and passes through Llyn Cwellyn before reaching the sea at Caernarfon Bay. 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, 2022b).

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, 2023e). Electrofishing data from the Environment Agency indicates the presence of healthy juvenile populations downstream of Llyn Cwellyn within the SAC (JNCC, 2023e).

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, 2022b). The current unfavourable status results from an assessment of feature distribution and abundance within the SAC, specifically salmon catch and juvenile surveys (NRW, 2022b).

Conservation objectives

1.7.2.56 The conservation objectives for the Afon Gwyrfai a Llyn Cwellyn SAC for Atlantic salmon (NRW, 2022b) are outlined below.

- The conservation objective for the water as outlined in NRW (2022b) 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 Bladnoch SAC

Site description

1.7.2.57 The River Bladnoch SAC is located approximately 89.5 km north from the Offshore Order Limits (**Figure 1.3**). 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, 2023f). The river's ecological and water quality characteristics are influenced by a moderate-sized catchment with diverse upland and lowland areas (JNCC, 2023f).

Feature accounts

Atlantic salmon

1.7.2.58 The River Bladnoch is located in south west Scotland and supports a high-quality salmon population and a spring run of salmon which is considered unusual for rivers in this region. There are potential problems 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, 2023f).

Condition assessment

1.7.2.59 The condition of the Atlantic salmon feature was assessed as part of the Nature Scot's site condition monitoring programme and is considered favourable. The feature was assessed as unfavourable recovering in September 2011 (NatureScot, 2020).

Conservation objectives

1.7.2.60 The conservation objectives for the River Bladnoch SAC (NatureScot, 2020) 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 FCS.
- 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 Eden SAC

Site description

1.7.2.61 The River Eden SAC is located approximately 127.7 km north (**Figure 1.3**) from the Offshore Order Limits. Atlantic salmon, sea lamprey and river lamprey are all species that are a primary reason for the selection of the River Eden SAC. The River Eden maintains a large population of Atlantic 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 river lamprey and a large population of sea lamprey in the middle to lower regions of the river (Natural England, 2018g).

Feature accounts

Atlantic salmon

1.7.2.62 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 Atlantic salmon (JNCC, 2023g).

Sea lamprey

1.7.2.63 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, 2023g).

River lamprey

1.7.2.64 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, 2023g).

Condition assessment

1.7.2.65 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).

Conservation objectives

1.7.2.66 The conservation objectives for the River Eden SAC (Natural England, 2018g) are outlined below. With regard to the SAC and the natural habitats and/or species for which the site has been designated and subject to natural change site integrity should be ensured by maintaining or restoring as appropriate. The site should contribute 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; and
- the distribution of qualifying species within the site.

1.7.2.67 Only conservation objectives relevant to Annex II diadromous fish qualifying features will be assessed in **sections 1.7.3** and **1.7.4**; 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; document reference: E3).

1.7.3 Assessment of adverse effects alone

1.7.3.1 The following assessments of the effects of the Transmission Assets alone on Annex II diadromous fish have been informed by the detailed project-specific underwater sound modelling presented in Volume 1, Annex 5.2: Underwater sound technical report of the ES (document reference: F1.5.2) and the technical assessments presented in Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3). The assessments have also drawn upon the sensitivity assessments of the relevant fish species detailed in Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3) which reference the best available literature and evidence with regards to sensitivity. In this regard, the Applicants are confident that the conclusions on the potential for an adverse effect on the integrity of European site(s) have been identified in light of the best available scientific knowledge and all reasonable scientific doubt can be ruled out.

Underwater sound from UXO clearance impacting fish and shellfish receptors

1.7.3.2 UXO clearance during the construction of the Transmission Assets may lead to underwater sound impacting fish and shellfish receptors. The increase in underwater sound has the potential to result in mortality, injury and/or disturbance to diadromous fish. Furthermore, increased underwater sound has the potential to disrupt the migration of fish to or from their preferred spawning habitats (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). No UXO clearance will be carried out during the operation and maintenance or decommissioning phase and therefore no potential impacts from underwater sound are assessed during these phases.

1.7.3.3 The assessment of LSE in the HRA Stage 1 Screening Report (document reference: E3) identified that during construction activities, LSE could not be ruled out for the potential impact of underwater sound from UXO clearance impacting fish and shellfish receptors. This relates to the designated sites and relevant Annex II diadromous fish features listed in **Table 1.17.**

Table 1.17: 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 from UXO clearance impacting fish and shellfish receptors

SAC	Annex II diadromous fish features
Dee Estuary/Aber Dyfrdwy SAC	• Sea lamprey • River lamprey
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	• Atlantic salmon • Sea lamprey • River lamprey
River Ehen SAC	• Atlantic salmon • Freshwater pearl mussel
River Kent SAC	• Freshwater pearl mussel
River Derwent and Bassenthwaite Lake SAC	• Sea lamprey • River lamprey • Atlantic salmon
Solway Firth SAC	• Sea lamprey • River lamprey
Afon Gwyrfai a Llyn Cwellyn SAC	• Atlantic salmon
River Bladnoch 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 has 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 1.18.** The MDS has been selected as the one which has the potential to result in the greatest effect on the identified receptor and considers the activities to be carried out sequentially. These scenarios have been selected from the project design provided in Volume 1, Chapter 3: Project description of the ES. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project design (e.g.,

different infrastructure layout), to that assessed here, be taken forward in the final design.

Table 1.18: Maximum design scenario considered for the assessment of potential impacts on diadromous fish from underwater sound from UXO clearance impacting fish and shellfish receptors

Phase	Maximum design scenario	Justification
Construction phase	UXO clearance: • Clearance of up to 25 UXOs within the Offshore Order Limits (22 for the Morgan Offshore Wind Project and 3 for the Morecambe Offshore Windfarm). • A range of UXO sizes assessed from 25 kg up to 907 kg with 130 kg the most likely maximum • For high order clearance donor charges of 1.2 kg (most common) and 3.5 kg (single barracuda blast charge). • Up to 0.5 kg Net Explosive Quantity (NEQ) clearance shot for neutralisation of residual explosive material at each location. • Clearance during daylight hours only. The MDS is for high order clearance but assessment also considered: • Low order clearance charge size of 0.08 kg. • Low yield clearance configurations of 0.75 kg charges (up to 4 x 0.75 kg).	UXO clearance • Maximum number and maximum size of UXOs encountered at the Transmission Assets. 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 clearance. • Assumption of a clearance shot of up to 0.5 kg 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 Transmission Assets (Commitments)

1.7.3.7 Measures adopted as part of the Transmission Assets which are of relevance to the assessment of potential impacts on Annex II diadromous fish features from underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase are presented in **Table 1.19**.

Table 1.19: Measures (commitments) adopted as part of the project which are relevant to the assessment of adverse effects on European sites designated for Annex II diadromous fish features from underwater sound from UXO clearance impacting fish and shellfish receptors

Commitment number	Measure adopted	How the measure will be secured
Embedded measures		
CoT64	Detailed Marine Mammal Mitigation Protocols (MMMPs) will be developed and implemented in accordance with the Outline MMMP (document reference:J18), to reduce the risk of injury to marine mammals. The Detailed MMMP(s) will include measures to apply in advance of and during surveys and UXO clearance. The Detailed MMMP(s) will include for the use of low order techniques, where possible, as the primary mitigation measure alongside other measures. The detailed MMMP(s) will be approved by Marine Management Organisation, in consultation with Natural England.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 – Condition 20(1)(b) (UXO clearance) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Windfarm Transmission Assets), Part 2 - Condition20(1)(b) (UXO clearance)

Construction phase

Information to support assessment

Hearing sensitivity of Annex II diadromous fish features

1.7.3.8 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 1, Annex 5.2: Underwater sound technical report of the ES; document reference: F1.5.2). 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 500 Hz.

- 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.

1.7.3.9 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.

1.7.3.10 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 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 Transmission Assets

1.7.3.11 To understand the magnitude of sound emissions from UXO clearance during construction activities, underwater sound modelling has been undertaken. Full details of the modelling undertaken are presented in Volume 1, Annex 5.2: Underwater sound technical report of the ES (document reference: F1.5.2). A summary of the underwater sound modelling has been provided below and additional detail is also included in Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3) including full details of sound exposure criteria used to inform the assessment, in line with Popper *et al*. (2014).

1.7.3.12 Modelling has been completed for underwater sound associated with UXO clearance, from a realistic worse case high order clearance to low order clearances (e.g., deflagration and the use of clearance shots).

1.7.3.13 The clearance of UXO prior to commencement of construction may result in the detonation of UXO. This activity has the potential to generate some of the highest peak sound pressures of all anthropogenic underwater sound sources (von Benda-Beckman *et al.,* 2015) and is considered a high energy, impulsive sound source. The potential effects of this activity will depend upon sound source characteristics, the receptor species, distance from the sound source and sound attenuation within the environment.

1.7.3.14 Estimates were conservative as the charge is assumed to be freely standing in mid-water, unlike an UXO which would be resting on or partially buried in the seabed, and could potentially be buried, degraded or subject to other significant attenuation. In addition, the explosive material is likely to have deteriorated over time, so maximum sound levels are likely to be over-estimates of true sound level potential.

1.7.3.15 For the purposes of this assessment, it has been assumed that the MDS will be clearance of UXO with a NEQ of 907 kg cleared by either low order or high order techniques, with an NEQ of 130 kg considered the more likely (common) scenario (see Volume 2, Chapter 3: Fish and shellfish ecology of

the ES; document reference: F2.3). Embedded mitigation can be employed to reduce the risk of injury by using low order techniques to clear UXOs where possible, noting however, that low order techniques are not always possible and are dependent upon the individual situations surrounding each UXO, therefore low order is included in the assessment.

1.7.3.16 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 clearance (i.e., smaller ranges for low order clearance, larger ranges for high order clearance). An explosive mass of 907 kg (high order explosion) yielded the largest injury (PTS) ranges for fish, with the greatest lower injury range of 985 m. However, the more common 130 kg charge results in a reduced injury range of 514 m. Further detail on sound modelling of UXO clearance are provided in Volume 1, Annex 5.2: Underwater sound technical report of the ES (document reference: F1.5.2). The closest SAC, designated for Annex II diadromous fish species is the Dee Estuary/Aber Dyfrdwy SAC, located 32.8 km from the Offshore Order Limits. Due to the large distances between the Offshore Order Limits and the surrounding coastlines, underwater sound would not represent a barrier to migration for those fish moving through the Irish Sea to/from the relevant SACs discussed below.

1.7.3.17 Underwater sound as a result of UXO clearance also has the potential to produce behavioural disturbance; however, there are no agreed sound level thresholds for the onset of a behavioural response generated as a result of explosives.

1.7.3.18 Diadromous fish species which are located in close proximity to UXO clearance at the time of detonation may suffer injury or mortality. However, the nature of diadromous fish species being highly mobile and tending to only utilise the environment within the study area to pass through during migration, the clearance of UXO is unlikely to result in significant mortality or injury of diadromous species, and is unlikely to generate population level effects.

1.7.3.19 Diadromous fish species may experience behavioural effects in response to sound from UXO clearance, including a startle response, disruption of feeding, or avoidance of an area. These behavioural responses may occur within a range of hundreds of metres to several kilometres from UXO clearance operations, depending on the species and their relative sensitivities to underwater sound (i.e., in order of lowest to highest sensitivities: Group 1 lamprey species and Group 2 Atlantic salmon). It should be noted however that while UXO clearance operations are likely to result in behavioural effects on diadromous fish species, such events will represent individual, sporadic, extremely short duration events during the construction phase, with recovery of baseline fish behaviours occurring quickly following completion of UXO clearance activities.

Dee Estuary/Aber Dyfrdwy SAC

Sea lamprey and river lamprey

1.7.3.20 Sea and river lamprey which are located in close proximity to UXO clearance at the time of clearance may suffer injury or mortality. However, the nature of these species being highly mobile and tending to only utilise the environment within the study area to pass through during migration (although there is potential for them to be present within the study area all year), the clearance of UXO is unlikely to result in significant mortality or injury of diadromous species and is unlikely to generate population level effects. In addition, the measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document reference: J18; see **Table 1.19**), will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact.

1.7.3.21 As outlined in **paragraph 1.7.3.16**, the Dee Estuary is located 32.8 km from the Offshore Order Limits. Due to the large distances between the Offshore Order Limits and the surrounding coastlines and the short term, temporary and intermittent nature of the impact, underwater sound from UXO clearance would not represent a barrier to migration for those fish moving through the Irish Sea to/from the SAC.

1.7.3.22 Sea and river lamprey may experience behavioural effects in response to sound from UXO clearance, including a startle response, disruption of feeding, or avoidance of an area. These behavioural responses may occur within a range of hundreds of metres to several kilometres from UXO clearance operations.

1.7.3.23 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 Hz to 200 Hz (Mickle *et al.,* 2019), suggesting a low vulnerability to impacts associated with underwater sound overall. As such, there is negligible risk of disruption to migration of lamprey.

Conclusions

1.7.3.24 Adverse effects on the Annex II sea lamprey and river lamprey features which undermine the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC will not occur as a result of underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase. An assessment of this potential impact against each relevant conservation objective (as presented in **paragraphs 1.7.2.8** to **1.7.2.12**) 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 Dee Estuary/Aber Dyfrdwy SAC for underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase

Conservation objective	Conclusion
The migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee is unobstructed by physical barriers and/or poor water quality	There is no pathway for underwater sound to result in adverse effects on the habitats of river and sea lampreys. The assessment indicates that any behavioural effects in response to underwater sound from UXO clearance will not result in any barriers to migration to and from this SAC, and potential impacts will be short-term, temporary and intermittent during the construction phase. There is no route to impact for underwater sound to affect water quality or to physically obstruct the migratory passage of lamprey species. As such there is negligible risk of disruption to migration of lamprey. Therefore, the migratory passage of both adult and juvenile river lamprey through the Dee Estuary between Liverpool Bay and the River Dee will be unobstructed by physical barriers and/or poor water quality.
The five year mean count of river lampreys recorded by the Chester Weir fish trap is no less than 55 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000) **The five year mean count of sea lampreys by the Chester Weir fish trap is no less than 18 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000)**	Sea and river lamprey which are located in close proximity to UXO clearance at the time of clearance may suffer injury or mortality. However, due to the nature of sea and river lamprey being highly mobile and tending to only utilise the environment within the study area to pass through during migration (although there is potential for them to be present within the study area all year), the clearance of UXO is unlikely to result in significant mortality or injury and is unlikely to generate population level effects. Sea lamprey and river lamprey may experience behavioural effects in response to sound from UXO clearance. These behavioural responses may occur within a range of hundreds of metres to several kilometres from UXO clearance operations, depending on the species and their relative sensitivities to underwater sound. Given that lamprey species are known to have a low vulnerability to impacts associated with underwater sound overall (and that potential sound impacts from UXO clearance will be very short-term and intermittent during the construction phase), there is negligible risk of disruption to migration of lamprey, especially given the limited reported migration window(s) of lamprey species through the affected zones of the study area (although there is potential for them to be present within the study area all year). In addition, these impacts are unlikely to result in barriers to migration noting that the Dee Estuary/Aber Dyfrdwy SAC is located 32.8 km from the Offshore Order Limits. Therefore, underwater sound from UXO clearance associated with the Transmission Assets will not result in the reduction of sea lamprey or river lamprey populations.
The abundance of prey species forming the river lamprey/sea lamprey's food resource within the estuary, is maintained.	As stated above, since any potential effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility, there is limited potential for spawning habitats of prey species to be affected (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). In addition, Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3) concluded that for prey species of the sea lamprey and river lamprey potential impacts from underwater sound from UXO clearance will not be significant. Therefore, underwater sound from UXO clearance will not prevent the abundance of prey species

Conservation objective	Conclusion
	forming the river and sea lamprey's food resource within the estuary from being maintained.

1.7.3.25 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets alone.

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

Sea lamprey and river lamprey

1.7.3.26 Potential impacts from underwater sound from UXO clearance impacting fish and shellfish receptors 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 (32.8 km south from the Offshore Order Limits; **Figure 1.3**) as outlined in **paragraphs 1.7.3.20** to **1.7.3.24.** As the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC is located at an increased distance from the Transmission Assets than the Dee Estuary/Aber Dyfrdwy SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**), it is considered that impacts on the lamprey features of this site would be of similar if not of a lower magnitude.

1.7.3.27 Given the distance to the SAC, the large distances between the Offshore Order Limits and the surrounding coastlines and the short term, temporary and intermittent nature of the impact, no adverse effect on integrity was concluded for the Dee Estuary/Aber Dyfrdwy SAC (see **paragraph 1.7.3.25**). In addition the measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document reference: J18; see **Table 1.19**) will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact. 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

1.7.3.28 Atlantic salmon which are located in close proximity to UXO clearance at the time of clearance may suffer injury or mortality. However, the nature of this species being highly mobile and tending to only utilise the environment within the study area to pass through during migration (although for the purposes of the assessment, they could potentially be present all year), the clearance of UXO is unlikely to result in significant mortality or injury of Atlantic salmon and is unlikely to generate population level effects. In addition, the measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document reference: J18; see **Table 1.19 Table 1.19.**

1.7.3.29 Table 1.19), will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact.

1.7.3.30 As outlined in **paragraph 1.7.3.16**, River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC is located 59.1 km south from the Offshore Order Limits (**Figure 1.3**). Due to the large distances between the Offshore Order Limits and the surrounding coastlines and the short term, temporary and intermittent nature of the impact, underwater sound from UXO clearance would not represent a barrier to migration for those fish moving through the Irish Sea to/from the SAC.

1.7.3.31 Atlantic salmon may experience behavioural effects in response to sound from UXO clearance, including a startle response, disruption of feeding, or avoidance of an area. These behavioural responses may occur within a range of hundreds of metres to several kilometres from UXO clearance operations.

1.7.3.32 Direct impacts on salmonid species can range from barotrauma to behavioural responses, with increases in stress hormone production immediately following exposure to explosive blasts (Kolden, 2013). Experimental results have indicated that salmonid species have exhibited fewer alarm reactions to external stimuli after being exposed to sub-lethal explosions (Sverdrup *et al*., 1994), with heavy gull predation noted on stunned fish exposed to similar non-lethal explosive blasts (Teleki and Chamberlain, 1978). Research from Harding *et al.* (2016) failed to produce physiological or behavioural responses in Atlantic salmon when subjected to sound levels similar to piling, which is not planned in this case but is used to support the evidence base regarding underwater sound effects on diadromous fish. Therefore the application of piling studies to UXO clearance effects should be interpreted with caution as piling is generally a longer duration impact, while UXO detonation is a very short term impact. However, the sound levels tested were estimated at <160 dB re 1 µPa 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. This built on a previous study that showed no behavioural reaction to impact piling (400 m away) or vibropiling (less than 50 m away) as well as no physical injuries (Nedwell *et al.*, 2003).

1.7.3.33 Physical impacts on migrating salmonids have been noted from piling producing sounds of 218 dB re 1 μPa^2s SEL (Bagocius, 2015), although at these sound levels, it would be expected that avoidance reactions would occur based on impulsive sound over a period of time, thus avoiding injury effects. However, given the nature of UXO clearance, comprising a singular or series of blasts over a short period of time, with a high degree of intermittency between clearance events, and the transient nature of migratory fish there is considered a negligible risk of disruption to migration of these species. The low risk of effects on migration of Atlantic salmon (and sea

trout) is likely to extend to the freshwater pearl mussel, as part of its life stage is reliant on diadromous fish species including Atlantic salmon and sea trout, although this has not been directly studied.

Conclusions

1.7.3.34 Adverse effects on the 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 from UXO clearance impacting fish and shellfish receptors during the construction phase. An assessment of this potential impact against each relevant conservation objective (as presented in **paragraphs 1.7.2.20** to **1.7.2.23**) 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 Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC for underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase

Conservation objective	Conclusion
The parameters defined in the vision for the watercourse as outlined in NRW (2022a) must be met	Due to the nature of the impact and the distance of the Offshore Order Limits from the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km), there is no route to impact from underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets. Therefore, this impact 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 of Atlantic salmon, sea lamprey and river lamprey 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 which are located in close proximity to UXO clearance at the time of clearance may suffer injury or mortality. However, the nature of these species being highly mobile and tending to only utilise the environment within the study area to pass through during migration (although there is potential for them to be present within the study area all year), the clearance of UXO is unlikely to result in significant mortality or injury and is unlikely to generate population level effects.

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	Sea lamprey, river lamprey and Atlantic salmon may experience behavioural effects in response to sound from UXO clearance. These behavioural responses may occur within a range of hundreds of metres to several kilometres from UXO clearance operations, depending on the species and their relative sensitivities to underwater sound. Given that qualifying species of this SAC are known to have a low vulnerability to impacts associated with underwater sound overall (and that potential sound impacts from UXO clearance will be very short-term and intermittent during the construction phase), there is negligible risk of disruption to migration of lamprey species and Atlantic salmon, especially given the limited migration window of these species through the affected zones of the study area (although there is potential for them to be present within the study area all year). In addition, these impacts are unlikely to result in barriers to migration noting that the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC is located 59.1 km south from the Offshore Order Limits. Therefore, underwater sound from UXO clearance associated with the Transmission 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 Transmission 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.
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.

1.7.3.35 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets alone.

River Ehen SAC

Atlantic salmon

1.7.3.36 Potential impacts from underwater sound from UXO clearance impacting fish and shellfish receptors on Atlantic salmon features of the River Ehen SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.28** to **1.7.3.32**. As the River Ehen SAC is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (62.5 km north from the Offshore Order Limits), 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 Ehen SAC in respect to the Transmission Assets, and the short term, temporary and intermittent nature of the impact, it is unlikely to present a barrier to migration. In addition, the

measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document reference: J18; see **Table 1.19**), will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (see **paragraph 1.7.3.35**); therefore, no adverse effect on the Atlantic salmon feature of the River Ehen SAC can also be concluded.

Freshwater pearl mussel

1.7.3.37 The freshwater pearl mussel has been considered within this HRA Stage 2 ISAA - Part 2 SAC Assessments as Atlantic salmon are one of the host species during a critical parasitic phase of the mussel's lifecycle. Adult freshwater pearl mussel are confined to freshwater habitats therefore there is no pathway for direct effects to this species during the construction phase of the Transmission Assets as a result of underwater sound from UXO clearance impacting fish and shellfish receptors. There is potential however, for indirect adverse effects upon 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 in **paragraph 1.7.3.36**, concluded that Atlantic salmon will not be adversely affected. Therefore, no adverse effects on the freshwater pearl mussel can also be concluded.

Conclusions

1.7.3.38 Adverse effects on the 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 from UXO clearance impacting fish and shellfish receptors during the construction phase. An assessment of this potential impact against each relevant conservation objective (as presented in **paragraphs 1.7.2.30** and **1.7.2.31**) is presented in **Table 1.22**. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.22: Conclusions against the conservation objectives of the River Ehen SAC for underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase

Conservation objective	Conclusion
The extent and distribution of habitats of qualifying species are maintained or restored	There is no impact pathway for underwater sound from UXO clearance to result in adverse effects on the habitats of Atlantic salmon and freshwater pearl mussel. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission 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
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
	and freshwater pearl mussel rely from being maintained or restored.
The populations of qualifying species are maintained or restored	Atlantic salmon, which are located in close proximity to UXO clearance at the time of clearance may suffer injury or mortality. However, the nature of Atlantic salmon being highly mobile and in general likely to utilise the environment within the study area during migration (although for the purposes of the assessment, they could potentially be present all year), the clearance of UXO is unlikely to result in significant mortality or injury and is unlikely to generate population level effects. Since significant mortality of Atlantic salmon is not predicted to occur then it follows freshwater pearl mussel will not be indirectly impacted. Atlantic salmon may experience behavioural effects in response to sound from UXO clearance. These behavioural responses may occur within a range of hundreds of metres to several kilometres from UXO clearance operations, depending on the species and their relative sensitivities to underwater sound. Given that qualifying species of this SAC are known to have a low vulnerability to impacts associated with underwater sound overall (and that potential sound impacts from UXO clearance will be very short-term and intermittent during the construction phase), there is negligible risk of disruption to migration of Atlantic salmon, especially given the limited migration window of Atlantic salmon through the affected zones of the study area (although for the purposes of the assessment, they could potentially be present all year). In addition, these impacts are unlikely to result in barriers to migration noting that the River Ehen is located 62.5 km north from the Offshore Order Limits. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets will not prevent the populations or the distributions of Atlantic salmon and freshwater pearl mussel from being maintained or restored.
The distributions of qualifying species within the site are maintained or restored	

1.7.3.39 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets alone.

River Kent SAC

Freshwater pearl mussel

1.7.3.40 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.

1.7.3.41 For the SACs outlined above, where Atlantic salmon is a qualifying feature, no adverse effects have been concluded in relation to underwater sound from UXO clearance impacting fish and shellfish receptors. Potential impacts from underwater sound from UXO clearance impacting fish and shellfish receptors on brown trout and Atlantic salmon of the River Kent SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.28** to **1.7.3.32**. As the River Kent SAC is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (65.2 km north from the Offshore Order Limits; **Figure 1.3**), 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 Transmission Assets, and the short term, temporary and intermittent nature of the impact, it is unlikely to present a barrier to migration to Atlantic salmon. In addition, the measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document reference: J18; **Table 1.19**), will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (see **paragraph 1.7.3.35**); 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

1.7.3.42 Adverse effects on the freshwater pearl mussel which undermine the conservation objectives of the River Kent SAC will not occur as a result of underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase. An assessment of this potential impact against each relevant conservation objective (as presented in **paragraphs 1.7.2.35** to **1.7.2.37**) is presented in **Table 1.23**. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.23: Conclusions against the conservation objectives of the River Kent SAC for underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase

Conservation objective	Conclusion
The extent and distribution of habitats of qualifying species are maintained or restored	The River Kent SAC is located 65.2 km north from the Offshore Order Limits. There is no impact pathway for underwater sound to result in adverse effects on the habitats of freshwater pearl mussel. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission 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 pearl mussel feature of the River Kent SAC and adverse effects are not anticipated for host species such as brown trout and Atlantic salmon populations within the SAC, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission 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	

1.7.3.43 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets alone.

River Derwent and Bassenthwaite Lake SAC

Sea lamprey and river lamprey

1.7.3.44 Potential impacts from underwater sound from UXO clearance impacting fish and shellfish receptors 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 (32.8 km south from the Offshore Order Limits; **Figure 1.3**) as outlined in **paragraphs 1.7.3.20** to **1.7.3.24**. As the River Derwent and Bassenthwaite Lake SAC is located at an increased distance from the Transmission Assets than the Dee Estuary/Aber Dyfrdwy SAC (72.3 km north from the Offshore Order Limits; **Figure 1.3**), it is considered that impacts on the lamprey features of this site would be of similar if not of a lower magnitude. In addition, the measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document reference: J18; see **Table 1.19**), will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact.

1.7.3.45 Given the distance to the SAC, the large distances between the Offshore Order Limits and the surrounding coastlines and the short term, temporary and intermittent nature of the impact, no adverse effect on integrity was concluded for the Dee Estuary/Aber Dyfrdwy SAC (see **paragraph 1.7.3.25**);

therefore, no adverse effect on the sea lamprey and river lamprey features of the River Derwent and Bassenthwaite Lake SAC can also be concluded.

Atlantic salmon

1.7.3.46 Potential impacts from underwater sound from UXO clearance impacting fish and shellfish receptors on Atlantic salmon features of the River Derwent and Bassenthwaite Lake SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.28** to **1.7.3.32.** As the River Derwent and Bassenthwaite Lake SAC is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (72.3 km north from the Offshore Order Limits; **Figure 1.3**), 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 Derwent and Bassenthwaite Lake SAC in respect to the Transmission Assets and the short term, temporary and intermittent nature of the impact, it is unlikely to present a barrier to migration. In addition, the measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document reference: J18; see **Table 1.19**), will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (see **paragraph 1.7.3.35**); therefore, no adverse effect on the Atlantic salmon feature of the River Derwent and Bassenthwaite Lake SAC can also be concluded.

Conclusions

1.7.3.47 Adverse effects on the 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 from UXO clearance impacting fish and shellfish receptors during the construction phase. An assessment of this potential impact against each relevant conservation objective (as presented in **paragraphs 1.7.2.43** to **1.7.2.45**) is presented in **Table 1.24**. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.24: Conclusions against the conservation objectives of the River Derwent and Bassenthwaite Lake SAC for underwater sound from UXO clearance impacting fish and shellfish receptors 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 from UXO clearance to result in adverse effects on the habitats of river lamprey, sea lamprey and Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets will not prevent the extent,
The structure and function of the habitats of qualifying species are maintained or restored	

Conservation objective	Conclusion
The supporting processes on which the habitats of qualifying species rely are maintained or restored	distribution, structure and function of the habitats of river lamprey, sea lamprey and Atlantic salmon or the supporting processes on which the habitats of river lamprey, sea lamprey and Atlantic salmon rely from being maintained or restored.
The populations of qualifying species are maintained or restored	Sea lamprey, river lamprey and Atlantic salmon within close proximity to UXO clearance at the time of clearance may suffer injury or mortality. However, the nature of these species being highly mobile and tending to only utilise the environment within the study area to pass through during migration (although there is potential for them to be present within the study area all year), the clearance of UXO is unlikely to result in significant mortality or injury and is unlikely to generate population level effects. Atlantic salmon, sea lamprey and river lamprey may experience behavioural effects in response to sound from UXO clearance. These behavioural responses may occur within a range of hundreds of metres to several kilometres from UXO clearance operations, depending on the species and their relative sensitivities to underwater sound. Given that qualifying species of River Derwent and Bassenthwaite Lake SAC are known to have a low vulnerability to impacts associated with underwater sound overall (and that potential sound impacts from UXO clearance will be very short-term and intermittent during the construction phase), there is negligible risk of disruption to migration of Atlantic salmon, sea lamprey or river lamprey, especially given the limited migration window of these species through the affected zones of the study area (although there is potential for them to be present within the study area all year). In addition, these impacts are unlikely to result in barriers to migration noting that the River Derwent and Bassenthwaite Lake SAC is located 72.3 km north from the Offshore Order Limits. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets will not prevent the populations or the distributions of Atlantic salmon, sea lamprey or river lamprey from being maintained or restored.
The distributions of qualifying species within the site are maintained or restored	

1.7.3.48 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets alone.

Solway Firth SAC

Sea lamprey and river lamprey

1.7.3.49 Potential impacts from underwater sound from UXO clearance impacting fish and shellfish receptors 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 (32.8 km south from the Offshore Order Limits; **Figure 1.3**) as outlined in **paragraphs 1.7.3.20** to **1.7.3.24**. As the Solway Firth SAC is located at an increased distance from the Transmission Assets than the Dee Estuary/Aber Dyfrdwy SAC (85.7 km north from the Offshore Order Limits; **Figure 1.3**), it is considered that impacts on the lamprey features of this site would be of similar if not of a lower magnitude. In addition, the measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document reference: J18; see **Table 1.19**), will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact.

1.7.3.50 Given the distance to the SAC, the large distances between the Offshore Order Limits and the surrounding coastlines and the short term, temporary and intermittent nature of the impact, no adverse effect on integrity was concluded for the Dee Estuary/Aber Dyfrdwy SAC (see **paragraph 1.7.3.25**); therefore, no adverse effect on the sea lamprey and river lamprey features of the Solway Firth SAC can also be concluded.

Conclusions

1.7.3.51 Adverse effects on the sea lamprey and river lamprey which undermine the conservation objectives of the Solway Firth SAC will not occur as a result of underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase. An assessment of this potential impact against each relevant conservation objective (as presented in **paragraphs 1.7.2.50** to **1.7.4.53**) 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 Solway Firth SAC for underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase

Conservation objective	Conclusion
The extent and distribution of habitats of qualifying species are maintained or restored	There is no impact pathway for underwater sound from UXO clearance to result in adverse effects on the habitats of river and sea lampreys. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission 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
The structure and function of the habitats of qualifying species are maintained or restored	

Conservation objective	Conclusion
The supporting processes on which the habitats of qualifying species rely are maintained or restored	habitats of river and sea lampreys rely from being maintained or restored.
The populations of qualifying species are maintained or restored	Sea lamprey and river lamprey which are located in close proximity to UXO clearance at the time of clearance may suffer injury or mortality. However, the nature of these species being highly mobile and tending to only utilise the environment within the study area to pass through during migration (although there is potential for them to be present within the study area all year), the clearance of UXO is unlikely to result in significant mortality or injury and is unlikely to generate population level effects.
The distributions of qualifying species within the site are maintained or restored	Sea lamprey and river lamprey may experience behavioural effects in response to sound from UXO clearance. These behavioural responses may occur within a range of hundreds of metres to several kilometres from UXO clearance operations, depending on the species and their relative sensitivities to underwater sound. Given that lamprey species are known to have a low vulnerability to impacts associated with underwater sound overall (and that potential sound impacts from UXO clearance will be very short-term and intermittent during the construction phase), there is negligible risk of disruption to migration of sea lamprey and river lamprey, especially given the limited migration window of these species through the affected zones of the study area (although there is potential for them to be present within the study area all year). In addition, these impacts are unlikely to result in barriers to migration noting that the Solway Firth SAC is located 85.7 km north from the Offshore Order Limits. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets will not prevent the populations or the distributions of sea lamprey and river lamprey from being maintained or restored.

1.7.3.52 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets alone.

Afon Gwyrfai a Llyn Cwellyn SAC

Atlantic salmon

1.7.3.53 Potential impacts from underwater sound from UXO clearance impacting fish and shellfish receptors on Atlantic salmon features of the Afon Gwyrfai a Llyn Cwellyn SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.28** to **1.7.3.32**. As the Afon Gwyrfai a Llyn Cwellyn SAC) is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (88.1 km south from the Offshore Order

Limits; **Figure 1.3**), 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 Transmission Assets and the short term, temporary and intermittent nature of the impact, it is unlikely to present a barrier to migration. In addition, the measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document reference: J18; **Table 1.19)**, will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (see **paragraph 1.7.3.35**); therefore, no adverse effect on the Atlantic salmon feature of the Afon Gwyrfai a Llyn Cwellyn SAC can also be concluded.

Conclusions

1.7.3.54 Adverse effects on the Atlantic salmon which undermine the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC will not occur as a result of underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase. An assessment of this potential impact against each relevant conservation objective (as presented in **paragraph 1.7.2.56**) 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 Afon Gwyrfai a Llyn Cwellyn SAC for underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase

Conservation objective	Conclusion
The conservation objective for the water course as outlined in NRW (2022b) must be met	Considering the distance from the Offshore Order Limits to the Afon Gwyrfai a Llyn Cwellyn SAC (88.1 km) and the nature of the impact, there is no pathway for effects to the watercourse to occur. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission 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 which are located in close proximity to UXO clearance at the time of clearance may suffer injury or mortality. However, the nature of this species being highly mobile and in general likely to utilise the environment within the study area during migration (although for the purposes of the assessment they could potentially be present all year), the clearance of UXO is unlikely to result in significant mortality or injury and is unlikely to generate population level effects. Atlantic salmon may experience behavioural effects in response to sound from UXO clearance. These behavioural responses may occur within a range of hundreds of metres to several kilometres from UXO clearance operations, depending on the species and their relative sensitivities to underwater sound. Given that Atlantic salmon are known to have a low vulnerability to impacts associated with underwater sound
The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future	

Conservation objective	Conclusion
	overall (and that potential sound impacts from UXO clearance will be very short-term and intermittent during the construction phase), there is negligible risk of disruption to migration of Atlantic salmon, especially given the limited migration window of this species through the affected zones of the study area (although for the purposes of the assessment, they could potentially be present all year). In addition, these impacts are unlikely to result in barriers to migration noting that the Afon Gwyrfai a Llyn Cwellyn SAC is located 88.1 km south from the Offshore Order Limits. Therefore, underwater sound from UXO clearance associated with the Transmission Assets will not prevent the populations of Atlantic salmon from remaining stable or increasing in the long term. Similarly, underwater sound associated with the Transmission Assets will not reduce or likely reduce, in the foreseeable future, the natural range of Atlantic salmon within the site.
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 Offshore Order Limits to the Afon Gwyrfai a Llyn Cwellyn SAC (88.1 km) and the nature of the impact, there is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats supporting Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission 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.

1.7.3.55 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets alone.

River Bladnoch SAC

Atlantic salmon

1.7.3.56 Potential impacts from underwater sound from UXO clearance impacting fish and shellfish receptors on Atlantic salmon features of the River Bladnoch SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.28** to **1.7.3.32**. As the River Bladnoch SAC (89.5 km north from the Offshore Order Limits; **Figure 1.3**) is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid 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 Transmission Assets and the short term, temporary and intermittent nature of the impact, it is unlikely to present a barrier to migration. In addition, the measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document

reference: J18; see **Table 1.19)**, will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (see **paragraph 1.7.3.35**); therefore, no adverse effect on the Atlantic salmon feature of the River Bladnoch SAC can also be concluded.

Conclusions

1.7.3.57 Adverse effects on the Atlantic salmon which undermine the conservation objectives of the River Bladnoch SAC will not occur as a result of underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase. An assessment of this potential impact against each relevant conservation objective (as presented in **paragraph 1.7.2.60**) 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 Bladnoch SAC for underwater sound from UXO clearance impacting fish and shellfish receptors 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 which are located in close proximity to UXO clearance at the time of clearance may suffer injury or mortality. However, the nature of this species being highly mobile and in general likely to utilise the environment within the study area during migration (although for the purposes of the assessment they could potentially be present all year), the clearance of UXO is unlikely to result in significant mortality or injury and is unlikely to generate population level effects. Atlantic salmon may experience behavioural effects in response to sound from UXO clearance. These behavioural responses may occur within a range of hundreds of metres to several kilometres from UXO clearance operations, depending on the species and their relative sensitivities to underwater sound. Given that Atlantic salmon are known to have a low vulnerability to impacts associated with underwater sound overall (and that potential sound impacts from UXO clearance will be very short-term and intermittent during the construction phase), there is negligible risk of disruption to migration of Atlantic salmon, especially given the limited migration window of this species through the affected zones of the study area (although for the purposes of the assessment, they could potentially be present all year). In addition, these impacts are unlikely to result in barriers to migration noting that the River Bladnoch SAC is located 89.5 km north from the Offshore Order Limits. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission 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	

Conservation objective	Conclusion
Restore the habitats supporting the species within the site and availability of food	There is no impact pathway between underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase and the habitats of Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase associated with the Transmission Assets will not prevent the habitats supporting Atlantic salmon within the site and availability of food from being restored.

1.7.3.58 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets alone.

River Eden SAC

Sea lamprey and river lamprey

1.7.3.59 Potential impacts from underwater sound from UXO clearance impacting fish and shellfish receptors 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 (32.8 km south from the Offshore Order Limits; **Figure 1.3**) as outlined in **paragraphs 1.7.3.20** to **1.7.3.24**. As the River Eden SAC (is located at an increased distance from the Transmission Assets than the Dee Estuary/Aber Dyfrdwy SAC (127.7 km north from the Offshore Order Limits; **Figure 1.3**), it is considered that impacts on the lamprey features of this site would be of similar if not of a lower magnitude. In addition, the measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document reference: J18; see **Table 1.19**), will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact.

1.7.3.60 Given the distance to the SAC, the large distances between the Offshore Order Limits and the surrounding coastlines and the short term, temporary and intermittent nature of the impact, no adverse effect on integrity was concluded for the Dee Estuary/Aber Dyfrdwy SAC (see **paragraph 1.7.3.25**); therefore no adverse effect on the sea lamprey and river lamprey features of the River Eden SAC can also be concluded.

Atlantic salmon

1.7.3.61 Potential impacts from underwater sound from UXO clearance impacting fish and shellfish receptors on Atlantic salmon features of the River Eden SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.20** to **1.7.3.24**. As the River Eden SAC is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (127.7 km north from the Offshore Order Limits; **Figure 1.3**), 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 Eden SAC in respect to the Transmission Assets and the short term, temporary and intermittent nature of the impact, it is unlikely to present a barrier to migration. In addition, the measures adopted as part of the Transmission Assets, including the development of an MMMP (CoT64, document reference: J18; see **Table 1.19**), will reduce the risk of injury to some fish species by potentially allowing reactive individuals in close proximity to UXO clearance to move away from the area of impact. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (see **paragraph 1.7.3.35**); therefore, no adverse effect on the Atlantic salmon feature of the River Eden SAC can also be concluded.

Conclusions

1.7.3.62 Adverse effects on the 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 from UXO clearance impacting fish and shellfish receptors during the construction phase. An assessment of this potential impact against each relevant conservation objective (as presented in **paragraphs 1.7.2.66** and **1.7.2.67**) 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 Eden SAC for underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase

Conservation objective	Conclusion
The extent and distribution of habitats of qualifying species are maintained or restored	There is no impact pathway for underwater sound to result in adverse effects on the habitats of river lamprey, sea lamprey and Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets will not prevent the extent, distribution, structure and function of the habitats of river lamprey, sea lamprey and Atlantic salmon or the supporting processes on which the habitats of river lamprey, sea lamprey and Atlantic salmon 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 which are located in close proximity to UXO clearance at the time of clearance may suffer injury or mortality. However, the nature of these species being highly mobile and tending to only utilise the environment within the study area to pass through during migration (although there is potential for them to be present within the study area all year), the

Conservation objective	Conclusion
The distributions of qualifying species within the site are maintained or restored	clearance of UXO is unlikely to result in significant mortality or injury and is unlikely to generate population level effects. Atlantic salmon, sea lamprey and river lamprey may experience behavioural effects in response to sound from UXO clearance. These behavioural responses may occur within a range of hundreds of metres to several kilometres from UXO clearance operations, depending on the species and their relative sensitivities to underwater sound. Given that qualifying species of this SAC are known to have a low vulnerability to impacts associated with underwater sound overall (and that potential sound impacts from UXO clearance will be very short-term and intermittent during the construction phase), there is negligible risk of disruption to migration of Atlantic salmon, sea lamprey or river lamprey, especially given the limited migration window of these species through the affected zones of the study area (although there is potential for them to be present within the study area all year). In addition, these impacts are unlikely to result in barriers to migration noting that the River Eden is located 127.1 km north from the Offshore Order Limits. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets will not prevent the populations or the distributions of river lamprey, sea lamprey and Atlantic salmon from being maintained or restored.

1.7.3.63 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets alone.

EMF from subsea electrical cabling

1.7.3.64 The presence and operation of the offshore export cables within the Offshore Order Limits will lead to localised potential EMF impacts, which may affect Annex II diadromous fish features and freshwater pearl mussel.

1.7.3.65 The assessment of LSE in the HRA Stage 1 Screening Report (document reference: E3) identified that during the operation and maintenance phase, LSE could not be ruled out for the potential impacts of EMF from subsea electrical cabling. This relates to the European sites and relevant Annex II features listed in **Table 1.29**.

Table 1.29: European sites and relevant Annex II diadromous fish features from which the potential for an LSE could not be ruled out in relation to EMF from subsea electrical cabling

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

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

1.7.3.67 The MDS considered for the assessment of potential impacts on Annex II diadromous fish features from EMF from subsea electrical cabling effects is presented in **Table 1.30**. The MDS has been selected as the one which has the potential to result in the greatest effect on the identified receptor and considers the activities to be carried out sequentially. These scenarios have been selected from the project design provided in Volume 1, Chapter 3: Project description of the ES (document reference: F1.3), which presents the same cable installation period for both concurrent and sequential installations. Under the proposed construction programme activities are not due to be taken at the same time, as to the Generation Assets sharing the same cable corridor and cable routing from the Morecambe Offshore Windfarm: Generation Assets to the Landfall. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project design (e.g., different infrastructure layout), to that assessed here, be taken forward in the final design.

1.7.3.68 For the purposes of the assessment sea lamprey and river lamprey have been assessed together due to their similar sensitivity to EMF from subsea electrical cabling 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 1.30: Maximum design scenario considered for the assessment of potential impacts on diadromous fish from EMF from subsea electrical cabling

Phase	Maximum design scenario	Justification
Operation and maintenance phase	Presence of offshore export cables. • Export cables: up to 484 km of 220 kV or 275 kV HVAC cables. – Morgan export cables: 4 x 100 km (400 km total) of 220 kV or 275 kV HVAC cables – Morecambe export cables: 2 x 42 km (84 km total) of 220 kV or 275 kV HVAC cables • Minimum burial depth 0.5 m. • Up to 10% of Morgan export cables and 10% of Morecambe export cables may require additional cable protection. • Cable protection: cables will also require cable protection at asset crossings (up to 45 crossings for the Morgan export cables and up to six cable crossings for the Morecambe export cables). Operation and maintenance phase of up to 35 years.	Maximum length of offshore export cable route and minimum burial depth (the greater the burial depth, the greater the distance between the EMF source and the receptor, reducing the potential for exposure to receptors by enhanced EMFs).

Measures adopted as part of the Transmission Assets (Commitments)

1.7.3.69 Measures adopted as part of the Transmission Assets which are of relevance to the assessment of potential impacts on Annex II diadromous fish features from EMF from subsea electrical cabling during the operation and maintenance phase are presented in **Table 1.31**.

Table 1.31: Measures adopted as part of the Transmission Assets which are relevant to EMF from subsea electrical cabling effects

Commitment number	Measure adopted	How the measure will be secured
CoT45	An Outline CSIP includes: details of cable burial depths, cable protection and cable monitoring. Detailed CSIP(s) and CBRA(s) will be prepared by the Applicants covering the full extent of their respective offshore export cable corridors. Detailed CSIPs will be developed in accordance with the Outline CSIP and will ensure safe navigation is not compromised including consideration of under keel clearance. No more than 5% reduction in water depth (referenced to Chart Datum) will occur at any point on the offshore export cable corridor route without prior written approval from the MCA.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(e) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Windfarm Transmission Assets), Part 2 - Condition 18(1)(e) (Pre-construction plans and documentation)
CoT54	An Outline Offshore Cable Specification and Installation Plan (CSIP) includes for cable burial to be the preferred option for cable protection, where practicable. Detailed CSIP(s) will be developed in accordance with the Outline CSIP.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 - Condition18(1)(e) (Pre-construction plans and documentation) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Windfarm Transmission Assets), Part 2 - Condition 18(1)(e) (Pre-construction plans and documentation)

Operation and maintenance phase

Information to support assessment

1.7.3.70 EMF subsea electrical cabling 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 50 µT (i.e., 500 mG) for example in the North Sea (Tasker *et al.,* 2010; Eirgrid Group, 2015). It is common practice to block the direct electrical field using conductive sheathing, meaning that the only EMF from subsea electrical cabling that are emitted into the marine environment are the magnetic field and the resultant induced electrical field.

1.7.3.71 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).

1.7.3.72 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).

1.7.3.73 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 1 m to 2 m 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.

1.7.3.74 Further information on the EMF from subsea electrical cabling levels associated with offshore wind farm power cables is included within Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3).

Dee Estuary/Aber Dyfrdwy SAC

Sea lamprey and river lamprey

1.7.3.75 EMF from subsea electrical cabling 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 100 mV/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 3: Fish and shellfish ecology of the ES (document reference: F2.3). There is currently no evidence of lamprey responses to magnetic B fields (Gill and Bartlett, 2010).

1.7.3.76 As outlined in **paragraph 1.7.3.75,** EMF from subsea electrical cabling 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.

1.7.3.77 Lamprey species are considered to have significantly reduced sensitivity to EMF from subsea electrical cabling 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 measures adopted as part of the Transmission Assets outlined in **Table 1.31,** including a detailed CSIP (which will be developed in accordance with the Outline CSIP (CoT54; document reference: J15), which outlines cable burial as the preferred option for cable protection**.** EMF impacts will therefore likely be reduced by increasing the distance between the EMF source and the receptor. This will further reduce the potential for adverse effects on lamprey species. While burial of cables will not reduce the strength of EMF from subsea electrical cabling, it does increase the distance between cables and Annex II diadromous fish features, thereby reducing the effect on those receptors.

1.7.3.78 Any impact of EMF from subsea electrical cabling 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 1.31**).

Conclusions

1.7.3.79 Adverse effects on the 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 electrical cabling during the operation and maintenance phase. An assessment of the potential impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.8** to **1.7.2.12**) 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 Dee Estuary/Aber Dyfrdwy SAC for EMF from subsea electrical cabling during the operation and maintenance phase

Conservation objective	Conclusion
The migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee is unobstructed by physical barriers and/or poor water quality.	The Dee Estuary/Aber Dyfrdwy SAC is located 32.8 km south from the Offshore Order Limits. There is no impact pathway from EMF to affect water quality or to physically obstruct a migratory pathway. As such, the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality.
The five year mean count of river lampreys recorded by the Chester Weir fish trap is no less than 55 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000). **The five year mean count of sea lampreys by the Chester Weir fish trap is no less than 18 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000)**	Given that lamprey species are considered to have low sensitivity to EMF from subsea electrical cabling and that the assessment concluded that EMF from subsea electrical cabling associated with the Transmission 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 abundance of prey species forming the river lamprey/sea lamprey's food resource within the estuary, is maintained.	Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3) concluded that for prey species of the sea lamprey and river lamprey impacts from EMF would be of minor adverse significance, which is not significant in EIA terms. The impact will be localised (i.e. metres from the cable) and reversible on decommissioning of the cables. Therefore, EMF from subsea electrical cabling will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.

1.7.3.80 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets alone.

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

Sea lamprey and river lamprey

1.7.3.81 Potential EMF from subsea electrical cabling 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 (32.8 km south from the Offshore Order Limits;

Figure 1.3) as outlined in **paragraphs 1.7.3.75** to **1.7.3.78**. As the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC is located at an increased distance from the Transmission Assets than the Dee Estuary/Aber Dyfrdwy SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**), 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 1.7.3.80**) 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

1.7.3.82 Atlantic salmon have been found to possess magnetic material of a size suitable for magnetoreception and can use the earth's magnetic field for orientation and direction-finding during migration (Gill and Bartlett, 2010; CSA, 2019). In the absence of additional literature focusing on Atlantic salmon, evidence on behavioural responses and sensitivity of European eel (as a species which has also been found to possess magnetic material of a size suitable for magnetoreception) has been presented as a proxy. 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).

1.7.3.83 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 7,000 km migration, with little to no impact on migratory behaviour noted beyond 500 m from wind farm development infrastructure (Öhman *et al.,* 2007). While this study was undertaken on European eel, this indicates that fish behavioural effects in response to EMF from subsea electrical cabling are limited both temporally and spatially and these do not cause barriers to migration.

1.7.3.84 Research in Sweden on the effects of a High Voltage Direct Current 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 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 direct current 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.

1.7.3.85 As outlined in **paragraphs 1.7.3.83** and **1.7.3.84**, the EMF from subsea electrical cabling associated with the Transmission Assets could potentially result in changes to Atlantic salmon behaviour. However, these behavioural effects are expected to be highly localised and temporary and not likely to be at a level that would affect migratory behaviour or migratory routes.

1.7.3.86 As a result, any EMF from subsea electrical cabling impacts will be localised in context within the wider Irish Sea region and will not present a barrier to migration to and from the SAC. In addition, considering the measures adopted as part of the Transmission Assets outlined in **Table 1.31,** including a detailed CSIP (which will be developed in accordance with the Outline CSIP (CoT54; document reference: J15), which outlines cable burial as the preferred option for cable protection, any behavioural effects are likely to be further minimised. This is due to the burial of cables increasing the distance between the EMF source and the receptor, thereby reducing the levels at which receptors are exposed to impacts from EMFs.

Conclusions

1.7.3.87 Adverse effects on the sea lamprey, river lamprey and Atlantic salmon features 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 electrical cabling during the operation and maintenance phase. An assessment of the potential impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.20** to **1.7.2.23**) 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 Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC for EMF from subsea electrical cabling during the operation and maintenance phase

Conservation objective	Conclusion
The parameters defined in the vision for the watercourse as outlined in NRW (2022a) must be met	Due to the nature of the potential impact, and the distance of the Transmission Assets from the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km), there is no pathway to potential impact on these conservation objectives and EMF from subsea electrical cabling associated with the Transmission Assets will not prevent the defined vision for the watercourse from being met (due to the short range of effects associated with EMFs from the source; i.e., a few metres). There will be no reduction in the area or quality of habitat for the populations of 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 electrical cabling and that the assessment concluded that EMF from subsea electrical cabling associated with the Transmission 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.
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.

1.7.3.88 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets alone.

River Ehen SAC

Atlantic salmon

1.7.3.89 Potential impacts from EMF from subsea electrical cabling on Atlantic salmon features of the River Ehen SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.83** to **1.7.3.86**. As the River Ehen SAC is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (62.5 km north from the Offshore Order Limits; **Figure 1.3**), 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 Ehen SAC in respect to the Transmission Assets, it is unlikely to present a barrier to migration. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC

(see **paragraph 1.7.3.88**) therefore no adverse effect on the Atlantic salmon feature of the River Ehen SAC can also be concluded.

Freshwater pearl mussel

1.7.3.90 The freshwater pearl mussel has been considered within this HRA Stage 2 ISAA - Part 2 SAC Assessments as Atlantic salmon are one of the host species during a critical parasitic phase of the mussel's lifecycle. There could therefore be a potential indirect impact upon the freshwater pearl mussel feature of the site if the Atlantic salmon population is adversely affected. However, as outlined in **paragraph 1.7.3.89**, 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

1.7.3.91 Adverse effects on the 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 electrical cabling during the operation and maintenance phase. An assessment of the potential impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.30** and **1.7.2.31**) is presented in **Table 1.34**. Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.34: Conclusions against the conservation objectives of the River Ehen SAC for EMF from subsea electrical cabling during the operation and maintenance phase

Conservation objective	Conclusion
The extent and distribution of habitats of qualifying species are maintained or restored	The River Ehen SAC is located 62.5 km north from the Offshore Order Limits. There is no pathway for effect between EMF from subsea electrical cabling and the habitats of Atlantic salmon and freshwater pearl mussel due to the short range of effects associated with EMFs from the source (i.e., a few metres). Therefore, EMF from subsea electrical cabling associated with the Transmission 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 electrical cabling and that the assessment concluded that EMF from subsea electrical cabling associated with the Transmission 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	

1.7.3.92 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

electrical cabling with respect to the operation and maintenance phase of the Transmission Assets alone.

River Kent SAC

Freshwater pearl mussel

1.7.3.93 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.

1.7.3.94 For the SACs outlined above, where Atlantic salmon is a qualifying feature, no adverse effects have been concluded in relation to EMF from subsea electrical cabling. Potential impacts from EMF from subsea electrical cabling on brown trout and Atlantic salmon features of the River Kent SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.83** to **1.7.3.86**.

1.7.3.95 As the River Kent SAC is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (65.2 km north from the Offshore Order Limits; **Figure 1.3**), 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 Transmission Assets, it is unlikely to present a barrier to migration to Atlantic salmon. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (see **paragraph 1.7.3.88**), 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

1.7.3.96 Adverse effects on the freshwater pearl mussel which undermine the conservation objectives of the River Kent SAC will not occur as a result of EMF from subsea electrical cabling during the operation and maintenance phase. An assessment of the potential impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.35** to **1.7.2.37**) is presented 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 Kent SAC for EMF from subsea electrical cabling during the operation and maintenance phase

Conservation objective	Conclusion
The extent and distribution of habitats of qualifying species are maintained or restored	The River Kent SAC is located 65.2 km north from the Offshore Order Limits. There is no pathway for effect between EMF from subsea electrical cabling and the habitats of freshwater pearl mussel due to the short range of effects associated with EMFs from the source (i.e. a few metres). Therefore, EMF from subsea electrical cabling associated with the Transmission 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 electrical cabling 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 electrical cabling and that the assessment concluded that EMF from subsea electrical cabling associated with the Transmission Assets would not result in a barrier to migration of Atlantic salmon.
The distributions of qualifying species within the site are maintained or restored	

1.7.3.97 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets alone.

River Derwent and Bassenthwaite Lake SAC

Sea lamprey and river lamprey

1.7.3.98 Potential EMF from subsea electrical cabling 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 (32.8 km south from the Offshore Order Limits; **Figure 1.3**) as outlined in **paragraphs 1.7.3.75** to **1.7.3.78**. As the River Derwent and Bassenthwaite Lake SAC is located at an increased distance from the Transmission Assets than the Dee Estuary/Aber Dyfrdwy SAC (72.3 km north from the Offshore Order Limits; **Figure 1.3**), 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 1.7.3.80**) therefore no adverse effect on the sea lamprey and river lamprey features of the River Derwent and Bassenthwaite Lake SAC can also be concluded.

Atlantic salmon

1.7.3.99 Potential impacts from EMF from subsea electrical cabling on Atlantic salmon features of the River Derwent and Bassenthwaite Lake SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.83** to **1.7.3.86**. As the River Derwent and Bassenthwaite Lake SAC is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (72.3 km north from the Offshore Order Limits; **Figure 1.3**), 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 Derwent and Bassenthwaite Lake SAC in respect to the Transmission Assets, it is unlikely to present a barrier to migration. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (see **paragraph 1.7.3.88**) therefore no adverse effect on the Atlantic salmon feature of the River Derwent and Bassenthwaite Lake SAC can also be concluded.

Conclusions

1.7.3.100 Adverse effects on the sea lamprey, river lamprey and Atlantic salmon features which undermine the conservation objectives of the River Derwent and Bassenthwaite Lake SAC will not occur as a result of EMF from subsea electrical cabling during the operation and maintenance phase. An assessment of the potential impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.43** to **1.7.2.45**) is presented 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 River Derwent and Bassenthwaite Lake SAC for EMF from subsea electrical cabling during the operation and maintenance phase

Conservation objective	Conclusion
The extent and distribution of habitats of qualifying species are maintained or restored	The River Derwent and Bassenthwaite Lake SAC is located 72.3 km north from the Offshore Order Limits. There is no impact pathway for effect between EMF from subsea electrical cabling and the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, EMF from subsea electrical cabling associated with the Transmission 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 electrical cabling and that the assessment concluded that

Conservation objective	Conclusion
The distributions of qualifying species within the site are maintained or restored	EMF from subsea electrical cabling associated with the Transmission 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.

1.7.3.101 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets alone.

Solway Firth SAC

Sea lamprey and river lamprey

1.7.3.102 Potential EMF from subsea electrical cabling 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 (32.8 km south from the Offshore Order Limits; **Figure 1.3**) as outlined in **paragraphs 1.7.3.75** to **1.7.3.78**. As the Solway Firth SAC is located at an increased distance from the Transmission Assets than the Dee Estuary/Aber Dyfrdwy SAC (85.7 km north from the Offshore Order Limits; **Figure 1.3**), 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 1.7.3.80**) therefore no adverse effect on the sea lamprey and river lamprey features of the Solway Firth SAC can also be concluded.

Conclusions

1.7.3.103 Adverse effects on the 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 electrical cabling during the operation and maintenance phase. An assessment of the potential impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.50** to **1.7.4.53**) is presented 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 Solway Firth SAC for EMF from subsea electrical cabling during the operation and maintenance phase

Conservation objective	Conclusion
The extent and distribution of habitats of qualifying species are maintained or restored	The Solway Firth SAC is located 85.7 km north from the Offshore Order Limits. There is no pathway for effect between EMF from subsea electrical cabling and the habitats of sea lamprey and river lamprey. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or the
The structure and function of the habitats of qualifying species are maintained or restored	

Conservation objective	Conclusion
The supporting processes on which the habitats of qualifying species rely are maintained or restored	supporting processes on which the habitats of sea lamprey and river lamprey rely from being 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 electrical cabling and that the assessment concluded that EMF from subsea electrical cabling associated with the Transmission 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	

1.7.3.104 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets alone.

Afon Gwyrfai a Llyn Cwellyn SAC

Atlantic salmon

1.7.3.105 Potential impacts from EMF from subsea electrical cabling on Atlantic salmon features of the Afon Gwyrfai a Llyn Cwellyn SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.83** to **1.7.3.86**. As the Afon Gwyrfai a Llyn Cwellyn SAC is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (87.3 km south from the Offshore Order Limits; **Figure 1.3**), 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 Transmission Assets, it is unlikely to present a barrier to migration. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (see **paragraph 1.7.3.88**) therefore no adverse effect on the Atlantic salmon feature of the Afon Gwyrfai a Llyn Cwellyn SAC can also be concluded.

Conclusions

1.7.3.106 Adverse effects on the 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 electrical cabling during the operation and maintenance phase. An assessment of the potential impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraph 1.7.2.56**) is presented in **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 Afon Gwyrfai a Llyn Cwellyn SAC for EMF from subsea electrical cabling during the operation and maintenance phase

Conservation objective	Conclusion
The conservation objective for the water course as outlined in NRW (2022b) must be met	Considering the distance from the Transmission Assets to the Afon Gwyrfai a Llyn Cwellyn SAC (87.3 km) and the nature of the potential impact, there is no pathway for effect between EMF from subsea electrical cabling and the watercourse. Therefore, EMF from subsea electrical cabling associated with the Transmission 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 electrical cabling and that the assessment concluded that EMF from subsea electrical cabling associated with the Transmission 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 electrical cabling and the habitats of the qualifying species. Therefore, EMF from subsea electrical cabling associated with the Transmission 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.

1.7.3.107 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets alone.

River Bladnoch SAC

Atlantic salmon

1.7.3.108 Potential impacts from EMF from subsea electrical cabling on Atlantic salmon features of the River Bladnoch SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.83** to **1.7.3.86**. As the River Bladnoch SAC is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (89.5 km north from the Offshore Order Limits; **Figure 1.3**), 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 Transmission Assets, it is unlikely to present a barrier to migration. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (see **paragraph 1.7.3.88**) therefore no adverse effect on the Atlantic salmon feature of the River Bladnoch SAC can also be concluded.

Conclusions

1.7.3.109 Adverse effects on the Atlantic salmon which undermine the conservation objectives of the River Bladnoch SAC will not occur as a result of EMF from subsea electrical cabling during the operation and maintenance phase. An assessment of the potential impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraph 1.7.2.60**) is presented 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 River Bladnoch SAC for EMF from subsea electrical cabling during the operation 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 electrical cabling and that the assessment concluded that EMF from subsea electrical cabling associated with the Transmission Assets would not result in a barrier to migration of Atlantic salmon (the River Bladnoch SAC is located 89.5 km north from the Offshore Order Limits), 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. Therefore, EMF from subsea electrical cabling associated with the Transmission 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 electrical cabling and the habitats of Atlantic salmon. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets will not prevent the habitats supporting Atlantic salmon within the site and availability of food from being restored.

1.7.3.110 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets alone.

River Eden SAC

Sea lamprey and river lamprey

1.7.3.111 Potential EMF from subsea electrical cabling 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 (32.8 km south from the Offshore Order Limits; **Figure 1.3**) as outlined in **paragraphs 1.7.3.75** to **1.7.3.78**. As the River Eden SAC is located at an increased distance from the Transmission Assets than the Dee Estuary/Aber Dyfrdwy SAC (127.7 km north from the Offshore Order Limits; **Figure 1.3**), 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 1.7.3.80**)

therefore no adverse effect on the sea lamprey and river lamprey features of the River Eden SAC can also be concluded.

Atlantic salmon

1.7.3.112 Potential impacts from EMF from subsea electrical cabling on Atlantic salmon features of the River Eden SAC are predicted to be similar to those associated with the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (59.1 km south from the Offshore Order Limits; **Figure 1.3**) outlined in **paragraphs 1.7.3.83** to **1.7.3.86**. As the River Eden SAC is located at an increased distance from the Transmission Assets than the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (127.7 km north from the Offshore Order Limits; **Figure 1.3**), 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 Eden SAC in respect to the Transmission Assets, it is unlikely to present a barrier to migration. No adverse effect on integrity was concluded for the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC (see **paragraph 1.7.3.88**) therefore no adverse effect on the Atlantic salmon feature of the River Eden SAC can also be concluded.

Conclusions

1.7.3.113 Adverse effects on the sea lamprey, river lamprey and Atlantic salmon features which undermine the conservation objectives of the River Eden SAC will not occur as a result of EMF from subsea electrical cabling during the operation and maintenance phase. An assessment of the potential impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.66** and **1.7.2.67**) is presented 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 Eden SAC for EMF from subsea electrical cabling during the operation and maintenance phase

Conservation objective	Conclusion
The extent and distribution of habitats of qualifying species are maintained or restored	The River Eden SAC is located 127.7 km north from the Offshore Order Limits. There is no pathway for effect between EMF from subsea electrical cabling and the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, EMF from subsea electrical cabling associated with the Transmission 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 electrical cabling and that the assessment concluded that

Conservation objective	Conclusion
The distributions of qualifying species within the site are maintained or restored	EMF from subsea electrical cabling associated with the Transmission 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.

1.7.3.114 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 electrical cabling with respect to the operation and maintenance phase of the Transmission 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 Transmission Assets on Annex II diadromous fish features of the designated sites identified have been summarised in **Table 1.41** and are shown in **Figure 1.5**.

1.7.4.2 As outlined in the HRA Stage 1 Screening Report (document reference: E3), where the potential for LSE has been concluded alone, the potential for LSE also has been concluded in-combination. For potential impacts where LSE has been ruled out with respect to the Transmission Assets alone, there is either no pathway to effect, or the Transmission 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 3: Fish and Shellfish Ecology of the ES (document reference: F2.3), and which have been brought forward for consideration in the in-combination assessment of the HRA Stage 2 ISAA - Part 2 SAC Assessments are:

- in-combination underwater sound from UXO clearance impacting fish and shellfish receptors; and
- in-combination EMF from subsea electrical cabling.

1.7.4.4 The following assessments of the effects of the Transmission Assets, acting in-combination with other relevant plans and projects (see **section 1.5.5** for more information on the approach to the in-combination assessment), on Annex II diadromous fish have been informed by the detailed project-specific underwater sound modelling presented in Volume 1, Annex 5.2: Underwater sound technical report of the ES (document reference: F1.5.2) and the technical assessments presented in Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3). The Applicants have made all reasonable efforts to ensure that the information included in the assessments relating to other plans and projects is correct and sufficiently detailed, with any limitations on the information available acknowledged. The assessments have also drawn upon the sensitivity assessments of the relevant fish

species detailed in Volume 2, Chapter 3: Fish and shellfish ecology of the ES (document reference: F2.3) which reference the best available literature and evidence with regards to sensitivity. In this regard, the Applicants are confident that the conclusions made on European site integrity from the Transmission Assets in-combination with other plans and projects have been identified in light of the best available scientific knowledge and all reasonable scientific doubt can be ruled out.

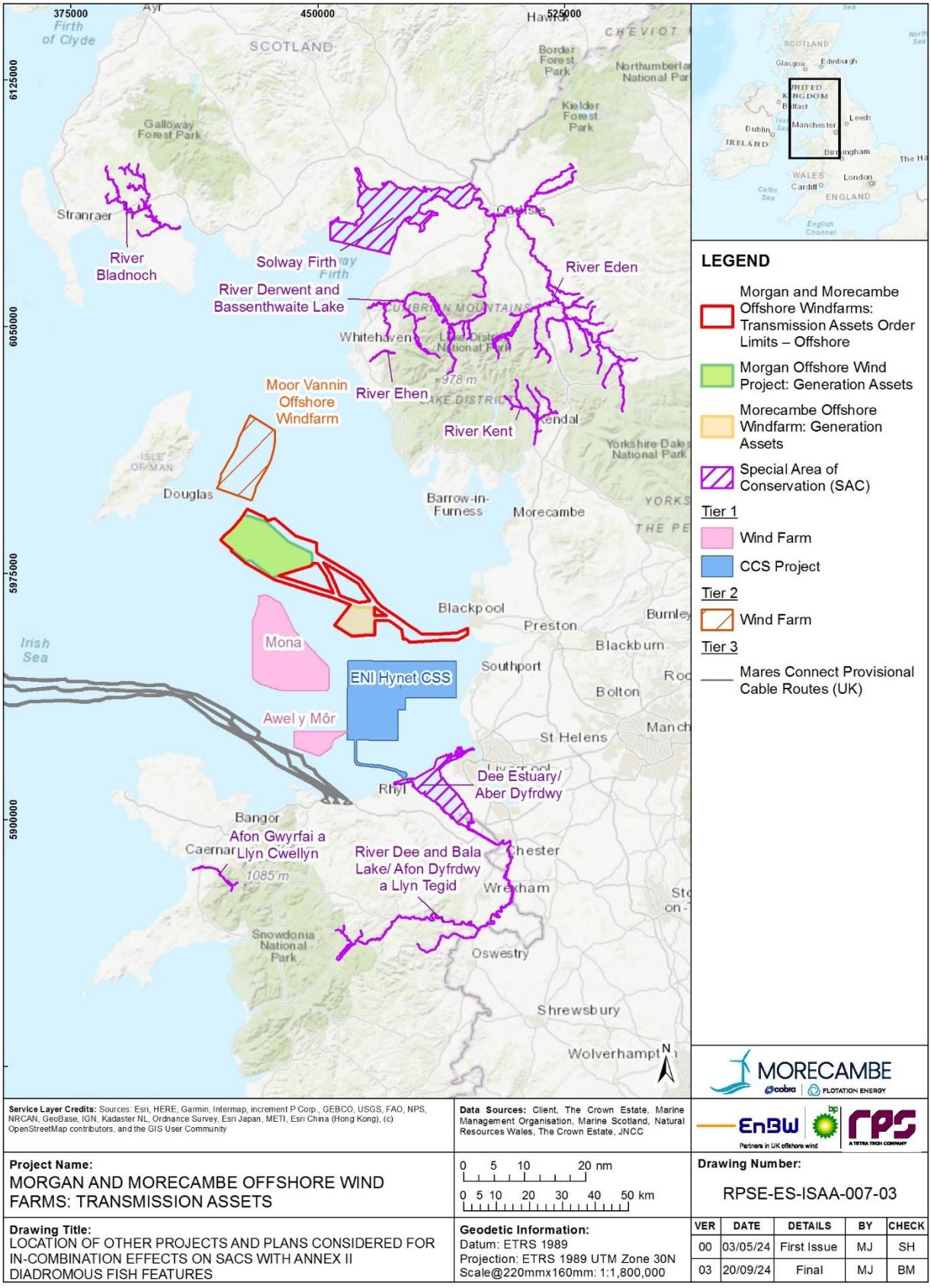

Figure 1.5: Locations of other projects and plans considered for in-combination effects on SACs with Annex II diadromous fish features (not to scale)

Table 1.41: List of other projects and plans with potential for in-combination effects on Annex II diadromous fish features

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Transmission Assets	-	-	-	2027 to 2030	2030 to 2065	-
Morecambe Offshore Windfarm: Generation Assets (Scenario 1 and 3)	Submitted	0.00	480 MW Offshore Wind Farm (generating assets)	2026 to 2029	2030 to 2065	The construction, operation and maintenance and decommissioning phases of this project will overlap with the construction, operation and maintenance and decommissioning phases of the Transmission Assets. Considered alongside the Transmission Assets in Scenarios 1, 3, 4a, 4b and 4c.
Morgan Offshore Wind Project: Generation Assets	Submitted	0 km	1.5 GW Offshore Wind Farm (generating assets)	2026 to 2030	2030 to 2065	The construction, operation and maintenance and decommissioning phases of this project will overlap with the construction, operation and maintenance and decommissioning phases of the Transmission Assets. Considered alongside the Transmission Assets in Scenarios 2, 3, 4a, 4b and 4c.

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Tier 1						
Mona Offshore Wind Project	Submitted	9.73	Application for the 1.5 GW Mona Offshore wind project in the east Irish Sea.	2028 – 2029	2030 – 2065	The construction, operation and maintenance, and decommissioning phases of this project will overlap with the construction, operation and maintenance, and decommissioning phases of the Transmission Assets.
Awel y Môr Offshore Wind Farm	Permitted	28.87	Offshore wind farm over 100 MW (48 to 91 wind turbines).	2026 – 2030	2030 – 2055	The construction, operation and maintenance and decommissioning phases of this project will overlap with the construction and operation and maintenance phases of the Transmission Assets.
Tier 2						
Mooir Vannin Offshore Windfarm	Pre-application	2.59	Ørsted have signed an agreement for lease to develop a 700 MW (annual output 3,000 GWh) wind farm on the east coast and have undertaken initial surveys since 2016	2030 to 2032	Operational in 2032 with end date unknown	This project will overlap with the operation and maintenance phase decommissioning phase of the Transmission Assets.
Eni HyNet Carbon Capture and Storage (CCS)	Pre-application (for offshore	5.74	CCS project in the east Irish Sea. Works will include installation of a new Douglas CCS	Unknown	Unknown	This project may overlap with the construction and operation and maintenance

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
	elements of the project)		platform and work on the existing Hamilton, Hamilton North and Lennox wellhead platforms.			phases of the Transmission Assets.
Tier 3						
MaresConnect	Pre-application	34.44	MaresConnect is a proposed 750 MW subsea and underground electricity interconnector system linking the electricity grids in Ireland and Great Britain.	2025 onwards	Unknown	This project will overlap with the construction, operation and maintenance phases of the Transmission Assets.
Isle of Man to UK Interconnector Cable 2	Pre-application	Unknown	A new 70 MW to 100 MW HVAC interconnector to be deployed by 2030 between Pulrose substation and north west England Distribution network.	2024 to 2030	2030 onwards	The construction, operation and maintenance, and decommissioning phases of this project will temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Mooir Vannin - UK Transmission Assets	Pre-application	N/A	Comprising of offshore export cables and a booster station to connect the Mooir Vannin Offshore Wind Farm to the UK.	Unknown	Unknown	The construction and operation and maintenance phases of this project may temporally overlap with the operation and maintenance and decommissioning phases of the Transmission Assets.

In-combination underwater sound from UXO clearance impacting fish and shellfish receptors

1.7.4.5 The assessment of LSE (in HRA Stage 1 Screening Report; document reference: E3) identified that LSE could not be ruled out for the potential in-combination impacts of underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase of the Transmission Assets in combination with other plans/projects. This relates to the designated sites and relevant Annex II diadromous fish features listed in **Table 1.42**.

Table 1.42: European sites and relevant Annex II diadromous fish features from which the potential for an LSE could not be ruled out in relation to in-combination underwater sound from UXO clearance impacting fish and shellfish receptors

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

1.7.4.6 There is potential for underwater sound from UXO clearance impacting fish and shellfish receptors as a result of activities associated with the Transmission Assets during the construction phase, in-combination with UXO clearance activities associated with the projects/plans considered under the following Scenarios.

- Scenario 1 considers the Transmission Assets and the Morecambe Offshore Windfarm: Generation Assets.

- Scenario 2 considers the Transmission Assets and the Morgan Offshore Wind Project: Generation Assets.
- Scenario 3 considers the Transmission Assets, the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets
- Scenario 4a considers the plans assessed under Scenario 3 (Transmission Assets and Generation Assets) alongside the following Tier 1 projects: Mona Offshore Wind Project and Awel y Môr Offshore Wind Farm.
- Scenario 4b considers the plans assessed under Scenario 4a and the following Tier 2 projects: Mooir Vannin Offshore Windfarm and Eni HyNet CCS Project.
- Scenario 4c considers the plans assessed under Scenario 4b and the following Tier 3 projects: MaresConnect and the Isle of Man to UK Interconnector 2.

1.7.4.7 The in-combination effects assessment follows the methodology set out in **section 1.5.5** and is presented in a series of tables (one for each potential in-combination effect). These tables (**Table 1.43** and **Table 1.44**) present a summary of the in-combination assessment, with the full detailed in-combination assessment presented in **paragraphs 1.7.4.8** *et seq*.

Construction phase

Information to support assessment

Scenario 1

1.7.4.8 The in-combination effects assessment for Scenario 1 considers:

- the Transmission Assets; and
- the Morecambe Offshore Windfarm: Generation Assets.

1.7.4.9 During the construction phase of the Transmission Assets, there is potential for increased underwater sound from UXO clearance to occur in-combination with the Morecambe Offshore Windfarm: Generation Assets.. The assessment of potential sound impacts associated with UXO clearance from the Transmission Assets alone has been presented in **section 1.7.3**. It is noted that given the relationship of these projects (i.e. that the Applicants of the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets (Morgan OWL and Morgan OWL) are jointly seeking consent for the Transmission Assets; see HRA Stage 2 ISAA – Part 1: Introduction; document reference E2.1), UXO clearance would likely be phased and is unlikely to occur concurrently. However, this Scenario has been assessed in full, adopting a precautionary approach.

1.7.4.10 For the Morecambe Offshore Windfarm: Generation Assets, modelling up to 353.6 kg NEQ indicated mortality and potential mortal injury to similar ranges as those predicted for the Transmission Assets, with ranges up to 710 m from the source (Morecambe Offshore Windfarm Ltd., 2024b). Based upon

the scale and location of the two projects in Scenario 1, the quantity and sizes of UXO at the Morecambe Offshore Windfarm: Generation Assets requiring clearance are expected to be similar to or less than those for the Transmission Assets.

1.7.4.11 Each clearance event is considered of a short-term, almost instantaneous nature, and is likely to result in close range mortality and mortal injury to fish and shellfish species. It is considered unlikely that the two projects will undertake clearance simultaneously (i.e., at exactly the same moment), which would lead to a greater area of instantaneous ensonification (i.e. a greater spatial range of effects on diadromous fish species). Furthermore, due to likelihood of intermittency of the sound, it is anticipated that the sound levels originating during UXO clearance at Transmission Assets and Morecambe Offshore Windfarm: Generation Assets will not be additive.

1.7.4.12 Overall, the intermittent UXO clearance expected for the Transmission Assets would only represent a very short-term increase in the ensonified area when considered in-combination with UXO clearance at Morecambe Offshore Windfarm: Generation Assets. Therefore, the in-combination effect is predicted to be of regional spatial extent, very short term duration, intermittent and of high reversibility.

Scenario 2

1.7.4.13 The in-combination effects assessment for Scenario 2 considers:

- the Transmission Assets; and
- the Morgan Offshore Wind Project: Generation Assets.

1.7.4.14 During the construction phase of the Transmission Assets, there is potential for increased underwater sound from UXO clearance to occur in-combination with the Morgan Offshore Wind Project: Generation Assets. The assessment of potential sound impacts associated with UXO clearance from the Transmission Assets alone has been presented in **section 1.7.3**. It is noted that given the relationship of these projects (i.e. that the Applicants of the Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets (Morgan OWL and Morgan OWL) are jointly seeking consent for the Transmission Assets; see HRA Stage 2 ISAA – Part 1: Introduction; document reference E2.1), UXO clearance would likely be phased and is unlikely to occur concurrently. However, this Scenario has been assessed in full, adopting a precautionary approach.

1.7.4.15 Fewer UXO are estimated to require clearance for the Morgan Offshore Wind Project: Generation Assets (13) than the Transmission Assets (25), and the maximum size of UXO is likely to be the same (130 kg as the most likely maximum) for both projects.

1.7.4.16 As described for Scenario 1, each clearance event is considered to be very short-term, almost instantaneous in nature, and likely to result in close range mortality and mortal injury to fish and shellfish species. It is considered highly unlikely that the two projects will undertake clearance simultaneously (i.e., at exactly the same moment), which would lead to a greater area of instantaneous ensonification (i.e. a greater spatial range of effects on

diadromous fish species). Furthermore, due to likelihood of intermittency of the sound, it is anticipated that the sound levels originating during UXO clearance at Transmission Assets and Morgan Offshore Wind Project: Generation Assets will not be additive.

1.7.4.17 Overall, the intermittent UXO clearance expected for the Transmission Assets would only represent a very short-term increase in the ensonified area when considered in-combination with UXO clearance at Morgan Offshore Wind Project: Generation Assets. Therefore, the in-combination effect is predicted to be of regional spatial extent, very short term duration, intermittent and of high reversibility.

Scenario 3

1.7.4.18 The in-combination effects assessment for Scenario 3 considers:

- the Transmission Assets;
- the Morecambe Offshore Windfarm: Generation Assets; and
- the Morgan Offshore Wind Project: Generation Assets.

1.7.4.19 During the construction phase of the Transmission Assets, there is potential for increased underwater sound from UXO clearance to occur in-combination with both Generation Assets.

1.7.4.20 Up to 38 UXO are estimated to require clearance for the Transmission Assets and Morgan Offshore Wind Project: Generation Assets, with the Morecambe Offshore Windfarm: Generation Assets considered unlikely to significantly increase this.

1.7.4.21 As described for Scenario 1 and 2, each clearance event is considered of a short-term, almost instantaneous nature, and is likely to result in close range mortality and mortal injury to fish and shellfish species. It is considered unlikely that the three projects will undertake clearance simultaneously (i.e., at exactly the same moment), which would lead to a greater area of instantaneous ensonification (i.e. a greater spatial range of effects on diadromous fish species). Furthermore, due to likelihood of intermittency of the sound, it is anticipated that the sound levels originating during UXO clearance from these projects will not be additive.

1.7.4.22 Overall, the intermittent UXO clearance expected for the Transmission Assets would only represent a very short-term increase in the ensonified area when considered in-combination with UXO clearance at the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets. Therefore, the in-combination effect is predicted to be of regional spatial extent, short term duration, intermittent and of high reversibility.

Scenario 4a

1.7.4.23 The in-combination effects assessment for Scenario 4a considers:

- Scenario 3 (Transmission Assets and Generation Assets); and
- the Tier 1 projects listed in **paragraph 1.7.4.6**.

1.7.4.24 Up to 23 UXO from 25 kg up to 907 kg NEQ (with 130 kg the most likely maximum) are estimated to require clearance for the Mona Offshore Wind Project (located 9.73 km from the Offshore Order Limits; Mona Offshore Wind Ltd., 2024). For Awel y Môr Offshore Wind Farm (located 28.87 km from the Offshore Order Limits), there is no estimated quantity and size ranges for UXO clearance presented in the Awel y Môr Offshore Wind Farm ES, as UXO clearance was excluded from the DCO application (RWE, 2022). Therefore, a qualitative in-combination assessment has been conducted for the purposes of the Transmission Assets ES.

1.7.4.25 As described for Scenarios 1, 2 and 3, it is considered unlikely that these projects considered under Scenario 4a will undertake clearance simultaneously (i.e., at exactly the same moment). Therefore, it is anticipated that the sound levels originating during UXO clearance from these projects will not be additive in a spatial context.

1.7.4.26 As such, the in-combination effect is predicted to be of regional spatial extent, short term duration, intermittent and of high reversibility.

Scenario 4b

1.7.4.27 The in-combination effects assessment for Scenario 4b considers:

- Scenario 4a; and
- the Tier 2 projects listed in **paragraph 1.7.4.6**.

1.7.4.28 It should be noted that there is no information available regarding UXO clearance activities for the Eni HyNet CCS Project (Eni, 2024), located 5.74 km from the Offshore Order Limits. Therefore, a qualitative assessment has been conducted for the purposes of the Transmission Assets ES. As described for Scenarios 1 to 4a, it is considered unlikely that these projects will undertake clearance simultaneously and therefore in-combination effects are not expected. Mooir Vannin is not expected to temporally overlap with the construction phase of the Transmission Assets, so has not been included in the in-combination assessment.

1.7.4.29 As such, the in-combination effect is predicted to be of regional spatial extent, short term duration, intermittent and of high reversibility.

Scenario 4c

1.7.4.30 The in-combination effects assessment for Scenario 4c considers:

- Scenario 4b; and
- the Tier 3 projects listed in **paragraph 1.7.4.6**.

1.7.4.31 It should be noted that there is no information available regarding UXO clearance activities for these projects (MaresConnect (located 34.44 km from the Offshore Order Limits) and the Isle of Man to UK Interconnector 2) (Department of the Environment, Climate and Communications, 2024; Manx Utilities, 2023). Therefore, a qualitative assessment has been conducted for the purposes of the Transmission Assets ES. As described for Scenarios 1 to 4b, it is considered unlikely that these projects will undertake clearance simultaneously and therefore in-combination effects are not expected.

1.7.4.32 As such, the in-combination effect is predicted to be of regional spatial extent, short term duration, intermittent and of high reversibility.

Dee Estuary/Aber Dyfrdwy SAC

Sea lamprey and river lamprey

1.7.4.33 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 underwater sound (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). In addition, it is considered unlikely that projects will undertake clearance simultaneously and therefore in-combination effects on lamprey species are not expected. As such, in-combination effects will not represent a barrier to migration for these species.

Conclusions

1.7.4.34 Adverse effects on sea lamprey and river lamprey features which undermine the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC will not occur as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact underwater sound from UXO clearance impacting fish and shellfish receptors against each relevant conservation objective (as presented in **paragraphs 1.7.2.8** to **1.7.2.12**) is presented in **Table 1.43** (Scenarios 1-3) and **Table 1.44** (Scenarios 4a-4c). 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 Dee Estuary/Aber Dyfrdwy SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee is unobstructed by physical barriers and/or poor water quality. **The five year mean count of river lampreys recorded by the Chester Weir fish trap is no less than 55 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000).** **The five year mean count of sea lampreys by the Chester Weir fish trap is no less than 18 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000)**	The in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.8** to **1.7.4.12** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a barrier to migration, the populations and distributions of sea lamprey and river lamprey will not be prevented from being maintained or restored.	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.13** to **1.7.4.17**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a barrier to migration, the populations and distributions of sea lamprey and river lamprey will not be prevented from being maintained or restored.	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.18** to **1.7.4.22**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility As such, the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a barrier to migration, the populations and distributions of sea lamprey and

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
			will not be prevented from being maintained or restored.
The abundance of prey species forming the river lamprey/sea lamprey's food resource within the estuary, is maintained.	As stated above, since any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility, there is limited potential for prey populations to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination UXO clearance are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, underwater sound from UXO clearance will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.	As stated above, since any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility, there is limited potential for prey populations to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination UXO clearance are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, underwater sound from UXO clearance will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.	As stated above, since any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility, there is limited potential for prey populations to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination UXO clearance are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, underwater sound from UXO clearance will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.

Table 1.44: Conclusions against the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee is unobstructed by physical barriers and/or poor water quality. **The five year mean count of river lampreys recorded by the Chester Weir fish trap is no less than 55 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000).** **The five year mean count of sea lampreys by the Chester Weir fish trap is no less than 18 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000)**	The in-combination effects assessment for Scenario 4a considers: • Scenario 3 (Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.23** to **1.7.4.26**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase of the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a barrier to migration, the populations and distributions of sea lamprey and	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.27** to **1.7.4.29**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase of the Scenario 4a in-combination with the projects considered under Scenario 4b will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a barrier to migration, the populations and distributions of sea lamprey and river lamprey will not be prevented from being maintained or restored.	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.30** to **1.7.4.32**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase of the Scenario 4c in-combination with the projects considered under Scenario 4c will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a barrier to migration, the populations and distributions of sea lamprey and river lamprey will not be prevented from being maintained or restored.

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	river lamprey will not be prevented from being maintained or restored.		
The abundance of prey species forming the river lamprey/sea lamprey's food resource within the estuary, is maintained.	As stated above, since any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility, there is limited potential for prey populations to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination UXO clearance are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, underwater sound from UXO clearance will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.	As stated above, since any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility, there is limited potential for prey populations to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination UXO clearance are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, underwater sound from UXO clearance will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.	As stated above, since any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility, there is limited potential for prey populations to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination UXO clearance are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, underwater sound from UXO clearance will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.

1.7.4.35 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission 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

1.7.4.36 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 underwater sound (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). In addition, it is considered unlikely that projects will undertake clearance simultaneously and therefore in-combination effects on lamprey species and Atlantic salmon are not expected. As such, in-combination effects will not present a barrier to migration for these species.

Conclusions

1.7.4.37 Adverse effects on the sea lamprey, river lamprey and Atlantic salmon features 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 in-combination underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact underwater sound from UXO clearance impacting fish and shellfish receptors against each relevant conservation objective (as presented in **paragraphs 1.7.2.20** to **1.7.2.23**) is presented in **Table 1.45** (Scenarios 1-3) and

1.7.4.39 Table 1.46 (Scenarios 4a-4c). 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 the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The parameters defined in the vision for the watercourse as outlined in NRW (2022a) must be met. **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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.8** to **1.7.4.12** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, 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 as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors.	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.13** to **1.7.4.17**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, 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 as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors.	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.18** to **1.7.4.22**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, 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 as a result

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
			of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors.
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.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such there is negligible risk of disruption to migration of sea lamprey, river lamprey and Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not reduce or likely reduce in the	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such there is negligible risk of disruption to migration of sea lamprey, river lamprey and Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not reduce or likely reduce in the foreseeable future the natural ranges	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such there is negligible risk of disruption to migration of sea lamprey, river lamprey and Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not reduce or likely reduce in the foreseeable future the natural ranges

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	foreseeable future the natural ranges of sea lamprey, river lamprey and Atlantic salmon within the site.	of sea lamprey, river lamprey and Atlantic salmon within the site.	of sea lamprey, river lamprey and Atlantic salmon within the site.
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.	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.	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.

Table 1.46: Conclusions against the conservation objectives of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The parameters defined in the vision for the watercourse as outlined in NRW (2022a) must be met. **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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.23** to **1.7.4.26**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, 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 as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors.	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.27** to **1.7.4.29**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, 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 as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors.	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.30** to **1.7.4.32**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, 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 as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors.

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
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.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such there is negligible risk of disruption to migration of sea lamprey, river lamprey and Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the populations of sea lamprey, river lamprey and Atlantic salmon from remaining stable or increasing in the long term.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such there is negligible risk of disruption to migration of sea lamprey, river lamprey and Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b will not prevent the populations of sea lamprey, river lamprey and Atlantic salmon from remaining stable or increasing in the long term.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such there is negligible risk of disruption to migration of sea lamprey, river lamprey and Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4b in-combination with the projects considered under Scenario 4c will not prevent the populations of sea lamprey, river lamprey and Atlantic salmon from remaining stable or increasing in the long term.
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.	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.	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.

1.7.4.40 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets in-combination with other plans/projects.

River Ehen SAC

Atlantic salmon and freshwater pearl mussel

1.7.4.41 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 underwater sound (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). In addition, it is considered unlikely that projects will undertake clearance simultaneously and therefore in-combination effects on Atlantic salmon are not expected. As such, in-combination effects will not present a barrier to migration for these species.

Conclusions

1.7.4.42 Adverse effects on the Atlantic salmon and freshwater pearl mussel which undermine the conservation objectives of the River Ehen SAC will not occur as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact underwater sound from UXO clearance impacting fish and shellfish receptors against each relevant conservation objective (as presented in **paragraphs 1.7.2.30** and **1.7.2.31**) is presented in **Table 1.47** (Scenarios 1-3) and **Table 1.48** (Scenarios 4a-4c). 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 the River Ehen SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.8** to **1.7.4.12** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon and freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the extent, distribution,	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.13** to **1.7.4.17**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon and freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the extent, distribution,	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.18** to **1.7.4.22**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon and freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	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.	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.	with the 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 populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the populations and distributions of Atlantic salmon and freshwater pearl	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the populations and distributions of Atlantic salmon and freshwater pearl mussel within the	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not prevent the populations and distributions of Atlantic salmon and freshwater pearl mussel within the site from being maintained or restored.

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	mussel within the site from being maintained or restored.	site from being maintained or restored.	

Table 1.48: Conclusions against the conservation objectives of the River Ehen SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.23** to **1.7.4.26**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.27** to **1.7.4.29**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.30** to **1.7.4.32**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	Atlantic salmon and freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a 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.	Atlantic salmon and freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b 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.	Atlantic salmon and freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4b in-combination with the projects considered under Scenario 4c 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 populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Projects considered under Scenario 4c will not prevent the

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	with the projects considered under Scenario 4a will not prevent the populations and distributions of Atlantic salmon and freshwater pearl mussel within the site from being maintained or restored.	Scenario 4b will not prevent the populations and distributions of Atlantic salmon and freshwater pearl mussel within the site from being maintained or restored.	populations and distributions of Atlantic salmon and freshwater pearl mussel within the site from being maintained or restored.

1.7.4.43 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets in-combination with other plans/projects.

River Kent SAC

Freshwater pearl mussel

1.7.4.44 Any potential in-combination impacts are predicted to be of very short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to underwater sound (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). In addition, it is considered unlikely that projects will undertake clearance simultaneously and therefore in-combination effects (including barriers to migration) on host species of freshwater pearl mussel are not expected. As such, in-combination effects are not expected to occur.

Conclusions

1.7.4.45 Adverse effects on the freshwater pearl mussel which undermine the conservation objectives of the River Kent SAC will not occur as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact underwater sound from UXO clearance impacting fish and shellfish receptors against each relevant conservation objective (as presented in **paragraphs 1.7.2.35** to **1.7.2.37**) is presented in **Table 1.49** (Scenarios 1-3) and **Table 1.50** (Scenarios 4a-4c). 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 the River Kent SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.8** to **1.7.4.12,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the extent, distribution, structure and function of the habitats of freshwater pearl mussel or the	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.13** to **1.7.4.17,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the extent, distribution, structure and function of the habitats of freshwater pearl mussel or the supporting	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.18** to **1.7.4.22,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not prevent the extent, distribution, structure and function of the habitats of

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	supporting processes on which the habitats of freshwater pearl mussel rely from being maintained or restored.	processes on which the habitats of freshwater pearl mussel rely from being maintained or restored.	freshwater pearl mussel or the supporting processes on which the habitats of freshwater pearl mussel rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect. Given that no direct effects are anticipated for freshwater pearl mussel feature of the River Kent SAC and adverse effects are not anticipated for host species such as brown trout and Atlantic salmon populations within the SAC, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the population and distribution of freshwater pearl mussel from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect. Given that no direct effects are anticipated for freshwater pearl mussel feature of the River Kent SAC and adverse effects are not anticipated for host species such as brown trout and Atlantic salmon populations within the SAC, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the population and distribution of freshwater pearl mussel from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect. Given that no direct effects are anticipated for freshwater pearl mussel feature of the River Kent SAC and adverse effects are not anticipated for host species such as brown trout and Atlantic salmon populations within the SAC, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not prevent the population and distribution of freshwater pearl mussel from being maintained or restored.

Table 1.50: Conclusions against the conservation objectives of the River Kent SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.6**. As outlined in detail in paragraphs **1.7.4.23** to **1.7.4.26**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the extent, distribution, structure and function of the habitats of freshwater pearl mussel or the supporting processes	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.27** to **1.7.4.29**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b 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	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.30** to **1.7.4.32**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of freshwater pearl mussel. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4b in-combination with the projects considered under Scenario 4c 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

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	on which the habitats of freshwater pearl mussel rely from being maintained or restored.	pearl mussel rely from being maintained or restored.	pearl mussel rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect. Given that no direct effects are anticipated for freshwater pearl mussel feature of the River Kent SAC and adverse effects are not anticipated for host species such as brown trout and Atlantic salmon populations within the SAC, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the population and distribution of freshwater pearl mussel from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect. Given that no direct effects are anticipated for freshwater pearl mussel feature of the River Kent SAC and adverse effects are not anticipated for host species such as brown trout and Atlantic salmon populations within the SAC, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b will not prevent the population and distribution of freshwater pearl mussel from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect. Given that no direct effects are anticipated for freshwater pearl mussel feature of the River Kent SAC and adverse effects are not anticipated for host species such as brown trout and Atlantic salmon populations within the SAC, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4b in-combination with the projects considered under Scenario 4c will not prevent the population and distribution of freshwater pearl mussel from being maintained or restored.

1.7.4.46 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets in-combination with other plans/projects.

River Derwent and Bassenthwaite Lake SAC

Sea lamprey, river lamprey and Atlantic salmon

1.7.4.47 Any potential in-combination impacts are predicted to be of very short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to underwater sound (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). In addition, it is considered unlikely that projects will undertake clearance simultaneously and therefore in-combination effects on lamprey species and Atlantic salmon are not expected. As such, in-combination effects will not present a barrier to migration for these species.

Conclusions

1.7.4.48 Adverse effects on the 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 in-combination underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact underwater sound from UXO clearance impacting fish and shellfish receptors against each relevant conservation objective (as presented in **paragraphs 1.7.2.43** to **1.7.2.45**) is presented in **Table 1.51** (Scenarios 1-3) and **Table 1.52** (Scenarios 4a-4c). 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 the River Derwent and Bassenthwaite Lake SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.8** to **1.7.4.12,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the extent, distribution, structure and function of the habitats of	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.13** to **1.7.4.17,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the extent, distribution,	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.18** to **1.7.4.22,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not prevent the extent, distribution,

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of these species rely from being maintained or restored.	structure and function of the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of these species rely from being maintained or restored.	structure and function of the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of these species rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 or river lamprey. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 or river lamprey. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.

Table 1.52: Conclusions against the conservation objectives of the River Derwent and Bassenthwaite Lake SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.23** to **1.7.4.26**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the extent, distribution, structure and function of	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.27** to **1.7.4.29**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b 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	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.30** to **1.7.4.32**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4b in-combination with the projects considered under Scenario 4c 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

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of these species rely from being maintained or restored.	habitats of these species rely from being maintained or restored.	habitats of these species rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4b in-combination with the projects considered under Scenario 4c will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.

1.7.4.49 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets in-combination with other plans/projects.

Solway Firth SAC

Sea lamprey and river lamprey

1.7.4.50 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 underwater sound (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). In addition, it is considered unlikely that projects will undertake clearance simultaneously and therefore in-combination effects on lamprey species are not expected. As such, in-combination effects will not present a barrier to migration for these species.

Conclusions

1.7.4.51 Adverse effects on the sea lamprey and river lamprey which undermine the conservation objectives of the Solway Firth SAC will not occur as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact underwater sound from UXO clearance impacting fish and shellfish receptors against each relevant conservation objective (as presented in **paragraphs 1.7.2.50** to **1.7.4.53** is presented in **Table 1.53** (Scenarios 1-3) and **Table 1.54** (Scenarios 4a-4c). Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.53: Conclusions against the conservation objectives of the Solway Firth SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.8** to **1.7.4.12,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the extent, distribution, structure and function of the habitats	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.13** to **1.7.4.17,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the extent, distribution, structure and function of the habitats	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.18** to **1.7.4.22,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	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.	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.	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 populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the populations and distributions of sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the populations and distributions of sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not prevent the populations and distributions of sea lamprey and river lamprey within the site from being maintained or restored.

Table 1.54: Conclusions against the conservation objectives of the Solway Firth SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.23** to **1.7.4.26**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the extent,	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.27** to **1.7.4.29**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or the supporting processes	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.30** to **1.7.4.32**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4b in-combination with the projects considered under Scenario 4c will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or the supporting processes

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	distribution, structure and function of the habitats of sea lamprey and river lamprey or the supporting processes on which the habitats of these species rely from being maintained or restored.	on which the habitats of these species rely from being maintained or restored.	on which the habitats of these species rely from being maintained or restored
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the populations and distributions of sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b will not prevent the populations and distributions of sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4b in-combination with the projects considered under Scenario 4c will not prevent the populations and distributions of sea lamprey and river lamprey within the site from being maintained or restored.

1.7.4.52 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets in-combination with other plans/projects.

Afon Gwyrfai a Llyn Cwellyn SAC

Atlantic salmon

1.7.4.53 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 underwater sound (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). In addition, it is considered unlikely that projects will undertake clearance simultaneously and therefore in-combination effects on Atlantic salmon are not expected. As such, in-combination effects will not present a barrier to migration for these species.

Conclusions

1.7.4.54 Adverse effects on the Atlantic salmon which undermine the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC will not occur as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact underwater sound from UXO clearance impacting fish and shellfish receptors against each relevant conservation objective (as presented in **paragraph 1.7.2.56**) is presented in **Table 1.55** (Scenarios 1-3) and

1.7.4.56 Table 1.56 (Scenarios 4a-4c). Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.55: Conclusions against the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The conservation objective for the water course as outlined in NRW (2022b) must be met.	The in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.8** to **1.7.4.12,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met.	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.13** to **1.7.4.17,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met.	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.18** to **1.7.4.22,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met.
The population of the feature in the SAC is stable or increasing over the long term.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The natural range of the feature in the SAC is neither being reduced nor is likely to be reduced for the foreseeable future.	phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such there is negligible risk of disruption to migration of Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the populations of Atlantic salmon from remaining stable or increasing in the long term. Similarly, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not reduce or likely reduce in the foreseeable future the natural ranges of Atlantic salmon within the site.	phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such there is negligible risk of disruption to migration of Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the populations of Atlantic salmon from remaining stable or increasing in the long term. Similarly, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not reduce or likely reduce in the foreseeable future the natural ranges of Atlantic salmon within the site.	phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such there is negligible risk of disruption to migration Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not prevent the populations of Atlantic salmon from remaining stable or increasing in the long term. Similarly, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not reduce or likely reduce in the foreseeable future the natural ranges of Atlantic salmon within the site.
The Gwyrfai will continue to be a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis.	Given the assessment above, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not	Given the assessment above, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not	Given the assessment above, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not reduce the area of the habitats of

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	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.	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.	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.

Table 1.56: Conclusions against the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The conservation objective for the water course as outlined in NRW (2022b) must be met.	The in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.23** to **1.7.4.26**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met.	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.27** to **1.7.4.29**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met.	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.30** to **1.7.4.32**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. As such, in-combination underwater sound from UXO clearance will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being 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.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility.

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	As such there is negligible risk of disruption to migration of Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the populations of Atlantic salmon from remaining stable or increasing in the long term.	As such there is negligible risk of disruption to migration of Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b will not prevent the populations of Atlantic salmon from remaining stable or increasing in the long term.	As such there is negligible risk of disruption to migration of Atlantic salmon. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4abin-combination with the projects considered under Scenario 4c will not prevent the populations of Atlantic salmon from remaining stable or increasing in the long term.
The Gwyrfai will continue to be a sufficiently large habitat to maintain the feature's population in the SAC on a long-term basis.	Given the assessment above, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with these 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 Afon Gwyrfai a Llyn Cwellyn SAC on a long-term basis.	Given the assessment above, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with these 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 Afon Gwyrfai a Llyn Cwellyn SAC on a long-term basis.	Given the assessment above, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with these 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 Afon Gwyrfai a Llyn Cwellyn SAC on a long-term basis.

1.7.4.57 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets in-combination with other plans/projects.

River Bladnoch SAC

Atlantic salmon

1.7.4.58 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 underwater sound (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). In addition, it is considered unlikely that projects will undertake clearance simultaneously and therefore in-combination effects on Atlantic salmon are not expected. As such, in-combination effects will not present a barrier to migration for these species.

Conclusions

1.7.4.59 Adverse effects on the Atlantic salmon which undermine the conservation objectives of the River Bladnoch SAC will not occur as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact underwater sound from UXO clearance impacting fish and shellfish receptors against each relevant conservation objective (as presented in **paragraph 1.7.2.60**) is presented in **Table 1.57** (Scenarios 1-3) and

1.7.4.61 Table 1.58 (Scenarios 4a-4c). Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.57: Conclusions against the conservation objectives of the River Bladnoch SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
Restore the population of the species, including range of genetic types, as a viable component of the site. **Restore the distribution of the species throughout the site.**	The in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.8** to **1.7.4.12,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect and disruption to the migration of Atlantic salmon is not expected. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the restoration of the population of Atlantic salmon as a	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.13** to **1.7.4.17,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect and disruption to the migration of Atlantic salmon is not expected. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the restoration of the population of Atlantic salmon as a	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.18** to **1.7.4.22,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect and disruption to the migration of Atlantic salmon is not expected. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not prevent the restoration of the

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	viable component of the site and its distribution throughout the site.	viable component of the site and its distribution throughout the site.	population of Atlantic salmon as a viable component of the site and its distribution throughout the site.
Restore the habitats supporting the species within the site and availability of food.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon.

Table 1.58: Conclusions against the conservation objectives of the River Bladnoch SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
Restore the population of the species, including range of genetic types, as a viable component of the site. **Restore the distribution of the species throughout the site.**	The in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.23** to **1.7.4.26**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect and disruption to the migration of Atlantic salmon is not expected. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the restoration of the population of Atlantic salmon as a viable component of the site and its distribution throughout the site.	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.27** to **1.7.4.29**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect and disruption to the migration of Atlantic salmon is not expected. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b will not prevent the restoration of the population of Atlantic salmon as a viable component of the site and its distribution throughout the site.	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.30** to **1.7.4.32**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, diadromous fish features are expected to have low sensitivity to the effect and disruption to the migration of Atlantic salmon is not expected. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4b in-combination with the projects considered under Scenario 4c will not prevent the restoration of the population of Atlantic salmon as a viable component of the site and its distribution throughout the site.

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
Restore the habitats supporting the species within the site and availability of food.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon.

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 underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets in-combination with other plans/projects.

River Eden SAC

Sea lamprey, river lamprey and Atlantic salmon

1.7.4.63 Any potential in-combination impacts are predicted to be of very short-term duration, intermittent and diadromous fish species are assessed as having low sensitivity to underwater sound (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). In addition, it is considered unlikely that projects will undertake clearance simultaneously and therefore in-combination effects on lamprey species and Atlantic salmon are not expected. As such, in-combination effects will not present a barrier to migration for these species.

Conclusions

1.7.4.64 Adverse effects on the sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Eden SAC will not occur as a result of in-combination underwater sound from UXO clearance impacting fish and shellfish receptors during the construction phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact underwater sound from UXO clearance impacting fish and shellfish receptors against each relevant conservation objective (as presented in **paragraphs 1.7.2.66** and **1.7.2.67**) is presented in **Table 1.59** (Scenarios 1-3) and **Table 1.60** (Scenarios 4a-4c). Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.59: Conclusions against the conservation objectives of the River Eden SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.8** to **1.7.4.12**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the extent, distribution, structure and function of the habitats of	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.13** to **1.7.4.17,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon, sea	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.18** to **1.7.4.22,** any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of these species rely from being maintained or restored.	lamprey and river lamprey or the supporting processes on which the habitats of these species rely from being maintained or restored.	with the 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 these species rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 or river lamprey. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 or river lamprey. Therefore, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets in-combination with the Generation Assets will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.

Table 1.60: Conclusions against the conservation objectives of the River Eden SAC for in-combination underwater sound from UXO clearance impacting fish and shellfish receptors with respect to the construction of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.23** to **1.7.4.26**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the extent, distribution, structure and function of	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.27** to **1.7.4.29**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b 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	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.6**. As outlined in detail in **paragraphs 1.7.4.30** to **1.7.4.32**, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. There is no pathway for underwater sound from UXO clearance impacting fish and shellfish receptors to result in adverse effects on the habitats of Atlantic salmon, sea lamprey and river lamprey. As such, underwater sound from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4bin-combination with the projects considered under Scenario 4c 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

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	the habitats of Atlantic salmon, sea lamprey and river lamprey or the supporting processes on which the habitats of these species rely from being maintained or restored.	habitats of these species rely from being maintained or restored.	habitats of these species rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4a in-combination with the projects considered under Scenario 4b will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.	As stated above, any potential in-combination effects associated with underwater sound from UXO clearance during the construction phase will be of regional spatial extent, very short term duration, intermittent and of high reversibility. In addition, 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 from UXO clearance impacting fish and shellfish receptors associated with the Scenario 4b in-combination with the projects considered under Scenario 4c will not prevent the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site from being maintained or restored.

1.7.4.65 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 from UXO clearance impacting fish and shellfish receptors with respect to the construction phase of the Transmission Assets in-combination with other plans/projects.

In-combination EMF from subsea electrical cabling

1.7.4.66 The assessment of LSE (in the HRA Stage 1 Screening Report; document reference: E3) identified that LSE could not be ruled out for the potential in-combination impacts of EMF from subsea electrical cabling during the operation and maintenance phase of the Transmission Assets in-combination with other plans/projects. This relates to the designated sites and relevant Annex II diadromous fish features listed in **Table 1.61**.

Table 1.61: European sites and relevant Annex II diadromous fish features from which the potential for an LSE could not be ruled out in relation to in-combination EMF from subsea electrical cabling

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

1.7.4.67 There is potential for EMF from subsea electrical cabling impacts as a result of activities associated with the Transmission Assets during the operation and maintenance phase, in-combination with activities associated with the projects/plans considered under the following Scenarios.

- Scenario 1 considers the Transmission Assets and the Morecambe Offshore Windfarm: Generation Assets.

- Scenario 2 considers the Transmission Assets and the Morgan Offshore Wind Project: Generation Assets.
- Scenario 3 considers the Transmission Assets, the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets
- Scenario 4a considers the plans assessed under Scenario 3 (Transmission Assets and Generation Assets) alongside the following Tier 1 projects: Mona Offshore Wind Project, and Awel y Môr Offshore Wind Farm
- Scenario 4b considers the plans assessed under Scenario 4a alongside the following Tier 2 projects: Mooir Vannin Offshore Windfarm and Eni HyNet CCS Project.
- Scenario 4c considers the plans assessed under Scenario 4b alongside the following Tier 3 projects: MaresConnect, the Isle of Man to UK Interconnector 2 and the Mooir Vannin – UK Transmission Assets.

1.7.4.68 The in-combination effects assessment follows the methodology set out in **section 1.5.5** and is presented in a series of tables (one for each potential in-combination effect). These tables (**Table 1.62** and **Table 1.63**) present a summary of the in-combination assessment, with the full detailed in-combination assessment presented in **paragraphs 1.7.4.69** *et seq*.

Operation and maintenance phase

Information to support assessment

Scenario 1

1.7.4.69 The in-combination effects assessment for Scenario 1 considers:

- the Transmission Assets; and
- the Morecambe Offshore Windfarm: Generation Assets.

1.7.4.70 The maximum potential EMF from subsea electrical cabling impacts will originate from the inter-array and interconnector cables of the Morecambe Offshore Windfarm: Generation Assets. For the Morecambe Offshore Windfarm: Generation Assets, this is likely to result from the operation of up to 110 km of up to 132 kV inter-array cables and 10 km of up to 132 kV interconnector cables. The minimum burial depth for cables will be between 0.5 m and 3 m with a target of burial depth of 1.5 m, likely limiting EMFs to the range of metres from the cable, with impacts expected to be lower than the Transmission Assets, due to the reduced size of cables (voltage, length, diameter) associated with Morecambe Offshore Windfarm: Generation Assets (Morecambe Offshore Windfarm Ltd., 2024a).

1.7.4.71 Whilst any potential in-combination impacts are predicted to be of long term duration and continuous during the operation of both projects, they are also predicted to be of local spatial extent. As presented in Volume 2, Chapter 3: Fish and Shellfish Ecology of the ES (document reference: F2.3) and summarised in **paragraphs 1.7.3.75** to **1.7.3.77** for lamprey species and

paragraphs 1.7.3.82 to **1.7.3.85** for Atlantic salmon, diadromous fish have low sensitivity and high recoverability to EMF from subsea electrical cabling. EMF from subsea electrical cabling effects will be confined to the close vicinity of cables for both projects and diadromous fish species are considered to be less likely to interact with emitted EMF from subsea electrical cabling as they are pelagic and swim in the water column rather than along the seabed. Both projects will implement mitigation including cable burial. The burial of cables will increase the distance between cables and diadromous fish which will result in reductions in EMF from subsea electrical cabling, thereby reducing the effect of EMF from subsea electrical cabling on diadromous fish.

1.7.4.72 Therefore, for diadromous fish species, the in-combination impact from the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets is predicted to be of local spatial extent, long term duration, continuous and of high reversibility.

Scenario 2

1.7.4.73 The in-combination effects assessment for Scenario 2 considers:

- the Transmission Assets; and
- the Morgan Offshore Wind Project: Generation Assets.

1.7.4.74 The potential EMF from subsea electrical cabling impacts will originate from the inter-array and interconnector cables of the Morgan Offshore Wind Project: Generation Assets. For the Morgan Offshore Wind Project: Generation Assets, this is likely to result from the operation of up to 390 km of 66 kV to 132 kV inter-array cables and 60 km of 275 kV HVAC interconnector cables. The minimum burial depth for all cables will be 0.5 m, likely limiting EMFs to the range of metres from the cable, with impacts expected to be similar to the Transmission Assets, due to the similar sizes of cables (voltage, length, diameter) associated both projects (Morgan Offshore Wind Project Ltd., 2024).

1.7.4.75 Whilst any potential in-combination impacts are predicted to be of long term duration and continuous during the operation of both 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 electrical cabling and, as set out above, EMF from subsea electrical cabling effects will be confined to the close vicinity of cables for both projects (expected to be limited to a range of just a few metres from the cables). Further, both projects will implement mitigation including cable burial which will further reduce the risk of effects of EMF on diadromous fish (i.e. by increasing the distance between the cable and the receptors).

1.7.4.76 Therefore, for diadromous fish species, the in-combination impact from the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets is predicted to be of local spatial extent, long term duration, continuous and of high reversibility.

Scenario 3

1.7.4.77 The in-combination effects assessment for Scenario 3 considers:

- the Transmission Assets;
- the Morecambe Offshore Windfarm: Generation Assets; and
- the Morgan Offshore Wind Project: Generation Assets.

1.7.4.78 As described above for Scenario 1 and 2, whilst any potential in-combination impacts are predicted to be of long term duration and continuous during the operation of these 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 electrical cabling and, as set out above, EMF from subsea electrical cabling effects will be confined to the close vicinity of cables for these projects (expected to be limited to a range of just a few metres from the cables associated with the projects). All three projects will also implement mitigation including cable burial which will further reduce the risk of effects of EMF on diadromous fish (i.e. by increasing the distance between the cable and the receptors).

1.7.4.79 Therefore, for diadromous fish species, the in-combination impact from the Transmission Assets in-combination with the Generation Assets is predicted to be of local spatial extent, long term duration, continuous and of high reversibility.

Scenario 4a

1.7.4.80 The in-combination effects assessment for Scenario 4a considers:

- Scenario 3 (Transmission Assets and Generation Assets); and
- the Tier 1 projects listed in **paragraph 1.7.4.67**.

1.7.4.81 The Scenario 4a operation and maintenance phase assessment considers plans assessed under Scenario 3 alongside the following two Tier 1 projects : Mona Offshore Wind Project, and Awel y Môr Offshore Wind Farm.

1.7.4.82 The potential EMF from subsea electrical cabling impacts will originate from the inter-array, interconnector and offshore export cables of the Mona Offshore Wind Project (located 9.73 km from the Offshore Order Limits). For the Mona Offshore Wind Project, the MDS considers up to 500 km of 66 kV to 132 kV inter-array cables, 50 km of 275 kV HVAC interconnector cable, and up to 360 km of 275 kV HVAC offshore export cables. The minimum burial depth for all cables will be 0.5 m, likely limiting EMFs to the range of metres from the cable (Mona Offshore Wind Ltd., 2024).

1.7.4.83 The potential EMF from subsea electrical cabling impacts for Awel y Môr Offshore Wind Farm ((located 28.87 km from the Offshore Order Limits; RWE, 2022) considers an MDS of 145 km of inter-array cables and 81.3 km of export cables. The minimum burial depth for cables is planned to be 1 m, likely limiting EMFs to the range of up to 10 m from the cable.

1.7.4.84 As described above for Scenarios 1, 2 and 3, whilst any potential in-combination impacts are predicted to be of long term duration and continuous during the operation of these projects, they are also predicted to be of local

spatial extent (i.e. the effects from EMF are expected to be limited to a range of just a few metres from the cables associated with these projects). Diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electrical cabling and, as set out above, EMF from subsea electrical cabling effects will be confined to the close vicinity of cables for all projects considered under this Scenario. Further, these projects will implement mitigation including cable burial which will further reduce the risk of effects of EMF on diadromous fish (i.e. by increasing the distance between the cable and the receptors).

1.7.4.85 Therefore, for diadromous fish species, the in-combination impact from the projects considered under Scenario 4a is predicted to be of local spatial extent, long term duration, continuous and of high reversibility.

Scenario 4b

1.7.4.86 The in-combination effects assessment for Scenario 4b considers:

- Scenario 4a; and
- the Tier 2 projects listed in **paragraph 1.7.4.67**.

1.7.4.87 The Scenario 4b operation and maintenance phase assessment considers plans assessed under Scenario 4a alongside the following two Tier 2 projects: Mooir Vannin Offshore Windfarm and Eni HyNet CCS Project. The operation and maintenance phases of the Mooir Vannin Offshore Wind Farm and Eni HyNet CCS Project are expected to overlap with the operation and maintenance phase of the Transmission Assets, alongside the Scenario 4a projects and plans, therefore potential in-combination effects may occur (see **Table 1.41** for the distances from the Offshore Order Limits to these projects).

1.7.4.88 No details are available regarding electrical cable lengths or specifications for these projects; however, cables are expected to be buried where possible. Whilst any potential in-combination impacts are predicted to be of long term duration and continuous during the operation of these projects, they are also predicted to be of local spatial extent (i.e. the effects from EMF are expected to be limited to a range of just a few metres from the cables associated with these projects).

1.7.4.89 Further, diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electrical cabling and, as set out above, EMF from subsea electrical cabling effects are predicted to be confined to the close vicinity of cables for all projects considered under this Scenario. Further, as outlined above, these projects will implement mitigation including cable burial which will further reduce the risk of effects of EMF on diadromous fish (i.e. by increasing the distance between the cable and the receptors).

1.7.4.90 As such, the in-combination impact on diadromous fish from the projects considered under Scenario 4b is predicted to be the same as that described above for Scenario 4a (i.e. of local spatial extent, long term duration, continuous and of high reversibility).

Scenario 4c

1.7.4.91 The in-combination effects assessment for Scenario 4c considers:

- Scenario 4b; and
- the Tier 3 projects listed in **paragraph 1.7.4.67**.

1.7.4.92 The Scenario 4c assessment considers the plans assessed under Scenario 4b alongside the following two Tier 3: MaresConnect and the Isle of Man to UK Interconnector 2 Cable. These projects will overlap with the operation and maintenance phase of the Transmission Assets alongside those projects identified under Scenario 4b, therefore potential in-combination effects may occur.

1.7.4.93 No details are available regarding electrical cable lengths or specifications. MaresConnect (located 34.44 km from the Offshore Order Limits) is expected to continuously produce EMF from subsea electrical cabling during operation, although as project parameters are not currently publicly available, a quantitative assessment is not possible at this stage.

1.7.4.94 The Mooir Vannin – UK Transmission Assets are likely to be constructed and become operational in the operation and maintenance phase of the Transmission Assets. Based on current information the Mooir Vannin – UK Transmission Assets is likely to comprise multiple HVAC or HVDC cables (Mooir Vannin Offshore Wind Farm Limited, 2024). No detailed project information is available for the Mooir Vannin – UK Transmission Assets and as such a quantitative assessment cannot be undertaken, although it is expected effects of EMF during operation will be similar to that of the Transmission Assets.

1.7.4.95 Diadromous fish species have been assessed as having low sensitivity and high recoverability to EMF from subsea electrical cabling and, as set out above, EMF from subsea electrical cabling effects will be confined to the close vicinity of cables (i.e. expected to be limited to a range of just a few metres from the cables) for all projects considered under this Scenario. Further, cables are likely to be buried beneath surface sediments or under cable protection to minimise EMF emissions and reduce the effect of EMF from subsea electrical cabling on diadromous fish (i.e. by increasing the distance between the cable and the receptors).

1.7.4.96 As such, the in-combination impact on diadromous fish from the projects considered under Scenario 4c is predicted to be the same as that described above for Scenario 4a and 4b (i.e. of local spatial extent, long term duration, continuous and of high reversibility).

Dee Estuary/Aber Dyfrdwy SAC

Sea lamprey and river lamprey

1.7.4.97 In-combination EMF from subsea electrical cabling has the potential to affect sea and river lamprey by interfering with navigation and influencing behaviour. The sensitivity of lamprey species to impacts from EMF is described for the alone assessment in **paragraphs 1.7.3.75** to **1.7.3.78**.

Conclusions

1.7.4.98 Adverse effects on the sea lamprey and river lamprey which undermine the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC will not occur as a result of in-combination EMF from subsea electrical cabling during the operation and maintenance phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.8** to **1.7.2.12**) is presented in **Table 1.62** (Scenarios 1-3) and **Table 1.63** (Scenarios 4a-4c). Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.62: Conclusions against the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee is unobstructed by physical barriers and/or poor water quality. **The five year mean count of river lampreys recorded by the Chester Weir fish trap is no less than 55 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000).** **The five year mean count of sea lampreys by the Chester Weir fish trap is no less than 18 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000)**	The in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.69** to **1.7.4.72**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a barrier to migration, the populations and distributions of sea lamprey and	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.73** to **1.7.4.76**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a barrier to migration, the populations and distributions of sea lamprey and	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.77** to **1.7.4.79**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	river lamprey will not be prevented from being maintained or restored.	river lamprey will not be prevented from being maintained or restored.	barrier to migration, the populations and distributions of sea lamprey and river lamprey will not be prevented from being maintained or restored.
The abundance of prey species forming the river lamprey/sea lamprey's food resource within the estuary, is maintained.	As stated above, since any potential in-combination effects on sea and river lamprey associated with EMF from subsea electrical cabling will be of local spatial extent, long term duration, continuous and of high reversibility, there is limited potential for prey species to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination EMF from subsea electrical cabling are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, EMF from subsea electrical cabling will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.	As stated above, since any potential in-combination effects on sea and river lamprey associated with EMF from subsea electrical cabling will be of local spatial extent, long term duration, continuous and of high reversibility, there is limited potential for prey species to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination EMF from subsea electrical cabling are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, EMF from subsea electrical cabling will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.	As stated above, since any potential in-combination effects on sea and river lamprey associated with EMF from subsea electrical cabling will be of local spatial extent, long term duration, continuous and of high reversibility, there is limited potential for prey species to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination EMF from subsea electrical cabling are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, EMF from subsea electrical cabling will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.

Table 1.63: Conclusions against the conservation objectives of the Dee Estuary/Aber Dyfrdwy SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee is unobstructed by physical barriers and/or poor water quality. **The five year mean count of river lampreys recorded by the Chester Weir fish trap is no less than 55 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000).** **The five year mean count of sea lampreys by the Chester Weir fish trap is no less than 18 under the monitoring regime in use prior to notification (i.e. 100% of the mean annual count during the five years for which data are available prior to notification: 1993, 1997 to 2000)**	The in-combination effects assessment for Scenario 4a considers: • Scenario 3 (Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.80** to **1.7.4.85**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a barrier to migration, the populations and distributions of sea lamprey and river lamprey will not be prevented from being maintained or restored.	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.86** to **1.7.4.90**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase are predicted be of local spatial extent, long term duration, continuous and of high reversibility. As such, it is predicted that the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a barrier to migration, the populations and distributions of sea lamprey and river lamprey will not be prevented from being maintained or restored.	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.91** to **1.7.4.96**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase are predicted to be of local spatial extent, long term duration, continuous and of high reversibility. As such, it is predicted that the migratory passage of both adult and juvenile river lamprey/sea lamprey through the Dee Estuary between Liverpool Bay and the River Dee will remain unobstructed by physical barriers and/or poor water quality. In addition, since this impact will not lead to a barrier to migration, the populations and distributions of sea lamprey and river lamprey will not be prevented from being maintained or restored.

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The abundance of prey species forming the river lamprey/sea lamprey's food resource within the estuary, is maintained.	As stated above, since any potential in-combination effects on sea and river lamprey associated with EMF from subsea electrical cabling will be of local spatial extent, long term duration, continuous and of high reversibility, there is limited potential for prey species to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination EMF from subsea electrical cabling are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, EMF from subsea electrical cabling will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.	As stated above, since any potential in-combination effects on sea and river lamprey associated with EMF from subsea electrical cabling will likely be of local spatial extent, long term duration, continuous and of high reversibility, there is limited potential for prey species to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination EMF from subsea electrical cabling are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, EMF from subsea electrical cabling will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.	As stated above, since any potential in-combination effects on sea and river lamprey associated with EMF from subsea electrical cabling will likely be of local spatial extent, long term duration, continuous and of high reversibility, there is limited potential for prey species to be affected. In addition, impacts on prey species of the sea lamprey and river lamprey from in-combination EMF from subsea electrical cabling are not predicted to be significant. (see Volume 2, Chapter 3: Fish and shellfish ecology of the ES; document reference: F2.3). Therefore, EMF from subsea electrical cabling will not prevent the abundance of prey species forming the river and sea lamprey's food resource within the estuary from being maintained.

1.7.4.99 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets in-combination other plans/projects.

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

Sea lamprey, river lamprey and Atlantic salmon

1.7.4.100 In-combination EMF from subsea electrical cabling has the potential to affect sea and river lamprey by interfering with navigation (including migration patterns) and influencing behaviour. The sensitivity of diadromous fish species to impacts from EMF is described for the alone assessment in **paragraphs 1.7.3.75** to **1.7.3.78** (for lamprey species) and **paragraphs 1.7.3.82** to **1.7.3.85** (for Atlantic salmon).

Conclusions

1.7.4.101 Adverse effects on the 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 in-combination EMF from subsea electrical cabling during the operation and maintenance phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.20** to **1.7.2.23**) is presented in **Table 1.64** (Scenarios 1-3) and

1.7.4.103 Table 1.65 (Scenarios 4a-4c). 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 River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The parameters defined in the vision for the watercourse as outlined in NRW (2022a) must be met. **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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.69** to **1.7.4.72**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, there will be no reduction in the area or quality of habitat for the populations of sea lamprey, river	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.73** to **1.7.4.76**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morgan Offshore Wind Project: Generation Assets will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, there will be no reduction in the area or quality of habitat for the populations of sea lamprey, river	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.77** to **1.7.4.79**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, there will be no reduction in

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	lamprey and Atlantic salmon in the SAC on a long-term basis as a result of EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets.	lamprey and Atlantic salmon in the SAC on a long-term basis as a result of EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morgan Offshore Wind Project: Generation Assets.	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 as a result of EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets
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.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morgan Offshore Wind Project: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling.

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
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.	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.	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.

Table 1.65: Conclusions against the conservation objectives of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The parameters defined in the vision for the watercourse as outlined in NRW (2022a) must be met. **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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.80** to **1.7.4.85**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, there will be no reduction in the area or quality of habitat for the populations of sea lamprey, river	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.86** to **1.7.4.90**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase are predicted to be of local spatial extent, long term duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, 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 as a result	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.91** to **1.7.4.96**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase are predicted to be of local spatial extent, long term duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Scenario 4b in-combination with the projects considered under Scenario 4c will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022a) from being met. Similarly, 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 as a result

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	lamprey and Atlantic salmon in the SAC on a long-term basis as a result of EMF from subsea electrical cabling.	of EMF from subsea electrical cabling.	of EMF from subsea electrical cabling.
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.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, 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 electrical cabling.	Given that EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations of sea lamprey, river lamprey and Atlantic salmon within the site are not predicted to 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 electrical cabling.	Given that EMF from subsea electrical cabling associated with the Scenario 4b in-combination with the projects considered under Scenario 4c are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations of sea lamprey, river lamprey and Atlantic salmon within the site are not predicted to 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 electrical cabling.
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.	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.	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.

1.7.4.104 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets in-combination with other plans/projects.

River Ehen SAC

Atlantic salmon and freshwater pearl mussel

1.7.4.105 In-combination EMF from subsea electrical cabling has the potential to affect Atlantic salmon by interfering with navigation and influencing behaviour. The sensitivity of Atlantic salmon to impacts from EMF is described for the alone assessment in **paragraphs 1.7.3.82** to **1.7.3.85.**

Conclusions

1.7.4.106 Adverse effects on the Atlantic salmon and freshwater pearl mussel which undermine the conservation objectives of the River Ehen SAC will not occur as a result of in-combination EMF from subsea electrical cabling during the operation and maintenance phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.30** and **1.7.2.31**) is presented in **Table 1.66** (Scenarios 1-3) and **Table 1.67** (Scenarios 4a-4c). 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 River Ehen SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.69** to **1.7.4.72**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets to affect the habitats of Atlantic salmon or freshwater pearl mussel. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.73** to **1.7.4.76**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets to affect the habitats of Atlantic salmon or freshwater pearl mussel. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morgan	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.77** to **1.7.4.79**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets to affect the habitats of Atlantic salmon or freshwater pearl mussel. Therefore, EMF from subsea electrical cabling

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	Morecambe Offshore Windfarm: 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.	Offshore Wind Project: 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.	associated with the Transmission Assets in-combination with the 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 populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morgan Offshore Wind Project: Generation Assets.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets and the Morgan Offshore Wind Project: Generation Assets.

Table 1.67: Conclusions against the conservation objectives of the River Ehen SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.80** to **1.7.4.85**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4a to affect the habitats of Atlantic salmon or freshwater pearl mussel. Therefore, in-combination EMF from subsea electrical cabling associated these projects will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon and freshwater pearl mussel	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.86** to **1.7.4.90**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase are predicted be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4b to affect the habitats of Atlantic salmon or freshwater pearl mussel. Therefore, in-combination EMF from subsea electrical cabling associated these 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	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.67** As outlined in detail in **paragraphs 1.7.4.91** to **1.7.4.96**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase are predicted to be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4c to affect the habitats of Atlantic salmon or freshwater pearl mussel. Therefore, in-combination EMF from subsea electrical cabling associated these 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

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	or the supporting processes on which the habitats of Atlantic salmon and freshwater pearl mussel rely from being maintained or restored.	freshwater pearl mussel rely from being maintained or restored.	freshwater pearl mussel rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, 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 electrical cabling associated with these projects in-combination.	Given that EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations and distributions of Atlantic salmon and freshwater pearl mussel within the site are not predicted to be prevented from being maintained or restored as a result of EMF from subsea electrical cabling associated with these projects in-combination.	Given that EMF from subsea electrical cabling associated with the Scenario 4b in-combination with the projects considered under Scenario 4c are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations and distributions of Atlantic salmon and freshwater pearl mussel within the site are not predicted to be prevented from being maintained or restored as a result of EMF from subsea electrical cabling associated with these projects in-combination.

1.7.4.107 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets in-combination other plans/project.

River Kent SAC

Freshwater pearl mussel

1.7.4.108 The sensitivity of diadromous fish species to impacts from EMF is described for the alone assessment in **paragraphs 1.7.3.82** to **1.7.3.85** (for Atlantic salmon). Since diadromous fish species have been assessed as having low sensitivity, in-combination effects (including barriers to migration) on host species of freshwater pearl mussel are not expected. As such, in-combination effects are not expected to occur on this feature.

Conclusions

1.7.4.109 Adverse effects on the freshwater pearl mussel which undermine the conservation objectives of the River Kent SAC will not occur as a result of in-combination EMF from subsea electrical cabling during the operation and maintenance phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.35** to **1.7.2.37**) is presented in **Table 1.66** (Scenarios 1-3) and **Table 1.67** (Scenarios 4a-4c). 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 River Kent SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.69** to **1.7.4.72**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets to affect the habitats of freshwater pearl mussel. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm:	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.73** to **1.7.4.76**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets to affect the habitats of freshwater pearl mussel. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morgan Offshore Wind Project:	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.77** to **1.7.4.79**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets to affect the habitats of freshwater pearl mussel. Therefore, EMF from subsea electrical cabling associated with the

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	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.	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.	Transmission Assets in-combination with the 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 populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morgan Offshore Wind Project: Generation Assets.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets and the Morgan Offshore Wind Project: Generation Assets.

Table 1.69: Conclusions against the conservation objectives of the River Kent SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.80** to **1.7.4.85**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4a to affect the habitats of freshwater pearl mussel. Therefore, in-combination EMF from subsea electrical cabling associated these projects will not prevent the extent, distribution, structure and function of	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.86** to **1.7.4.90**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4b to affect the habitats of freshwater pearl mussel. Therefore, in-combination EMF from subsea electrical cabling associated these projects will not prevent the extent, distribution, structure and function of the habitats of freshwater pearl mussel or the supporting processes	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.91** to **1.7.4.96**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4c to affect the habitats of freshwater pearl mussel. Therefore, in-combination EMF from subsea electrical cabling associated these projects will not prevent the extent, distribution, structure and function of the habitats of freshwater pearl mussel or the supporting processes

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	the habitats of freshwater pearl mussel or the supporting processes on which the habitats of freshwater pearl mussel rely from being maintained or restored.	on which the habitats of freshwater pearl mussel rely from being maintained or restored.	on which the habitats of freshwater pearl mussel rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, 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 electrical cabling associated with these projects in-combination.	Given that EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations and distributions of freshwater pearl mussel within the site are not predicted to be prevented from being maintained or restored as a result of EMF from subsea electrical cabling associated with these projects in-combination	Given that EMF from subsea electrical cabling associated with the Scenario 4b in-combination with the projects considered under Scenario 4c are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations and distributions of freshwater pearl mussel within the site are not predicted to be prevented from being maintained or restored as a result of EMF from subsea electrical cabling associated with these projects in-combination.

1.7.4.110 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets in-combination with other plans/projects.

River Derwent and Bassenthwaite Lake SAC

Sea lamprey, river lamprey and Atlantic salmon

1.7.4.111 In-combination EMF from subsea electrical cabling has the potential to affect Atlantic salmon, sea lamprey and river lamprey by interfering with navigation (including migration patterns) and influencing behaviour. The sensitivity of diadromous fish species to impacts from EMF is described for the alone assessment in **paragraphs 1.7.3.75** to **1.7.3.78** (for lamprey species) and **paragraphs 1.7.3.82** to **1.7.3.85** (for Atlantic salmon).

Conclusions

1.7.4.112 Adverse effects on the 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 in-combination EMF from subsea electrical cabling during the operation and maintenance phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.43** to **1.7.2.45**) is presented in **Table 1.70** (Scenarios 1-3) and **Table 1.71** (Scenarios 4a-4c). 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 River Derwent and Bassenthwaite Lake SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.69** to **1.7.4.72**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets to affect the habitats of Atlantic salmon, sea lamprey or river lamprey. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.73** to **1.7.4.76**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets to affect the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morgan	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.77** to **1.7.4.79**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets to affect the habitats of Atlantic salmon, sea lamprey or river lamprey. Therefore, EMF from subsea electrical cabling

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	Morecambe Offshore Windfarm: 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 these species rely from being maintained or restored.	Offshore Wind Project: 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 these species rely from being maintained or restored.	associated with the Transmission Assets in-combination with the 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 these species rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morgan Offshore Wind Project: Generation Assets.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets and the Morgan Offshore Wind Project: Generation Assets.

Table 1.71: Conclusions against the conservation objectives of the River Derwent and Bassenthwaite Lake SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.80** to **1.7.4.85**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4a to affect the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, in-combination EMF from subsea electrical cabling associated these projects will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon, sea lamprey and	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.86** to **1.7.4.90**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4b to affect the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, in-combination EMF from subsea electrical cabling associated these 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	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.91** to **1.7.4.96**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4c to affect the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, in-combination EMF from subsea electrical cabling associated these 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

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	river lamprey or the supporting processes on which the habitats of these species rely from being maintained or restored.	these species rely from being maintained or restored.	these species rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, 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 electrical cabling associated with these projects in-combination.	Given that EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site are not predicted to be prevented from being maintained or restored as a result of EMF from subsea electrical cabling associated with these projects in-combination.	Given that EMF from subsea electrical cabling associated with the Scenario 4b in-combination with the projects considered under Scenario 4c are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site are not predicted to be prevented from being maintained or restored as a result of EMF from subsea electrical cabling associated with these projects in-combination.

1.7.4.113 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets in-combination with other plans/projects.

Solway Firth SAC

Sea lamprey and river lamprey

1.7.4.114 In-combination EMF from subsea electrical cabling has the potential to affect sea and river lamprey by interfering with navigation (including migration patterns) and influencing behaviour. The sensitivity of lamprey species to impacts from EMF is described for the alone assessment in **paragraphs 1.7.3.75** to **1.7.3.78**.

Conclusions

1.7.4.115 Adverse effects on the sea lamprey and river lamprey which undermine the conservation objectives of the Solway Firth SAC will not occur as a result of in-combination EMF from subsea electrical cabling during the operation and maintenance phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.50** to **1.7.4.53**) is presented in **Table 1.72** (Scenarios 1-3) and **Table 1.73** (Scenarios 4a-4c)**.** 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 Solway Firth SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.69** to **1.7.4.72**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets to affect the habitats of sea lamprey or river lamprey. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm:	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.73** to **1.7.4.76**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets to affect the habitats of sea lamprey and river lamprey. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morgan Offshore Wind Project:	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.77** to **1.7.4.79**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets to affect the habitats of sea lamprey or river lamprey. Therefore, EMF from subsea electrical cabling associated with the

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	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 these species rely from being maintained or restored.	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 these species rely from being maintained or restored.	Transmission Assets in-combination with the 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 these species rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in- combination with Morgan Offshore Wind Project: Generation Assets.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets and the Morgan Offshore Wind Project: Generation Assets.

Table 1.73: Conclusions against the conservation objectives of the Solway Firth SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.80** to **1.7.4.85**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4a to affect the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, in-combination EMF from subsea electrical cabling associated these projects will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.86** to **1.7.4.90**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4b to affect the habitats of sea lamprey and river lamprey. Therefore, in-combination EMF from subsea electrical cabling associated these projects will not prevent the extent, distribution, structure and function of the habitats of sea lamprey and river lamprey or the supporting processes	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.91** to **1.7.4.96**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4c to affect the habitats of sea lamprey and river lamprey. Therefore, in-combination EMF from subsea electrical cabling associated these 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 these species

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	the supporting processes on which the habitats of these species rely from being maintained or restored.	on which the habitats of these species rely from being maintained or restored	rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, 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 electrical cabling associated with these projects in-combination.	Given that EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations and distributions of sea lamprey and river lamprey within the site are not predicted to be prevented from being maintained or restored as a result of EMF from subsea electrical cabling associated with these projects in-combination.	Given that EMF from subsea electrical cabling associated with the Scenario 4b in-combination with the projects considered under Scenario 4c are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations and distributions of sea lamprey and river lamprey within the site are not predicted to be prevented from being maintained or restored as a result of EMF from subsea electrical cabling associated with these projects in-combination.

1.7.4.116 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets in-combination with other plans/projects.

Afon Gwyrfai a Llyn Cwellyn SAC

Atlantic salmon

1.7.4.117 In-combination EMF from subsea electrical cabling has the potential to affect Atlantic salmon by interfering with navigation (including migration patterns) and influencing behaviour. The sensitivity of Atlantic salmon to impacts from EMF is described for the alone assessment in **paragraphs 1.7.3.82** to **1.7.3.85**.

Conclusions

1.7.4.118 Adverse effects on the Atlantic salmon which undermine the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC will not occur as a result of in-combination EMF from subsea electrical cabling during the operation and maintenance phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraph 1.7.2.56**) is presented in **Table 1.74** (Scenarios 1-3) and **Table 1.75** (Scenarios 4a-4c). Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.74: Conclusions against the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The conservation objective for the water course as outlined in NRW (2022b) must be met	The in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.69** to **1.7.4.72**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met. Similarly, there will be no reduction in the area or quality of habitat for the populations of Atlantic salmon in the	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.73** to **1.7.4.76**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morgan Offshore Wind Project: Generation Assets will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met. Similarly, there will be no reduction in the area or quality of habitat for the populations of Atlantic salmon in the	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.77** to **1.7.4.79**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met. Similarly, there will be no reduction in

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	SAC on a long-term basis as a result of EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets.	SAC on a long-term basis as a result of EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets.	the area or quality of habitat for the populations of Atlantic salmon in the SAC on a long-term basis as a result of EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets.
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**	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets will be localised in spatial extent, both 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 electrical cabling, the populations of Atlantic salmon within the site will not be prevented from remaining stable or increasing in the long term. Similarly, the natural ranges of Atlantic salmon will neither be reduced or likely be reduced in the foreseeable future as a result of EMF from subsea electrical cabling.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morgan Offshore Wind Project: Generation Assets will be localised in spatial extent, both 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 electrical cabling, the populations of Atlantic salmon within the site will not be prevented from remaining stable or increasing in the long term. Similarly, the natural ranges of Atlantic salmon will neither be reduced or likely be reduced in the foreseeable future as a result of EMF from subsea electrical cabling.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets will be localised in spatial extent, both 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 electrical cabling, the populations of Atlantic salmon within the site will not be prevented from remaining stable or increasing in the long term. Similarly, the natural ranges of Atlantic salmon will neither be reduced or likely be reduced in the foreseeable future as a result of EMF from subsea electrical cabling.
The Gwyrfai will continue to be a sufficiently large habitat to	There is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination	There is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination	There is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
maintain the feature's population in the SAC on a long-term basis	with Morecambe Offshore Windfarm: Generation Assets 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.	with Morgan Offshore Wind Project: Generation Assets 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.	with the Generation Assets 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.

Table 1.75: Conclusions against the conservation objectives of the Afon Gwyrfai a Llyn Cwellyn SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The conservation objective for the water course as outlined in NRW (2022b) must be met	The in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.80** to **1.7.4.85**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.86** to **1.7.4.90**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.91** to **1.7.4.96**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met. Similarly, there will be no reduction in the area or quality of habitat for the populations of Atlantic salmon in the SAC on a long-term basis as a result of EMF from subsea electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a.	duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met. Similarly, there will be no reduction in the area or quality of habitat for the populations of Atlantic salmon in the SAC on a long-term basis as a result of EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b.	duration, continuous and of high reversibility. Therefore, EMF from subsea electrical cabling associated with the Scenario 4b and Generation Assets in-combination with the projects considered under Scenario 4c will not prevent the parameters defined in the vision for the watercourse as outlined in NRW (2022b) from being met. Similarly, there will be no reduction in the area or quality of habitat for the populations of Atlantic salmon in the SAC on a long-term basis as a result of EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Scenario 4b in-combination with the projects considered under Scenario 4c.
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**	Given that EMF from subsea electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations of Atlantic salmon within the site will not	Given that EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations of Atlantic salmon within the site are not predicted to be	Given that EMF from subsea electrical cabling associated with the Scenario 4abin-combination with the projects considered under Scenario 4c are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations of Atlantic salmon within the site are not predicted to be

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	be prevented from remaining stable or increasing in the long term. Similarly, the natural ranges of Atlantic salmon will neither be reduced or likely be reduced in the foreseeable future as a result of EMF from subsea electrical cabling.	prevented from remaining stable or increasing in the long term. Similarly, the natural ranges of Atlantic salmon will neither be reduced or likely be reduced in the foreseeable future as a result of EMF from subsea electrical cabling.	prevented from remaining stable or increasing in the long term. Similarly, the natural ranges of Atlantic salmon will neither be reduced or likely be reduced in the foreseeable future as a result of EMF from subsea electrical cabling.
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 electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a 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.	There is no pathway for in-combination EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b 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.	There is no pathway for in-combination EMF from subsea electrical cabling associated with the Scenario 4b in-combination with the projects considered under Scenario 4c 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.

1.7.4.119 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets in-combination with other plans/projects.

River Bladnoch SAC

Atlantic salmon

1.7.4.120 In-combination EMF from subsea electrical cabling has the potential to affect Atlantic salmon by interfering with navigation (including migration patterns) and influencing behaviour. The sensitivity of Atlantic salmon to impacts from EMF is described for the alone assessment in **paragraphs 1.7.3.82** to **1.7.3.85**

Conclusions

1.7.4.121 Adverse effects on the Atlantic salmon which undermine the conservation objectives of the River Bladnoch SAC will not occur as a result of in-combination EMF from subsea electrical cabling during the operation and maintenance phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraph 1.7.2.60**) is presented in **Table 1.76** (Scenarios 1-3) and **Table 1.77** (Scenarios 4a-4c). Where the justifications and supporting evidence are the same for more than one conservation objective, the assessments have been grouped.

Table 1.76: Conclusions against the conservation objectives of the River Bladnoch SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
Restore the population of the species, including range of genetic types, as a viable component of the site **Restore the distribution of the species throughout the site**	The in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.69** to **1.7.4.72**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets to affect the populations or distributions of Atlantic salmon. Therefore, this impact will not prevent the restoration of the population of Atlantic salmon as a viable component of the site or	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.73** to **1.7.4.76**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets to affect the populations or distributions of Atlantic salmon. Therefore, this impact will not prevent the restoration of the population of Atlantic salmon as a viable component of the site or	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.77** to **1.7.4.79**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets to affect the populations or distributions of Atlantic salmon. Therefore, this impact will not prevent the restoration

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	affect its distribution throughout the site.	affect its distribution throughout the site.	of the population of Atlantic salmon as a viable component of the site or affect its distribution throughout the site.
Restore the habitats supporting the species within the site and availability of food	As stated above, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets 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.	As stated above, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets 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.	As stated above, any potential in-combination effects from the Generation Assets associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets 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.

Table 1.77: Conclusions against the conservation objectives of the River Bladnoch SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
Restore the population of the species, including range of genetic types, as a viable component of the site **Restore the distribution of the species throughout the site**	The in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.80** to **1.7.4.85**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with these projects to affect the populations or distributions of Atlantic salmon. Therefore, this impact will not prevent the restoration of the population of Atlantic salmon as a viable component of the site or affect its distribution throughout the site.	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.86** to **1.7.4.90**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with these projects to affect the populations or distributions of Atlantic salmon. Therefore, this impact will not prevent the restoration of the population of Atlantic salmon as a viable component of the site or affect its distribution throughout the site.	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.91** to **1.7.4.96**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with these projects to affect the populations or distributions of Atlantic salmon. Therefore, this impact will not prevent the restoration of the population of Atlantic salmon as a viable component of the site or affect its distribution throughout the site.

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
Restore the habitats supporting the species within the site and availability of food	As stated above, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a 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.	As stated above, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b 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.	As stated above, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Scenario 4b in-combination with the projects considered under Scenario 4c 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.

1.7.4.122 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets in-combination with other projects/plans.

River Eden SAC

Sea lamprey, river lamprey and Atlantic salmon

1.7.4.123 In-combination EMF from subsea electrical cabling has the potential to affect sea and river lamprey by interfering with navigation (including migration patterns) and influencing behaviour. The sensitivity of diadromous fish species to impacts from EMF is described for the alone assessment in **paragraphs 1.7.3.75** to **1.7.3.78** (for lamprey species) and **paragraphs 1.7.3.82** to **1.7.3.85** (for Atlantic salmon).

Conclusions

1.7.4.124 Adverse effects on the sea lamprey, river lamprey and Atlantic salmon which undermine the conservation objectives of the River Eden SAC will not occur as a result of in-combination EMF from subsea electrical cabling during the operation and maintenance phase of the Transmission Assets in-combination with the projects/plans considered under Scenarios 1 to 4c. An assessment of the potential in-combination impact EMF from subsea electrical cabling against each relevant conservation objective (as presented in **paragraphs 1.7.2.66** and **1.7.2.67**) is presented in **Table 1.78** (Scenarios 1-3) and **Table 1.79** (Scenarios 4a-4c)**.** 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 River Eden SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 1-3

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.7.4.69** to **1.7.4.72**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets to affect the habitats of Atlantic salmon, sea lamprey or river lamprey. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.73** to **1.7.4.76**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets to affect the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, EMF from subsea electrical cabling associated with the Transmission Assets in-combination with Morgan	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.7.4.77** to **1.7.4.79**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets to affect the habitats of Atlantic salmon, sea lamprey or river lamprey. Therefore, EMF from subsea electrical cabling

Conservation Objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	Morecambe Offshore Windfarm: 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 these species rely from being maintained or restored.	Offshore Wind Project: 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 these species rely from being maintained or restored.	associated with the Transmission Assets in-combination with the 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 these species rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets will be localised in spatial extent, both 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morgan Offshore Wind Project: Generation Assets.	Given that EMF from subsea electrical cabling associated with the Transmission Assets in-combination with the Generation Assets 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 electrical cabling, 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 electrical cabling associated with the Transmission Assets in-combination with Morecambe Offshore Windfarm: Generation Assets and the Morgan Offshore Wind Project: Generation Assets.

Table 1.79: Conclusions against the conservation objectives of the River Eden SAC for in-combination EMF from subsea electrical cabling with respect to the operation and maintenance phase of the Transmission Assets for Scenarios 4a-4c

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The extent and distribution of habitats of qualifying species are 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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.80** to **1.7.4.85**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4a to affect the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, in-combination EMF from subsea electrical cabling associated these projects will not prevent the extent, distribution, structure and function of the habitats of Atlantic salmon, sea lamprey and	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.86** to **1.7.4.90**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4b to affect the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, in-combination EMF from subsea electrical cabling associated these 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	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **paragraph 1.7.4.67**. As outlined in detail in **paragraphs 1.7.4.91** to **1.7.4.96**, any potential in-combination effects from these projects associated with EMF from subsea electrical cabling on diadromous fish during the operation and maintenance phase will be of local spatial extent, long term duration, continuous and of high reversibility. As such, there is no pathway for in-combination EMF from subsea electrical cabling associated with the projects considered under Scenario 4c to affect the habitats of Atlantic salmon, sea lamprey and river lamprey. Therefore, in-combination EMF from subsea electrical cabling associated these 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

Conservation Objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	river lamprey or the supporting processes on which the habitats of these species rely from being maintained or restored.	these species rely from being maintained or restored.	these species rely from being maintained or restored.
The populations of qualifying species are maintained or restored. **The distributions of qualifying species within the site are maintained or restored.**	Given that EMF from subsea electrical cabling associated with the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a will be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, 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 electrical cabling associated with these projects in-combination.	Given that EMF from subsea electrical cabling associated with the Scenario 4a in-combination with the projects considered under Scenario 4b are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site are not predicted to be prevented from being maintained or restored as a result of EMF from subsea electrical cabling associated with these projects in-combination.	Given that EMF from subsea electrical cabling associated with the Scenario 4b in-combination with the projects considered under Scenario 4c are predicted to be localised in spatial extent, all projects will likely implement mitigation measures such as cable burial and that Annex II diadromous fish are considered to have low sensitivity to EMF from subsea electrical cabling, the populations and distributions of Atlantic salmon, sea lamprey and river lamprey within the site are not predicted to be prevented from being maintained or restored as a result of EMF from subsea electrical cabling associated with these projects in-combination.

1.7.4.125 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 electrical cabling with respect to the operation and maintenance phase of the Transmission Assets in-combination with other projects/plans.

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

1.8.1 Introduction

1.8.1.1 The HRA Stage 1 Screening Report (document reference: E3) identified the potential for LSEs on the European sites for Annex II marine mammal features which are listed in **Table 1.80** and shown in **Figure 1.6.**

Table 1.80: 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 - Part 2 SAC Assessments

European site	Annex II marine mammal features
Eight sites in the United Kingdom	
North Anglesey Marine/Gogledd Môn Forol SAC	• Harbour porpoise
North Channel SAC	• Harbour porpoise
Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC	• Grey seal
Lambay Island	• Grey seal
West Wales Marine/Gorllewin Cymru Forol SAC	• Harbour porpoise
Cardigan Bay/Bae Ceredigion SAC	• Grey seal
Pembrokeshire Marine/Sir Benfro Forol SAC	• Grey seal
Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	• Harbour porpoise
Two sites in Ireland	
Rockabill to Dalkey Island SAC	• Harbour porpoise
Saltee Islands SAC	• Grey seal

1.8.1.2 As agreed during EWG meetings (**Table 1.1**), an iterative approach has been adopted for assessment of European sites with Annex II marine mammal features assessed within this HRA Stage 2 ISAA - Part 2 SAC Assessments. This process considers, in the first instance, the impacts on the European site for each qualifying species screened in (harbour porpoise and grey seal) which is closest to the Offshore Order Limits. The conclusion from the site closest to the Offshore Order Limits 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, 2022c).

1.8.1.3 The approach undertaken for harbour porpoise was, in the first instance, to assess the impacts on the European site which is closest to the Offshore Order Limits (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 **sections 1.8.4** and **1.8.5**. The North Channel SAC and Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC, designated for harbour porpoise have also been assessed in full, since they are located in English waters. This is in line with feedback from Natural England in EWG meetings from the Morgan Offshore Wind Project: Generation Assets.

1.8.1.4 For grey seal as above, an iterative approach to assessment has been undertaken starting with the closest site to the Offshore Order Limits (Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC) being assessed in the first instance. In addition, 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 (CIS) part of the OSPAR Region III area (NRW, 2022d). Therefore, these SACs are assessed for relevant impacts on grey seal in **sections 1.8.4** and **1.8.5.**

1.8.1.5 In light of **paragraphs 1.8.2.2** to **1.8.2.4**, 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 1.81**.

Table 1.81: 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
Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC	• Grey seal
Pembrokeshire Marine/Sir Benfro Forol SAC	• Grey seal
Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	• Harbour porpoise

1.8.1.6 For the sites listed in **Table 1.81,** a full assessment has been undertaken using information supplied in Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4). For European sites located exclusively in Welsh or Irish waters, an iterative approach has been followed (recommended by NRW), whereby a conclusion for the potential for an adverse effect on integrity is provided for each site based on the distance from the Offshore Order Limits.

1.8.1.7 Therefore, the Rockabill to Dalkey Island SAC, Lambay Island SAC, West Wales Marine/Gorllewin Cymru Forol SAC, Cardigan Bay/Bae Ceredigion SAC and the Saltee Islands SAC have been assessed in line with the iterative approach. These assessments are presented for the alone

assessment in **paragraphs 1.8.4.39** *et seq* and for the in-combination assessment in **paragraphs 1.8.5.92** *et seq*.

1.8.1.8 LSEs on these European sites were identified for the impact of injury and disturbance from elevated underwater sound during UXO clearance during the construction phase of the Transmission Assets alone and in-combination with other plans/projects. All other impacts were screened out in the HRA Stage 1 Screening Report (document reference: E3).

1.8.1.9 Baseline information is provided in **section 1.8.2** for the European sites identified for full assessment in **Table 1.81**, including information to support the Appropriate Assessment such as site descriptions, feature information, conservation objectives and condition assessments.

1.8.1.10 **Sections 1.8.4** and **1.8.5** presents the information required for the competent authority to undertake 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 1.9**).

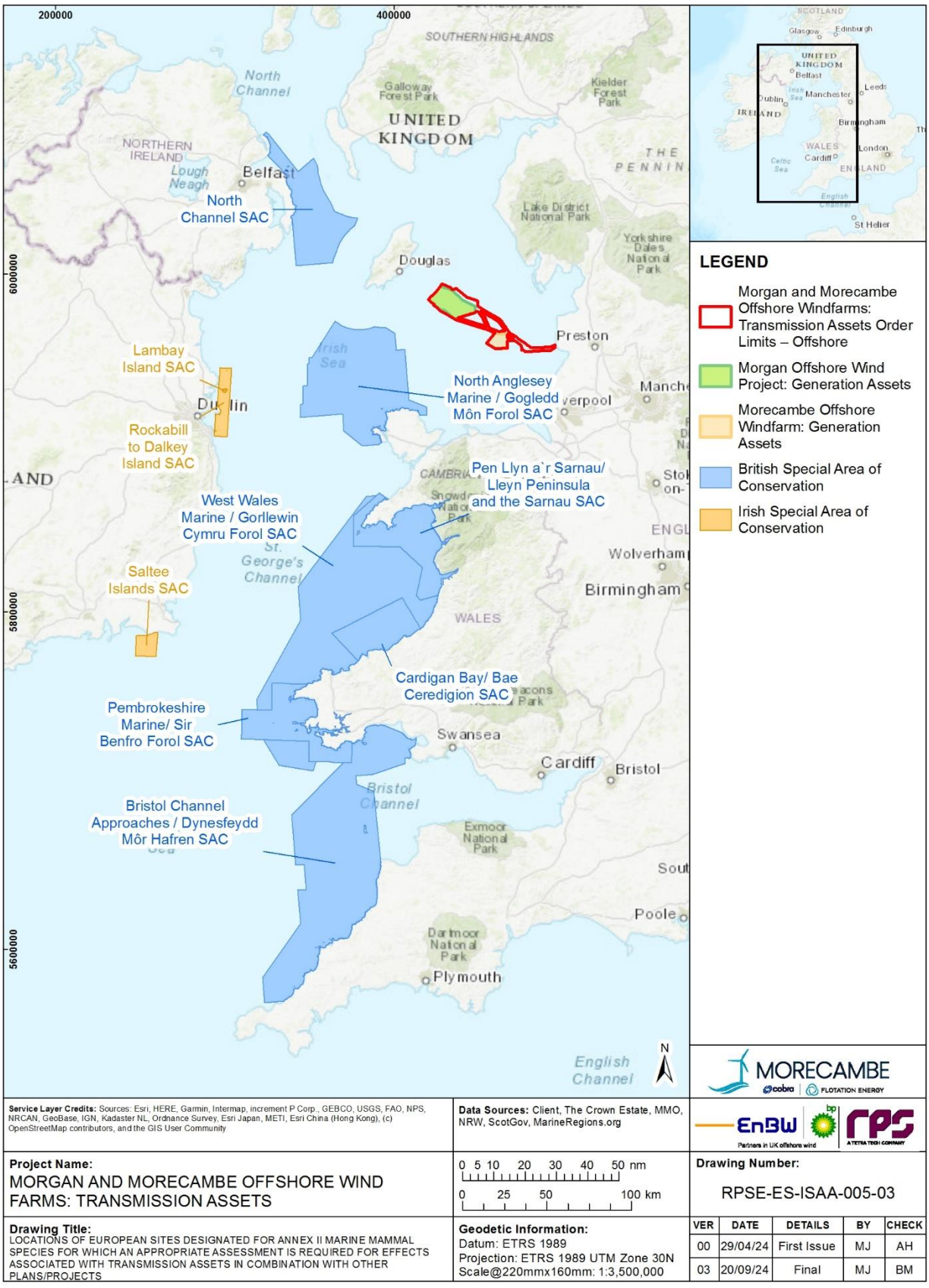

Figure 1.6: Location of European sites designated for Annex II marine mammal species for which an Appropriate Assessment is required (not to scale)

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 full 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. Full details are presented within Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4), Volume 2, Annex 4.1: Marine mammals technical report of the ES (document reference: F2.4.1) and Volume 1, Annex 5.2: Underwater sound technical report of the ES (document reference: F1.5.2).

North Anglesey Marine/Gogledd Môn Forol SAC

Site description

1.8.2.2 The North Anglesey Marine/Gogledd Môn Forol SAC, which is located approximately 28.5 km south west from the Offshore Order Limits (**Figure 1.6**), covers an area of 3,249 km^2 and extends from Anglesey in a north west direction into the Irish Sea. Water depths within the site range from mean low water tide level to 100 m with average depths of around 40 m to 50 m 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 harbour 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 1,084 individuals (95% Confidence Intervals (CI): 557 – 2111) for at least part of the year and represents approximately 4% of the population within the UK part of

the CIS MU (JNCC, NRW and DAERA, 2019). However, this 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) and considered in the assessment which are relevant to the harbour porpoise feature are outlined below.

- 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.

1.8.2.8 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:
  - sound 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[1] of the site in any given day[2];
    - an average of 10% of the relevant area of the site over a season[3],[4]; and
- the condition of supporting habitats and processes, and the availability of prey is maintained.

North Channel SAC

Site description

1.8.2.9 The North Channel SAC, which is located approximately 62.7 km north west from the Offshore Order Limits (**Figure 1.6**), between the North Channel and the north west Irish Sea between Northern Ireland, Scotland and the Isle of Man and covers an area of 1,604 km^2. The SAC runs along the east coast of Northern Ireland, connects with The Maidens SAC to the north and stands in

[1] 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).

[2] Applicable only in HRA due to impracticality of daily sound limit management of activities, but retrospective compliance analysis advised.

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

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

proximity to the Murlough SAC and Strangford Lough SAC to the south west. The SAC extends from coastal to offshore waters with most of the site ranging between 10 m to 40 m deep with a maximum of 150 m 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.

Feature accounts

Harbour porpoise

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

1.8.2.11 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 CIS 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% CI: 276 – 1,046) for at least part of the year (JNCC and DAERA, 2017). However, this 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

1.8.2.12 There is no condition assessment available for the harbour porpoise feature of the North Channel SAC.

Conservation objectives

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

- 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.

1.8.2.14 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:
  - sound 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[1] of the site in any given day[2];

- an average of 10% of the relevant area of the site over a season[3,4]; and

- the condition of supporting habitats and processes, and the availability of prey is maintained.

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

Site description

1.8.2.15 The Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC is located approximately 111.2 km south from the Offshore Order Limits (**Figure 1.6**), in north west 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 1460 km^2 (NRW, 2018a).

1.8.2.16 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 has created a wide range of habitats and associated communities of which some of which are unique to Wales (NRW, 2018a).

Feature accounts

Grey seal

1.8.2.17 Grey seal is listed as an Annex II species present as a qualifying feature, but is not a primary reason for site selection.

1.8.2.18 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).

1.8.2.19 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).

Condition assessment

1.8.2.20 **Table 1.82** 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 are in favourable condition although the condition of supporting habitats is currently

unknown (NRW, 2018b). There are no activities identified as having a direct impact on the site condition (NRW, 2018b).

Table 1.82: Condition assessment of grey seal Annex II marine mammal feature 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

Conservation objectives

1.8.2.21 The conservation objectives relevant for the grey seal feature of the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC are outlined below (NRW, 2018a).

1.8.2.22 Only conservation objectives relevant to the qualifying species (Annex II marine mammal qualifying features) of the SAC will be assessed in **sections 1.8.4** and **1.8.5**. Conservation objectives relating to the qualifying habitats of the SAC have been screened out in the HRA Stage 1 Screening Report (document reference: E3).

1.8.2.23 To achieve FCS, 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 FCS.

Population

1.8.2.24 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; and
- condition of the species within the site.

1.8.2.25 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; and
- for grey seal, populations should not be reduced as a consequence of human activity.

Range

1.8.2.26 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.

1.8.2.27 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; and
- 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

1.8.2.28 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; and
- prey availability and quality.

1.8.2.29 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; and
- disturbance by human activity is below levels that suppress reproductive success, physiological health or long-term behaviour.

Restoration and recovery

1.8.2.30 As part of this objective, it should be noted that for bottlenose dolphin, the population should be increasing.

Pembrokeshire Marine/Sir Benfro Forol SAC

Site description

1.8.2.31 The Pembrokeshire Marine/Sir Benfro Forol SAC, which is located approximately 216.1 km south west from the Offshore Order Limits (**Figure 1.6**), 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, Grassholm, 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, 2018e). There are also strong tidal streams within the SAC.

Feature accounts

Grey seal

1.8.2.32 Grey seal are present as an Annex II species that are a primary reason for selection of this site.

1.8.2.33 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, 2018e). Pup production from 2015 to 2018 has shown the highest totals ever recorded with average production for 2013 to 2015 at 357 pups (NRW, 2018e). Pupping primarily takes place in the south west end of the SAC (NRW, 2018e).

1.8.2.34 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 boundaries 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, 2018e).

Condition assessment

1.8.2.35 **Table 1.83** 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, 2018f). There are no activities identified as having a direct impact on the site condition (NRW, 2018e).

Table 1.83: 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

1.8.2.36 The conservation objectives outlined in NRW (2018f) considered in the assessment which are relevant to the grey seal feature are outlined below.

1.8.2.37 Only conservation objectives relevant to qualifying species (Annex II marine mammal qualifying features) of the SAC will be assessed in **sections 1.8.4** and **1.8.5**. Conservation objectives relating to the qualifying habitats or Annex II diadromous fish of the SAC will not be considered on the basis of the findings of the HRA Stage 1 Screening Report (document reference: E3).

Populations

1.8.2.38 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; and
- condition of the species within the site.

1.8.2.39 As part of this objective, it should be noted that for grey seal:

- contaminant burdens derived from human activity are below levels that may cause physiological damage, or immune or reproductive suppression; and
- populations should not be reduced as a consequence of human activity.

Range

1.8.2.40 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.

1.8.2.41 As part of this objective, it should be noted that for 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; and
- 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

1.8.2.42 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; and
- prey availability and quality.

1.8.2.43 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; and
- 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

1.8.2.44 Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC, which is located approximately 296 km south west from the Offshore Order Limits (**Figure 1.6**), 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 5,850 km^2 with depths ranging from mean low water to 70 m 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.

Feature accounts

Harbour porpoise

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

1.8.2.46 While harbour porpoise is present year round within the boundaries of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC, the site provides important winter habitat for harbour porpoise with persistent higher densities throughout the site compared to other regions of the UK CIS 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 CIS MU population. The SCANS-II surveys in 2005 estimated that the site supports approximately 2,100 individuals (95% CI: 805 – 5,661) for at least part of the year (JNCC, Natural England and NRW, 2016). However, this 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

1.8.2.47 There is no condition assessment available for the harbour porpoise feature of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC.

Conservation objectives

1.8.2.48 The conservation objectives as outlined in JNCC, Natural England and NRW (2019) and considered in the assessment which are relevant to the harbour porpoise feature are outlined below.

- 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.

1.8.2.49 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:
  - sound 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[1] of the site in any given day[2];
    - an average of 10% of the relevant area of the site over a season[3,4]; and
- the condition of supporting habitats and processes, and the availability of prey is maintained.

1.8.3 Reference populations

1.8.3.1 When considering the potential for an adverse effect on site integrity for the identified SACs with Annex II marine mammal features, the reference population applied to the assessment is the MU population in which the SAC is located.

1.8.3.2 For harbour porpoise, this approach is consistent with both stakeholder advice and the conservation advice for SACs, set out in the respective Conservation Objectives and Advice on Operations documents, 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, 2019).

1.8.3.3 The same approach is also considered appropriate for grey 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 North West England and Wales MUs 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.

1.8.3.4 The reference populations used within the Appropriate Assessment in **sections 1.8.4** and **1.8.5** are presented within **Table 1.84**.

Table 1.84: 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	0.227[5]	Celtic and Irish Seas	62,517[6]
Grey seal	0.108[7]	Wales NW England Northern Ireland SW Scotland Isle of Man estimate East of Ireland South East of Ireland (hereafter referred to as the 'Grey Seal	3,579[8] 1,196[8] 2,183[8] 2,056[8] 400[9] 1,622[10] 2,211[10]

[5] Density derived from Evans and Waggitt (2023) for the Transmission Order Limits: Offshore.

[6] Population estimates per MU from IAMMWG, 2022.

[7] Carter *et al.* (2022) values – average densities calculated to per km^2 from 25 km^2 cells for the study area.

[8] Based upon counts presented in SCOS (2021) with scalar of 0.215

[9] Population estimate from Howe (2018).

[10] Based upon counts in Morris and Duck (2019) with scalar of 0.215 from SCOS (2022)

Annex II marine mammal feature	Density (animals per km²)	Relevant MU	Abundance in MU
		Reference Population' (GSRP))	**13,283**
		OSPAR Region III	60,780[11]

1.8.4 Assessment of adverse effects alone

Injury and disturbance from elevated underwater sound during UXO clearance

1.8.4.1 The clearance of UXO prior to commencement of construction phase of Transmission Assets may result in clearance (high order) of a UXO. This activity has the potential to result in the hearing damage/auditory injury or behavioural disturbance/displacement (including barrier effects) of marine mammals.

1.8.4.2 The assessment of LSE in the HRA Stage 1 Screening Report (document reference: E3) identified that during construction activities, LSE could not be ruled out for the potential impact of injury and disturbance from elevated underwater sound during UXO clearance. This relates to the designated sites and relevant Annex II marine mammal features listed in **Table 1.85.**

Table 1.85: SACs and relevant Annex II marine mammal features from which the potential for an LSE could not be ruled out in relation to injury and disturbance from elevated underwater sound during UXO clearance

SAC	Annex II marine mammal features
North Anglesey Marine/Gogledd Môn Forol SAC	• Harbour porpoise
North Channel SAC	• Harbour porpoise
Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC	• Grey seal
Lambay Island	• Grey seal
Cardigan Bay/Bae Ceredigion SAC	• Grey seal
Pembrokeshire Marine/Sir Benfro Forol SAC	• Grey seal
West Wales Marine/Gorllewin Cymru Forol SAC	• Harbour porpoise
Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	• Harbour porpoise
Rockabill to Dalkey Island SAC	• Harbour porpoise
Saltee Islands SAC	• Grey seal

[11] Estimate derived from the OSPAR Quality Status Report (QSR) 2023 (Banga, 2022) (n*min* applied as a precautionary estimate, rather than n*mean*).

1.8.4.3 The following sections explain how this potential impact on Annex II marine mammal features of the SACs listed above has been quantified and assessed.

1.8.4.4 The MDS considered for the assessment of this potential impact on Annex II marine mammals features is presented in **Table 1.86.** The MDS has been selected as the one which has the potential to result in the greatest effect on the identified receptor and considers the activities to be carried out sequentially. These scenarios have been selected from the project design provided in Volume 1, Chapter 3: Project description of the ES, which presents the same cable installation period for both concurrent and sequential installations. Under the proposed construction programme activities are not due to be taken at the same time, as to the Generation Assets sharing the same cable corridor and cable routing from the Morecambe Offshore Windfarm: Generation Assets to the Landfall. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the project design (e.g., different infrastructure layout), to that assessed here, be taken forward in the final design.

Table 1.86: Maximum design scenario considered for the assessment of potential impacts on marine mammals from injury and disturbance from elevated underwater sound during UXO clearance

Phase	Maximum design scenario	Justification
Construction phase	• Clearance of up to 25 UXOs within the Transmission Assets (23 for the Morgan Offshore Wind Project and 3 for the Morecambe Offshore Windfarm) • A range of UXO sizes assessed from 25 kg up to 907 kg with 130 kg the most likely maximum. • For high order detonation donor charges of 1.2 kg (most common) and 3.5 kg (single barracuda blast charge). • Up to 0.5 kg Net Explosive Quantities (NEQ) clearance shot for neutralisation of residual explosive material at each location • Clearance during daylight hours only. The MDS is for high order clearance, but assessment also considered: • Low order clearance charge size of 0.08 kg. • Low yield clearance configurations of 0.75 kg charges (up to 4x0.75 kg).	• Maximum number and maximum size of UXOs encountered within the Offshore Order Limits. 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 0.5 kg 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 Transmission Assets (Commitments)

1.8.4.5 Measures adopted as part of the Transmission Assets which are of relevance to the assessment of potential impacts on Annex II marine mammal features from injury and disturbance from elevated underwater sound during UXO clearance during the construction phase are presented in **Table 1.87**.

Table 1.87: Measures (commitments) adopted as part of the project which are relevant to the assessment of adverse effects on European sites designated for Annex II marine mammal features from injury and disturbance from elevated underwater sound during UXO clearance during the construction phase

Commitment number	Measure adopted	How the measure will be secured
Embedded measures		
CoT64	Detailed Marine Mammal Mitigation Protocols (MMMP) will be developed and implemented in accordance with the Outline MMMP (document reference: J18), to reduce the risk of injury to marine mammals. The detailed MMMP(s) will include measures to apply in advance of and during surveys and UXO clearance. The detailed MMMP(s) will include for the use of low order techniques, where possible, as the primary mitigation measure alongside other measures. The detailed MMMP(s) will be approved by the Marine Management Organisation, in consultation with Natural England.	DCO Schedule 14 (Marine Licence 1: Morgan Offshore Wind Project Transmission Assets) Part 2 – Condition 20(1)(b) (UXO clearance) and DCO Schedule 15 (Marine Licence 2: Morecambe Offshore Windfarm Transmission Assets), Part 2 - Condition20(1)(b) (UXO clearance)

Construction phase

Information to support assessment

Injury - PTS

1.8.4.6 Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4) presents the impact ranges for low order, low yield and high order UXO clearance activities, as well as donor charges used in high order UXO clearance. The number of animals predicted to experience PTS due to low order and low-yield UXO clearance activities is less than one animal for grey seal and up to four harbour porpoise. The number of animals predicted to experience PTS due to donor charges used in high order UXO clearance activities is less than one animal for grey seal and up to five harbour porpoise. Additional information is provided in Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4).

1.8.4.7 As reported in Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4), an explosive mass of 907 kg (absolute maximum) (high order explosion) yielded the largest PTS ranges for all species, with the greatest range of effects (15,370 m) predicted for harbour porpoise (peak Sounds Pressure Level (SPL_{pk})). However, the more common 130 kg charge sees this injury range reduce to 8,045 m for harbour porpoise (SPL_{pk}). Conservatively, the number of harbour porpoise that could be potentially injured, based on the Welsh Marine Mammal Atlas (Evans and Waggitt, 2023) density of 0.227 animals per km^2, was estimated as 169 animals for 907 kg UXO (absolute maximum) high order explosion equating to 0.27% of the CIS MU[5]. Predicted numbers of harbour porpoise were much smaller for the most likely (common) 130 kg and 25 kg UXO with up to 47 animals and 16 animals potentially experiencing PTS respectively (applying the SPL_{pk} metric). For low order techniques, the largest range of 2,290 m was predicted from the 4 x 0.75 kg low-yield charges, which could injure up to four harbour porpoise within this range.

1.8.4.8 The underwater sound assessment (Volume 1, Annex 5.2: Underwater sound technical report of the ES; document reference: F1.5.2) found that the maximum injury (PTS) range estimated for grey seal using the SPL_{pk} metric was 3,015 m for the clearance of charge size of 907 kg (absolute maximum), but this was reduced to 1,580 m for 130 kg and 910 m for 25 kg. Therefore conservatively, the number of individuals that could be potentially injured was estimated as up to four grey seal for 907 kg UXO (absolute maximum) high order explosion, which equates to 0.03% of the GSRP or 0.007% of the OSPAR Region III reference population[11] and less than grey seal for both 130 kg and 25 kg UXO. For low order techniques, the largest range of 449 m was predicted from the 4 x 0.75 kg low-yield charges, which could injure less than one grey seal within this range.

1.8.4.9 Further detail on underwater sound modelling of UXO clearance are provided in Volume 1, Annex 5.2: Underwater sound technical report of the ES (document reference: F1.5.2) and Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4).

Behavioural displacement (TTS as a proxy)

1.8.4.10 Within Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4), a second threshold assessed was the onset of Temporary Threshold Shift (TTS) where the resulting effect would be a potential temporary loss in hearing. This is assumed that 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. However, 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 (it represents the boundary between the most severe disturbance levels and the start of physical auditory impacts on animals).

1.8.4.11 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. The largest ranges using SPL_{pk} were predicted for clearance of the 907 kg UXO (absolute maximum) with potential strong TTS/moving away response over a distance of up to 28.32 km for harbour porpoise. Ranges predicted for grey seal using cumulative Sound Exposure Level (SEL_{cum}) were smaller for clearance of 907 kg UXO (absolute maximum) with potential TTS/moving away response over a distance of up to 6.47 km.

1.8.4.12 The greatest predicted impact range for harbour porpoise from the clearance of the 907 kg UXO (absolute maximum) using the SPL_{pk} metric was 28.32 km, which equates to 0.915% of the CIS MU population[5] and up to 572 animals with the potential to experience TTS. The number of grey seal with the potential to experience TTS from the 907 kg UXO (absolute maximum) within the 6.47 km TTS range was estimated as 15 animals (0.11% of the GSRP, or 0.024% of the OSPAR Region III reference population[11]; based on SEL_{cum}).

1.8.4.13 Further detail on underwater sound modelling of UXO clearance are provided in Volume 1, Annex 5.2: Underwater sound technical report of the ES (document reference: F1.5.2) and Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4).

1.8.4.14 The conclusions presented onwards are based on the assessment for high order clearance.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

1.8.4.15 As outlined in **paragraph 1.8.4.7**, the number of harbour porpoise that could be potentially injured was estimated as 169 animals for 907 kg UXO (absolute maximum), high order explosion which equates to 0.27% of the CIS MU[5]. For TTS, as outlined in **paragraph 1.8.4.12**, the number of harbour porpoise potentially affected, based on high order clearance of a 907 kg UXO (absolute maximum), was up to 572 animals which equates to 0.915% of the CIS MU population[5].

1.8.4.16 The North Anglesey Marine/Gogledd Môn Forol SAC is located 28.5 km south west from the closest point of the Offshore Order Limits. The maximum injury (PTS) range estimated for harbour porpoise using the SPL_{pk} metric was 15.4 km for the clearance of charge size of 907 kg (absolute maximum) (the more common 130 kg charge sees this injury range reduce to 8,045 m) (see **paragraph 1.8.4.7**). The maximum predicted range for TTS/moving away response was estimated at approximately 28 km (see **paragraph 1.8.4.11**) and therefore there is no potential overlap between the predicted absolute maximum impact zones and the SAC.

1.8.4.17 With the implementation of embedded measures (outlined in **Table 1.87**), Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4) identified that there would be a residual risk of injury over a range of 2,290 m 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 15 km for a 907 kg UXO (absolute maximum) and approximately 8 km for a 130 kg UXO (most likely (common) scenario). Therefore, adopting standard industry practice (JNCC, 2010), embedded mitigation measures will be applied as part of a MMMP (CoT64, which will be developed in accordance with the Outline MMMP (document reference: J18). Embedded mitigation will therefore also include the use of ADDs and scare charges to deter animals from the injury zone (see **Table 1.87**). With the embedded 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.

1.8.4.18 For harbour porpoise, the ranges of effect are large for high order clearance and there is considered to be a residual risk of PTS to a number of individuals (based upon the absolute maximum 907 kg UXO). It is difficult to quantify this residual risk due to uncertainties over the predicted ranges of effect and the potential ranges over which deterrence measures are effective, alongside assessing on the MDS of high order clearance, which may be refined following site-investigation surveys. It is anticipated that there would be some measurable changes at an individual level however, these would not manifest to population level effects as demonstrated by the small proportion of the CIS MU potentially affected.

1.8.4.19 In line with guidance from stakeholders (JNCC and Natural England) the EDR approach has also been used for the assessment of disturbance associated with UXO clearance during the construction phase for the harbour porpoise feature of the North Anglesey Marine/Gogledd Môn Forol SAC. The EDR approach, as outlined in JNCC (2020), recommends the use of 26 km deterrence range for UXO. The assessment considered UXO detonation could theoretically occur at the closest location within the Offshore Order Limits to the North Anglesey Marine/Gogledd Môn Forol SAC.

1.8.4.20 Since the North Anglesey Marine/Gogledd Môn Forol SAC is located 28.5 km from the Offshore Order Limits, there is no overlap of the 26 km EDR with this SAC. Therefore, using the disturbance footprints associated with the Transmission Assets, this does not result in any potential disturbance across the North Anglesey Marine/Gogledd Môn Forol SAC. Therefore, disturbance associated with UXO detonation would not contribute to or exceed the daily 20% disturbance threshold[12] or the 10% threshold of the relevant area of the SAC over the season[34].

1.8.4.21 The next closest SAC designated for harbour porpoise is the North Channel SAC, located 62.7 km away from the Offshore Order Limits, which is also outside of the 26 km EDR range. Therefore, with the implementation of a 26 km EDR, there will be no overlap with the North Channel SAC or any other SACs designated for harbour porpoise and disturbance associated with UXO detonation will not contribute to or exceed the daily 20% disturbance threshold[12] or the 10% threshold of the relevant area of these SACs over the season[34].

Conclusions

1.8.4.22 Adverse effects on the Annex II marine mammal features which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of injury and disturbance from elevated underwater sound during UXO clearance during the construction phase. An assessment of the potential impact 'injury and disturbance from elevated underwater sound during UXO clearance' against each relevant conservation objective (as presented in **paragraphs 1.8.2.7** to **1.8.2.8**) is presented in **Table 1.88**.

Table 1.88: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC for injury and disturbance from elevated underwater sound during UXO clearance during the construction phase

Conservation objective	Conclusion
The species is a viable component of the site	As outlined in **paragraph 1.8.4.16**, where low order/low yield measures are not possible, there is a maximum risk of injury (predicted for harbour porpoise) out to 15.4 km for a 907 kg UXO (absolute maximum) and 8.1 km for a 130 kg UXO. The North Anglesey Marine/Gogledd Môn Forol SAC is located 28.5 km south west from the Offshore Order Limits and therefore there is no potential for overlap between the predicted absolute maximum 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 embedded 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 (0.27%[5]). TTS is reversible and therefore animals that experience this effect are anticipated to fully recover. Therefore, injury and disturbance from elevated underwater sound during UXO clearance associated with the Transmission Assets will not prevent harbour porpoise from remaining a viable component of the SAC.
There is no significant disturbance of the species	TTS as a proxy for behavioural disturbance is considered reversible and therefore animals that experience this effect are anticipated to fully recover. It is, however, recognised that where embedded mitigation is applied (i.e., ADD and soft start charges) deterrence measures by their nature would contribute to, rather than reduce, the moving away response (behavioural disturbance). However, 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 clearance 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 elevated underwater sound during UXO clearance associated with the Transmission Assets will not result in significant disturbance of harbour porpoise.

Conservation objective	Conclusion
The supporting habitats and processes relevant to harbour porpoise and their prey are maintained	Supporting habitats and processes will not be affected by underwater sound generated from UXO clearance associated with the Transmission Assets (i.e., there will be no habitat loss/disturbance from underwater sound associated with UXO clearance). 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 Transmission Assets will not affect prey species populations being maintained in the long term.

1.8.4.23 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 injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets alone.

North Channel SAC

Harbour porpoise

1.8.4.24 The North Channel SAC is located at an increased distance to the Transmission Assets (62.7 km north west from the Offshore Order Limits; **Figure 1.6**) than the North Anglesey Marine/Gogledd Môn Forol SAC (28.5 km south west from the Offshore Order Limits; **Figure 1.6**), assessed in **paragraphs 1.8.4.15** to **1.8.4.23.** As the North Channel SAC is located at an increased distance from the Transmission Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.25 Adverse effects on the Annex II marine mammal features which undermine the conservation objectives of the North Channel SAC will not occur as a result of injury and disturbance from elevated underwater sound during UXO clearance during the construction phase. An assessment of the potential impact 'injury and disturbance from elevated underwater sound during UXO clearance' against each relevant conservation objective (as presented in **paragraphs 1.8.2.13** to **1.8.2.14**) is presented 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 North Channel SAC for injury and disturbance from elevated underwater sound during UXO clearance during the construction phase

Conservation objective	Conclusion
The species is a viable component of the site	As outlined in **paragraph 1.8.4.7**, where low order/low yield measures are not possible, there is a maximum risk of injury (predicted for harbour porpoise) out to 15.4 km for a 907 kg UXO (absolute maximum) and 8.1 km for a 130 kg UXO. The North Channel SAC is located 62.7 km north west from the Offshore Order Limits and therefore there is no

Conservation objective	Conclusion
	potential overlap between the predicted absolute maximum 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 embedded 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 (0.27%). TTS is reversible and therefore animals that experience this effect are anticipated to fully recover. Therefore, injury and disturbance from elevated underwater sound during UXO clearance associated with the Transmission Assets will not prevent harbour porpoise from remaining a viable component of the SAC.
There is no significant disturbance of the species	TTS as a proxy for behavioural disturbance are considered reversible and therefore animals that experience this effect are anticipated to fully recover. It is, however, recognised that where embedded 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 clearance 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 elevated underwater sound during UXO clearance associated with the Transmission Assets will not result in significant disturbance of harbour porpoise.
The supporting habitats and processes relevant to harbour porpoise and their prey are maintained	Supporting habitats and processes will not be affected by underwater sound generated from UXO clearance associated with the Transmission Assets (i.e., there will be no habitat loss/disturbance from underwater sound associated with UXO clearance). 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 Transmission Assets will not affect prey species populations being maintained in the long term.

1.8.4.26 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 injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets alone.

Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC

Grey seal

1.8.4.27 As outlined in **paragraph 1.8.4.8**, the number of grey seal that could be potentially injured (PTS), was estimated as up to four individuals for 907 kg UXO (absolute maximum) higher order clearance which equates 0.03% of the GSRP or 0.007% of the OSPAR Region III reference population[11], and up to less than one animal for both 130 kg and 25 kg UXO. For TTS, as outlined in **paragraph 1.8.4.12**, the number of grey seal potentially affected, based on high order clearance of a 907 kg UXO (absolute maximum), was up to 15 animals (based on SEL_{cum}), which equates to 0.11% of the GSRP or 0.024% of the OSPAR Region III population[7].

1.8.4.28 The Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC is located 111.2 km south from the Offshore Order Limits (**Figure 1.6**). The maximum injury (PTS) range estimated for grey seal using the SPL_{pk} metric was 3,015 m for the UXO clearance of charge size of 907 kg (absolute maximum) (see **paragraph 1.8.4.8**) and the maximum predicted range for TTS/moving away response was 6,470 m (based on SEL_{cum}) (see **paragraph 1.8.4.11**) and therefore there is no potential overlap between the predicted absolute maximum impact zones and the SAC.

1.8.4.29 Embedded mitigation will be applied as part of a MMMP (CoT64) in line with standard industry practice (JNCC, 2010). Embedded mitigation will therefore also include the use of ADDs and scare charges to deter animals from the injury zone (see **section 1.5.2**). With the embedded 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.

1.8.4.30 As outlined in **paragraph 1.8.4.8,** the number of animals at risk of potential PTS would be very small, with the implementation of embedded 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 GSRP or the OSPAR Region III population[7] potentially affected.

Conclusions

1.8.4.31 Adverse effects on the Annex II marine mammal features which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC will not occur as a result of injury and disturbance from elevated underwater sound during UXO clearance during the construction phase. An assessment of the potential impact 'injury and disturbance from elevated underwater sound during UXO clearance' against each relevant conservation objective (as presented in **paragraphs 1.8.2.24** to **1.8.2.29**) is presented 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 Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC for injury and disturbance from elevated underwater sound during UXO clearance 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	There is a maximum risk of injury out to 3,015 m for grey seal. There is a maximum risk of disturbance out to 6,470 m for grey seal. The Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC is located 111.2 km south from the Offshore Order Limits and therefore there is no potential overlap between the predicted absolute maximum impact zones and the SAC. The number of animals at risk of potential PTS would be very small (up to four grey seal, which equates to 0.03% of the GSRP or 0.007% of the OSPAR Region III reference population[11]). With the implementation of embedded mitigation, this would be further reduced. There may be some measurable changes at an individual level (up to four grey seal), but this would not manifest to population level effects demonstrated by the small proportion of the MU or GSRP/OSPAR Region III population potentially affected. TTS impacts are reversible and therefore animals that experience this effect are anticipated to fully recover. Therefore, injury and disturbance from elevated underwater sound during UXO clearance associated with the Transmission Assets will not prevent the grey seal populations from maintaining themselves on a long-term basis as a viable component of their natural habitats. Similarly, injury and disturbance from elevated underwater sound during UXO clearance associated with the Transmission Assets will not adversely affect the population size, structure, production, and condition of grey seal within the site. The populations of 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 injury and disturbance from elevated underwater sound during UXO clearance.
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 generation from UXO clearance associated with the Transmission Assets (i.e., there will be no habitat loss/disturbance from underwater sound associated with UXO clearance). 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 Transmission Assets will not affect the distribution, abundance and populations dynamics of grey seal within the site and population beyond the site from remaining stable or increasing.

1.8.4.32 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 Llŷn a'r Sarnau SAC as a result of injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets alone.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.4.33 The Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance to the Transmission Assets (223.7 km south west from the Offshore Order Limits; **Figure 1.6**) than the Lleyn Peninsula and the Sarnau/Pen Llŷn

a`r Sarnau SAC (111.2 km south from the Offshore Order Limits; **Figure 1.6**), assessed in **paragraphs 1.8.4.27** to **1.8.4.32**. As the Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance from the Transmission Assets than the Lleyn Peninsula and the Sarnau/Pen Llŷn a`r Sarnau SAC, it is considered that effects on grey seal would be of similar if not lower magnitude.

Conclusions

1.8.4.34 Adverse effects on the Annex II marine mammal features which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of injury and disturbance from elevated underwater sound during UXO clearance during the construction phase. An assessment of the potential impact 'injury and disturbance from elevated underwater sound during UXO clearance' against each relevant conservation objective (as presented in **paragraphs 1.8.2.36** to **1.8.2.43**) is presented 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 the Pembrokeshire Marine/Sir Benfro Forol SAC for injury and disturbance from elevated underwater sound during UXO clearance 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	There is a maximum risk of injury out to 3,015 m and a maximum risk of disturbance out to 6,470 m for grey seal. The Pembrokeshire Marine/Sir Benfro Forol SAC is located 233.7 km south west from the Offshore Order Limits and therefore there is no potential overlap between the predicted absolute maximum impact zones and the SAC. The number of animals at risk of potential PTS would be very small (up to four grey seal, which equates to 0.03% of the GSRP or 0.007% of the OSPAR Region III reference population[11]). With the implementation of embedded mitigation, this would be further reduced. There may be some measurable changes at an individual level (up to four grey seal), but this would not manifest to population level effects demonstrated by the small proportion of the GSRP and OSPAR Region III population potentially affected. TTS impacts are reversible and therefore animals that experience this effect are anticipated to fully recover. Therefore, injury and disturbance from elevated underwater sound during UXO clearance associated with the Transmission 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, injury and disturbance from elevated underwater sound during UXO clearance associated with the Transmission Assets will 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 injury and disturbance from elevated underwater sound during UXO clearance.
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	

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	The presence, abundance, condition and diversity of supporting habitats and processes will not be affected by underwater sound generation from UXO clearance associated with the Transmission Assets (i.e., there will be no habitat loss/disturbance from underwater sound associated with UXO clearance). 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 Transmission 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.

1.8.4.35 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 injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets alone.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

1.8.4.36 The Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located at an increased distance to the Transmission Assets (296.9 km south west from the Offshore Order Limits; **Figure 1.6**) than the North Anglesey Marine/Gogledd Môn Forol SAC (28.5 km south west from the Offshore Order Limits; **Figure 1.6**), assessed in **paragraphs 1.8.4.15** to **1.8.4.23**. As the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located at an increased distance from the Transmission Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.4.37 Adverse effects on the Annex II marine mammal features which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC will not occur as a result of injury and disturbance from elevated underwater sound during UXO clearance during the construction phase. An assessment of the potential impact ‘injury and disturbance from elevated underwater sound during UXO clearance’ against each relevant conservation objective (as presented in **paragraphs 1.8.2.48** to **1.8.2.49**) is presented in **Table 1.92.**

Table 1.92: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC for injury and disturbance from elevated underwater sound during UXO clearance during the construction phase

Conservation objective	Conclusion
The species is a viable component of the site	As outlined in **paragraph 1.8.4.7**, where low order/low yield measures are not possible, there is a maximum risk of injury (predicted for harbour porpoise) out to 15.4 km for a 907 kg UXO (absolute maximum) and 8.1 km for a 130 kg UXO. The Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located 296.9 km south west from the Offshore Order Limits and therefore there is no potential overlap between the predicted absolute maximum 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 embedded 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 (0.27%[5]). TTS is reversible and therefore animals that experience this effect are anticipated to fully recover. Therefore, injury and disturbance from elevated underwater sound during UXO clearance associated with the Transmission Assets will not prevent harbour porpoise from remaining a viable component of the SAC.
There is no significant disturbance of the species	TTS as a proxy for behavioural disturbance is considered reversible and therefore animals that experience this effect are anticipated to fully recover. It is, however, recognised that where embedded 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 clearance 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 elevated underwater sound during UXO clearance associated with the Transmission Assets will not result in significant disturbance of harbour porpoise.
The supporting habitats and processes relevant to harbour porpoise and their prey are maintained	Supporting habitats and processes will not be affected by underwater sound generated from UXO clearance associated with the Transmission Assets (i.e., there will be no habitat loss/disturbance from underwater sound associated with UXO clearance). 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 Transmission Assets will not affect prey species populations being maintained in the long term.

1.8.4.38 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 injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets alone.

Sites assessed in line with the iterative approach

1.8.4.39 As outlined in **paragraphs 1.8.1.2** to **1.8.2.4,** following the iterative approach adopted for this HRA Stage 2 ISAA - Part 2 SAC Assessments, the closest SAC to the Offshore Order Limits within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining European sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA - Part 2 SAC Assessments, are located at a greater distance from the Offshore Order Limits 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 1.8.4.15** to **1.8.4.38** are, therefore, deemed to be applicable for the remaining sites presented below in **paragraphs 1.8.4.40** to **1.8.4.44.**

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.4.40 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 (located 28.5 km and 62.7 km from the Offshore Order Limits, respectively; **paragraphs 1.8.4.15** to **1.8.4.23** and **paragraphs 1.8.4.24** to **1.8.4.26**), 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 (located 111.4 km from the Offshore Order Limits) as a result of injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets alone.

Rockabill to Dalkey Island SAC

1.8.4.41 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 North Channel SAC (located 28.5 km and 62.7 km from the Offshore Order Limits, respectively; **paragraphs 1.8.4.15** to **1.8.4.23** and **paragraphs 1.8.4.24** to **1.8.4.26**), it can be concluded that there is **no risk of an adverse effect on the integrity** of the Rockabill to Dalkey Island SAC (located 123.6 km from the Offshore Order Limits) as a result of injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets alone.

Lambay Island SAC

1.8.4.42 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 (located 111.2 km from the Offshore Order Limits; **paragraphs 1.8.4.27** to **1.8.4.32**), it can be concluded that there is **no risk of an adverse effect on the integrity** of the Lambay Island SAC (located 130.4 km from the Offshore Order Limits) as a result of injury and disturbance from elevated

underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets alone.

Cardigan Bay/Bae Ceredigion SAC

1.8.4.43 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 (located 111.2 km from the Offshore Order Limits; **paragraphs 1.8.4.27** to **1.8.4.32**), it can be concluded that there is **no risk of an adverse effect on the integrity** of the Cardigan Bay/Bae Ceredigion SAC (located 183.4 km from the Offshore Order Limits) as a result of injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets alone.

Saltee Islands SAC

1.8.4.44 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 (located 111.2 km from the Offshore Order Limits; **paragraphs 1.8.4.27** to **1.8.4.32**), it can be concluded that there is **no risk of an adverse effect on the integrity** of the Saltee Islands SAC (located 259.3 km from the Offshore Order Limits) as a result of injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets alone.

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

1.8.5.1 The other developments (projects/plans) that could result in in-combination effects associated with the Transmission Assets on Annex II marine mammal features of the designated sites identified have been summarised in **Table 1.93** and **Figure 1.7.**

1.8.5.2 As outlined in the HRA Stage 1 Screening Report (document reference: E3) where the potential for LSE has been concluded alone, the potential for LSE has also been concluded in-combination. For potential impacts where LSE has been ruled out with respect to the Transmission Assets alone, there is either no pathway to effect, or the Transmission 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 (see document reference: E3).

1.8.5.3 On this basis, the only potential impact identified for assessment as part of the Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4), and which have been brought forward for consideration in the in-combination assessment of this HRA Stage 2 ISAA - Part 2 SAC Assessments is in-combination injury and disturbance from elevated underwater sound during UXO clearance.

1.8.5.4 The following assessments of the effects of the Transmission Assets, acting in-combination with other relevant plans and projects (see **section 1.5.5** for

more information on the approach to the in-combination assessment), on Annex II marine mammals have been informed by the detailed project-specific underwater sound modelling presented in Volume 1, Annex 5.2: Underwater sound technical report of the ES (document reference: F1.5.2) and the technical assessments presented in Volume 2, Chapter 4: Marine mammals of the ES. The approach taken in this in-combination assessment also follows the same approach taken in the CEA assessment in Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4), for consistency. The Applicants have made all reasonable efforts to ensure that the information included in the assessments relating to other plans and projects is correct and sufficiently detailed, with any limitations on the information available acknowledged. The assessments have also drawn upon the sensitivity assessments of the relevant marine mammal species detailed in Volume 2, Chapter 4: Marine mammals of the ES, which reference the best available literature and evidence with regards to sensitivity. In this regard, the Applicants are confident that the conclusions made on European site integrity from the Transmission Assets in-combination with other plans and projects have been identified in light of the best available scientific knowledge and all reasonable scientific doubt can be ruled out.

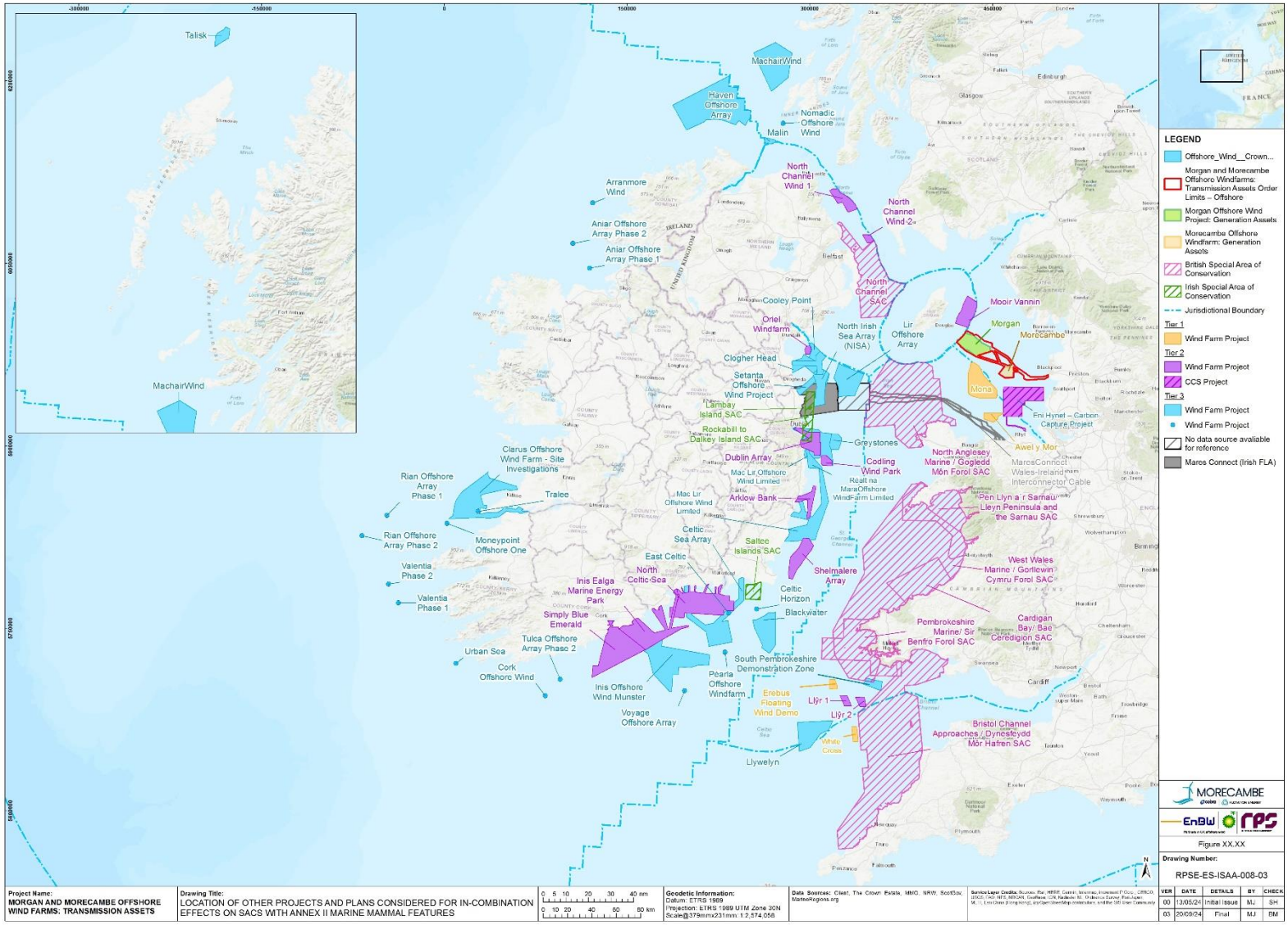

Figure 1.7: Locations of other projects and plans considered for in-combination effects on SACs with Annex II marine mammal features (not to scale)

Table 1.93: List of other projects and plans with potential for in-combination effects on Annex II marine mammal features

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Transmission Assets	-	-	-	2026 to 2029	2030 to 2065	-
Morecambe Offshore Windfarm: Generation Assets	Submitted	0 km	480 MW Offshore Wind Farm (generating assets)	2026 to 2029	2030 to 2065	The construction, operation and maintenance and decommissioning phases of this project will overlap with the construction, operation and maintenance and decommissioning phases of the Transmission Assets. Considered alongside the Transmission Assets in Scenarios 1, 3, 4a, 4b and 4c.
Morgan Offshore Wind Project: Generation Assets	Submitted	0 km	1.5 GW Offshore Wind Farm (generating assets)	2026 to 2030	2030 to 2065	The construction, operation and maintenance and decommissioning phases of this project will overlap with the construction, operation and maintenance and decommissioning phases of the Transmission Assets. Considered alongside the Transmission Assets in Scenarios 2, 3, 4a, 4b and 4c.

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Tier 1						
Mona Offshore Wind Project	Submitted	9.73	Offshore wind farm (generating assets, up to 1.5 GW) and offshore export cable (transmission assets)	2026 to 2029	2030 to 2065	The construction, operation and maintenance and decommissioning phases of this project will overlap temporally with the construction, operation and maintenance and decommissioning phases of the Transmission Assets.
Awel y Môr Offshore Wind Farm	Permitted	28.87	Offshore wind farm Over 100 MW (48 to 91 wind turbines)	2026 to 2030	2030 to 2055	The construction, operation and maintenance and decommissioning phases of this project will overlap with the construction and operation and maintenance phases of the Transmission Assets.
Erebus Floating Wind Demonstration	Permitted	284.61	Floating test and demonstration projects	2025 to 2026	2026 to unknown	The operation and maintenance phase of this project will overlap temporally with the operation and maintenance phase of the Transmission Assets.
White Cross Offshore Wind Farm	Submitted	311.28	Test and demonstration Floating Wind Farm	2025 to 2027	2027 to unknown	The construction, operation and maintenance phases of this project may temporally overlap with the construction, operation and maintenance

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
						phases of the Transmission Assets.
Tier 2						
Eni Hynet – Carbon Capture Project – offshore	Pre-application (for offshore elements of the project)	5.74	CCS project in the east Irish Sea. Works will include installation of a new cable, a new Douglas CCS platform and work on the existing Hamilton, Hamilton North and Lennox wellhead platforms.	Unknown	Unknown	This project will likely overlap with the construction and operations and maintenance phases of the Transmission Assets.
North Channel Wind 2	Pre-application	106.47	Offshore Wind Farm	2027 to 2029	2029 to unknown	The construction and operation and maintenance phases of this project may temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
NISA Offshore Wind Farm	Pre-application	107.69	Offshore Wind Farm	2025 to 2027	2027 to unknown	The construction, operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Codling Wind Park Extension Offshore Wind Farm	Pre-application	114.23	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phases of this project may temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Oriel Offshore Wind Farm	Pre-application	119.47	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phases of this project may temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
North Channel Wind 1	Pre-application	134.47	Offshore Wind Farm	2027 to 2029	2029 to unknown	The construction and operation and maintenance phases of this project may temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Dublin Array	Pre-application	134.50	Offshore Wind Farm	2026 to 2027	2027 to unknown	The construction and operation and maintenance phases of this project may temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Arklow Bank Wind Park Phase 2	Pre-application	165.19	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
						phases of this project may temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
North Celtic Sea Offshore Wind Farm	Pre-application	276.90	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phases of this project may temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Llŷr 2	Pre-application	286.98	Floating Demonstration Project	2025 to 2026	2026 to unknown	The operation and maintenance phase of this project may temporally overlap with the operation and maintenance phase of the Transmission Assets.
Llŷr 1	Pre-application	291.76	Floating Demonstration Project	2025 to 2026	2026 to unknown	The operation and maintenance phase of this project may temporally overlap with the operation and maintenance phase of the Transmission Assets.
Inis Ealga Marine Energy Park	Pre-application	326.54	Offshore Wind Farm	2028 to 2029	2029 to Unknown	The construction, operation and maintenance phases of this project may temporally overlap with the construction, operation and maintenance

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
						phases of the Transmission Assets.
Simply Blue Emerald	Pre-application	359.16	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phases of this project may temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Tier 3						
MaresConnect Wales-Ireland Interconnector Cable ('MaresConnect')	Pre-application	34.4	A subsea and underground electricity interconnector system between Ireland and Great Britain	2026 to 2028	2028 to unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Cooley Point Offshore Wind Farm	Pre-application	108.19	Site investigation surveys	Unknown	Unknown	The construction and operation and maintenance phases of this project may temporally overlap with the construction, operation and maintenance phases of the Transmission Assets.
Setanta Offshore Wind Project	Pre-application	113.68	Offshore Wind Farm	2027 to 2029	2029 to unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
						phases of the Transmission Assets.
Clogher Head Offshore Wind Farm	Pre-application	114.37	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Lir Offshore Array	Pre-application	115.88	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Greystones Offshore Wind Farm	Pre-application	122.97	Offshore Wind Farm	2027 to 2029	2029 to unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Realt na Mara Offshore Wind Project	Pre-application	162.10	Offshore Wind Farm	2028 to 2029	2029 to unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Mac Lir Offshore Wind Project	Pre-application	182.84	Offshore Wind Farm	2028 to 2029	2029 to unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Malin Sea Wind	Pre-application	220.38	Floating Offshore Wind Farm	Unknown	Unknown	The construction, operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets
Shelmalere Offshore Wind Farm – site investigation surveys	Pre-application	200.89	Offshore Wind Farm	2028 to 2029	2029 to 2055	The construction and operation and maintenance phases of this project may temporally overlap with the construction and operation and maintenance phases of the Transmission Assets.
Nomadic Offshore Wind Project	Pre-application	227.31	Floating Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets
Haven Offshore Array	Pre-application	247.84	Offshore Wind Farm (static and floating)	Unknown	Unknown	The construction and operation and maintenance phase of this project may

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
						overlap with the construction, operation and maintenance phases of the Transmission Assets
Machair Wind – Hybrid Energy Project	Pre-application	253.73	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets
Celtic Sea Array Offshore Wind Farm	Pre-application	260.55	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets
Blackwater Offshore Wind Farm	Pre-application	265.53	Floating Offshore Wind Farm	2027 to 2029	2029 to unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
South Pembrokeshire Demonstration Zone	Submitted but not yet determined	269.21	Wave energy demonstration projects	Unknown	Unknown	There is potential for construction and/or operational activities at the Transmission Assets to overlap with construction

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
						and/or operational activities at this project .
Celtic Horizon Offshore Wind Project	Pre-application	273.12	Offshore Wind Farm	2027 to 2029	2029 to unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
East Celtic Offshore Wind Project	Pre-application	290.28	Offshore Wind Farm	unknown	unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Aniar Offshore Array Phase 1 Offshore Wind Project	Pre-application	307.31	Offshore Wind Farm Array	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Llywelyn Offshore Wind Project	Pre-application	315.15	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Péarla Offshore Wind Farm	Pre-application	317.03	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets
Arranmore Offshore Wind Project	Pre-application	319.83	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets
Aniar Offshore Array Phase 2 Offshore Wind Project 'Aniar Offshore Array (Floating)'	Pre-application	325.39	Floating Offshore Wind Farm Array	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Inis Offshore Wind Munster	Pre-application	326.54	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Clarus Floating Offshore Wind Farm	Pre-application	339.06	Floating Offshore Wind Farm	2028 to 2029	2029 to unknown	The construction and operation and maintenance

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
						phases of this project may temporally overlap with the construction, operation and maintenance phases of the Transmission Assets.
Voyage Offshore Array	Pre-application	362.41	Floating Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Project Saoirse Wave Energy	Pre-application	372.37	Floating wind and wave energy conversion project	Unknown	Unknown	The construction, operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Tralee Offshore Wind Project	Pre-application	416.57	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Tulca Offshore Array Phase 2	Pre-application	427.30	Offshore Wind Farm Array	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
						phases of the Transmission Assets.
Moneypoint One Offshore Wind Project	Pre-application	443.97	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Cork Offshore Wind Project	Pre-application	445.46	Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Urban Sea Offshore Wind Project	Pre-application	488.41	Floating Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Rian Offshore Array Phase 1	Pre-application	488.86	Offshore Wind Farm Array	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.

Project/Plan	Status	Distance from the Offshore Order Limits (nearest point, km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Transmission Assets
Valentia Phase 1 Offshore Wind Project	Pre-application	505.85	Floating Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Valentia Phase 2 Offshore Wind Project	Pre-application	506.89	Floating Offshore Wind Farm	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Rian Offshore Array Phase 2	Pre-application	513.43	Floating Offshore Wind Farm Array	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.
Isle of Man-UK Interconnector 2	Pre-application	N/A	70 MW to 100 MW HVAC interconnector between Pulrose substation and north west England Distribution network	Unknown	Unknown	The construction and operation and maintenance phase of this project may overlap with the construction, operation and maintenance phases of the Transmission Assets.

In-combination injury and disturbance from elevated underwater sound during UXO clearance

1.8.5.5 The assessment of LSE (in the HRA Stage 1 Screening Report; document reference: E3) identified that LSE could not be ruled out for the potential in-combination impacts of injury and disturbance from elevated underwater sound during UXO clearance during the construction phase of the Transmission Assets in combination with other plans/projects. This relates to the designated sites and relevant Annex II marine mammal features listed in **Table 1.94.**

Table 1.94: SACs and relevant Annex II marine mammal features from which the potential for an LSE could not be ruled out in relation to in-combination injury and disturbance from elevated underwater sound during UXO clearance

European site	Annex II marine mammal features
North Anglesey Marine/Gogledd Môn Forol SAC	• Harbour porpoise
North Channel SAC	• Harbour porpoise
Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC	• Grey seal
Lambay Island SAC	• Grey seal
Cardigan Bay/Bae Ceredigion SAC	• Grey seal
Pembrokeshire Marine/Sir Benfro Forol SAC	• Grey seal
Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC	• Harbour porpoise
West Wales Marine/Gorllewin Cymru Forol SAC	• Harbour porpoise
Rockabill to Dalkey Island SAC	• Harbour porpoise
Saltee Islands SAC	• Grey seal

1.8.5.6 There is potential for injury and disturbance from elevated underwater sound during UXO clearance as a result of activities associated with the Transmission Assets during construction, in-combination with activities associated with the projects/plans outlined in **Figure 1.7** and **Table 1.93.**

1.8.5.7 As presented in Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4), the duration of impact for each UXO clearance is very short (seconds) and has the potential to lead to PTS and behavioural effects. Given that there are no published thresholds for behavioural effects from UXO clearance, the use of the TTS-onset threshold was considered as a proxy for disturbance and referred to as such in this section). 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).

1.8.5.8 Furthermore, many of the projects identified in Irish waters which are considered in the in-combination assessment are unlikely to come forward in

a timescale that would overlap with the construction phase of the Transmission Assets. This is due to a change in the government's approach to designating areas of offshore renewables which will likely result in delays to some of the projects identified[12]. However, these have been considered in the in-combination assessment below based on information currently available in the public domain (including construction timescales), to ensure a precautionary approach is adopted.

1.8.5.9 The in-combination effects assessment follows the methodology set out in **section 1.5.5** and is presented in a series of tables (one for each potential in-combination effect). These tables (**Table 1.102** and **Table 1.103**) present a summary of the in-combination assessment, with the full detailed in-combination assessment presented in **paragraphs 1.8.5.10** *et seq*.

Construction phase

Information to support assessment

Scenario 1

1.8.5.10 The in-combination effects assessment for Scenario 1 considers:

- the Transmission Assets; and
- the Morecambe Offshore Windfarm: Generation Assets.

1.8.5.11 During the construction phase of the Transmission Assets, there is potential for increased underwater sound from UXO clearance to occur in-combination with the Morecambe Offshore Windfarm: Generation Assets. The assessment of potential sound impacts associated with UXO clearance from the Transmission Assets alone has been presented in **section 1.8.4**. It is noted that given the relationship of these projects (i.e. that the Applicants of the Morecambe Offshore Windfarm: Generation Assets and the Morgan Offshore Wind Project: Generation Assets (Morgan OWL and Morgan OWL) are jointly seeking consent for the Transmission Assets; see HRA Stage 2 ISAA – Part 1: Introduction; document reference E2.1), UXO clearance would likely be phased and is unlikely to occur concurrently. However, this Scenario has been assessed in full, adopting a precautionary approach.

1.8.5.12 The Morecambe Offshore Windfarm: Generation Assets did not identify the number of UXO requiring clearance and instead set out that the number of UXO would be determined following a detailed UXO survey, which would be completed prior to construction. The Morecambe Offshore Windfarm: Generation Assets assessment is based on high order clearance of 354 kg (plus donor charge) (absolute maximum).

A.1.1.1.1 An explosive mass of 354 kg NEQ (high order explosion) yielded the largest PTS range for harbour porpoise of 11 km and a PTS range of 2.1 km for grey seal, based on the SPL_{pk} metric. The number of animals predicted to experience PTS as a result of high-order detonation (354 kg absolute

[12] https://www.gov.ie/en/publication/36d9a-designated-maritime-area-plan-dmap-proposal-for-offshore-renewable-energy/ https://www.gov.ie/en/consultation/72a5c-south-coast-designated-maritime-area-plan-for-offshore-renewable-energy/

maximum) at the Morecambe Offshore Windfarm: Generation Assets, based on the SPL_{pk} metric is 616 harbour porpoise and one grey seal (**Table 1.95**). However, the Morecambe Offshore Windfarm: Generation Assets ES, identified that clearance of UXO with low order techniques (0.5 kg NEQ) would result in significantly lower numbers of animals (e.g. 7 harbour porpoise over a maximum range of 1.2 km, based on low-order clearance of 0.5 kg NEQ).

1.8.5.13 An explosive mass of 354 kg NEQ (high order explosion) also yielded the largest TTS ranges (as a proxy for behavioural disturbance) for harbour porpoise of 20 km (based on the SPL_{pk} metric) and 16 km for grey seal (based on the SEL_{cum} metric). The number of animals with the potential to experience TTS, as a result of high-order detonation (354 kg absolute maximum) was up to 2,037 harbour porpoise and up to 5 grey seal (**Table 1.95**). This is based on high-order clearance of an absolute maximum of 354 kg, whereas the Morecambe Offshore Windfarm: Generation Assets ES, identified that clearance of UXO with low order techniques (0.5 kg NEQ) would result in significantly lower numbers of animals (e.g. 27 harbour porpoise over a maximum range of 2.3 km, based on low-order clearance of 0.5 kg NEQ). As such, the numbers presented are expected to be highly precautionary.

1.8.5.14 The Morecambe Offshore Windfarm: Generation Assets ES identified that the implementation of mitigation measures within the MMMP for UXO clearance would reduce the risk of any PTS during UXO clearance and would also reduce the risk of TTS. The proposed mitigation measures for consideration in the MMMP for UXO clearance include the use of low-order clearance techniques such as deflagration, potential use of bubble curtains, establishing a monitoring zone and surveying prior to UXO clearance (MMOs and potentially PAMs), and the use of ADDs.

Table 1.95: Number of animals with the potential to experience onset PTS and disturbance (using TTS-onset as a proxy) during high-order UXO clearance as presented in the Morecambe Offshore Windfarm: Generation Assets ES.

Species	Maximum charge size leading to highest impact (kg)	Metric	Maximum range (km)	Estimated number of animals within impact area
PTS				
Harbour porpoise	354	SPL_{pk}	11	616
Grey seal		SPL_{pk}	2.1	1
Behavioural disturbance (TTS/moving away response as a proxy)				
Harbour porpoise	354	SPL_{pk}	20	2,037
Grey seal			16	5

1.8.5.15 The Morecambe Offshore Windfarm: Generation Assets ES also included the maximum number of harbour porpoise predicted to be disturbed from UXO

clearance, based on a maximum potential impact area of a 26 km EDR and the maximum number of all marine mammals predicted to be disturbed from UXO clearance based on a 5 km disturbance range.

1.8.5.16 Applying the 26 km EDR (to predict the maximum number of animals disturbed from UXO clearance), the maximum number of harbour porpoise that could potentially be disturbed using this area-based approach, based on a species-specific density was set out as 3,443 animals (5.51% of the CIS MU[5]).

1.8.5.17 The Morecambe Offshore Windfarm: Generation Assets ES also included the maximum number of all marine mammal species (based on species-specific densities) predicted to be disturbed during ADD activation over 80 minutes for high order UXO clearance. The number of animals that could potentially be disturbed within the 5 km disturbance ranges, and during ADD activation for high-order UXO clearance, based on species-specific densities are set out in **Table 1.96**.

Table 1.96: Number of animals with the potential to be disturbed within (i) a 5 km disturbance range and (ii) during activation of an ADD for high order UXO clearance, as presented in the Morecambe Offshore Windfarm: Generation Assets ES.

Species	Maximum range (km)	Estimated number of animals	Maximum range (km)	Estimated number of animals
	5 km disturbance area		80 minute activation of ADD for high order clearance	
Harbour porpoise	5	122.5	7.2 (1.5 m/s swimming speed)	264
Grey seal		8	7.2 (1.5 m/s swimming speed)	16

1.8.5.18 A spatial MDS would occur where UXO clearance activities coincide at both projects. This is, however, highly unlikely, as UXO clearance activities would likely take place before other construction activities commence, and whilst there may be some overlap in pre-construction activities, UXO clearance at each project will occur as discrete stages within the overall construction phase. Furthermore, each clearance event results in a very short duration of sound emission (seconds) and therefore the impact will be short in duration and unlikely to overlap. Sequential UXO clearance is therefore more likely (see also **paragraph 1.8.5.11**). Production of underwater sound during detonation of UXOs at both projects has the potential to cause behavioural disturbance in marine mammal receptors, however, this effect will be short-lived and reversible.

1.8.5.19 The in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and, although the impact itself is reversible (i.e. elevated underwater sound during the detonation event) the effect of injury on sensitive receptors is permanent. It is predicted that the impact will affect the receptor directly. In line with UXO guidance, assuming the application of standard industry measures, it is anticipated that

for grey seal animals would be deterred from the injury zone and therefore the risk of PTS would be removed. Given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals from these projects in-combination, even with the application of standard industry measures. However, for both the Transmission Assets and the Morecambe Offshore Windfarm: Generation Assets, the Applicants have committed to the development of MMMPs, which will ensure the risk of injury to harbour porpoise from UXO clearance is minimised. If this requires further mitigation beyond standard industry measures, these will be discussed and agreed with stakeholders as part of the development of the MMMP for the Transmission Assets (CoT64).

1.8.5.20 For TTS, the in-combination impact resulting from a high order clearance is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Since behavioural disturbance is a recoverable and the duration of impact will be very short, the potential for in-combination impact is considered to be limited.

1.8.5.21 In line with guidance from stakeholders (JNCC and Natural England) the EDR approach has also been used for the in-combination assessment of disturbance associated with UXO clearance during the construction phase for harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC (as the closest site, located 28.5 km from the Offshore Order Limits). The EDR approach, as outlined in JNCC (2020), recommends the use of 26 km deterrence range for UXO. The assessment considered UXO clearance could occur at the closest location within the Morecambe Offshore Windfarm: Generation Assets and the Transmission Assets to the North Anglesey Marine/Gogledd Môn Forol SAC.

1.8.5.22 There is no overlap of the Transmission Assets 26 km EDR (located 28.5 km from the North Anglesey Marine/Gogledd Môn Forol SAC), or the Morecambe Offshore Windfarm 26 km EDR (located 49 km from the North Anglesey Marine/Gogledd Môn Forol SAC) with the North Anglesey Marine/Gogledd Môn Forol SAC. Therefore, using the disturbance footprints associated with the Morecambe Offshore Windfarm: Generation Assets and the Transmission Assets, this does not result in any potential disturbance across an area of the North Anglesey Marine/Gogledd Môn Forol SAC. Therefore, disturbance associated with UXO clearance from both projects in-combination using the 26 km EDR approach would not exceed the daily 20% disturbance threshold[12] or the 10% threshold of the relevant area of the site over the season[34].

Scenario 2

1.8.5.23 The in-combination effects assessment for Scenario 2 considers:

- the Transmission Assets; and
- the Morgan Offshore Wind Project: Generation Assets.

1.8.5.24 During the construction phase of the Transmission Assets, there is potential for increased underwater sound from UXO clearance to occur in-combination with the Morgan Offshore Wind Project: Generation Assets. The assessment

of potential sound impacts associated with UXO clearance from the Transmission Assets alone has been presented in **section 1.8.4**. It is noted that given the relationship of these projects (i.e. that the Applicants of the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets (Morgan OWL and Morgan OWL) are jointly seeking consent for the Transmission Assets; see HRA Stage 2 ISAA – Part 1: Introduction; document reference: E2.1), UXO clearance would likely be phased is unlikely to occur concurrently. However, this Scenario has been assessed in full, adopting a precautionary approach.

1.8.5.25 The Morgan Offshore Wind Project: Generation Assets ES assumed there may be up to 13 UXOs requiring clearance. Although the Morgan Offshore Wind Project: Generation Assets ES presents a range of impacts for low order clearance as well as low-yield donor charges, the assessment is based on the high order clearance of the maximum 907 kg. An explosive mass of 907 kg (high order explosion) yielded the largest PTS ranges for all species, with the greatest injury range (15,370 m) seen for harbour porpoise (**Table 1.97**). With primary measures in place for the Morgan Offshore Wind Project: Generation Assets (e.g. development and adherence to a MMMP), the assessment found that there would be a residual risk of injury over a range of 2,290 m that would require additional tertiary measures and therefore the Morgan Offshore Wind Project: Generation Assets will be adopting standard industry practice (JNCC, 2010) tertiary measures as part of an MMMP, discussed and agreed with consultees post-consent. Behavioural disturbance (using TTS-onset as a proxy) could affect harbour porpoise across the largest range of up to 28.2 km (SPL_{pk} metric; **Table 1.97**). Construction of the Morgan Offshore Wind Project: Generation Assets is expected from 2026 to 2029 and therefore there may be up to four years of overlap with the Transmission Assets, though the exact dates are uncertain at this stage.

1.8.5.26 The number of animals predicted to experience PTS as a result of high-order clearance at the Morgan Offshore Wind Project: Generation Assets, based on the SPL_{pk} metric is 195 harbour porpoise and 2 grey seal. For TTS, based on high-order clearance of 907 kg, large impact ranges were predicted for harbour porpoise (28.2 km; SPL_{pk} metric; **Table 1.97**), and grey seal (6.47 km; SEL_{cum} metric; **Table 1.97**), with the potential to affect up to 661 harbour porpoise and up to six grey seal. This is based on high-order clearance of an absolute maximum of 907 kg, whereas the Morgan Offshore Wind Project: Generation Assets ES identified that clearance of UXO with an NEQ of 130 kg is considered the more likely (common) scenario, in line with the assumptions made for the Transmission Assets. As such, the numbers presented are expected to be highly precautionary. Proposed mitigation measures for UXO clearance for the Morgan Offshore Wind Project: Generation Assets include the application of a UXO-specific MMMP, using low order techniques, where possible, as the primary mitigation measure for this project, alongside other measures which will be agreed with Natural England and the Marine Management Organisation, if these are required (such as including the use of MMOs, PAM and ADDs).

1.8.5.27 Impacts including PTS and disturbance ranges are similar to those identified for the Transmission Assets (see Volume 2, Chapter 4: Marine mammals of the ES; document reference: F2.4) and given the overlap of the two projects,

there is potential for in-combination effects to occur with Morgan Offshore Wind Project: Generation Assets. Adopting a precautionary approach, and assuming application of standard industry measures (such as MMOs, PAM and ADDs), the assessment considered the magnitude of impact for a high order clearance.

Table 1.97: Number of animals with the potential to experience onset PTS and disturbance (using TTS-onset as a proxy) during high-order UXO clearance at Morgan Offshore Wind Project: Generation Assets.

Species	Maximum charge size leading to highest impact (kg)	Metric	Maximum range (m)	Estimated number of animals within impact area
PTS				
Harbour porpoise	907	SPL_{pk}	15,370	195
Grey seal		SPL_{pk}	3,015	2
Behavioural disturbance (TTS/moving away response as a proxy)				
Harbour porpoise	907	SPL_{pk}	28,230	661
Grey seal		SEL_{cum}	6,470	6

1.8.5.28 UXO clearance at both the Transmission Assets and Morgan Offshore Wind Project: Generation Assets 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 a very short duration of sound emission (seconds) and therefore the impact will be short in duration and unlikely to overlap. In addition, both the Transmission Assets and Morgan Offshore Wind Project: Generation Assets have proposed mitigation measures, including an MMMP for the Transmission Assets (CoT64, see **Table 1.87**) and an MMMP for the Morgan Offshore Wind Project: Generation Assets with a primary measure to use low order techniques where possible. The Morgan Offshore Wind Project: Generation Assets have also committed to tertiary measures including measures set out in an Underwater sound management strategy to be discussed and agreed with consultees post-consent.

1.8.5.29 The in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible (i.e. elevated underwater sound during the clearance event only), the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for both the Transmission Assets and Morgan Offshore Wind Project: Generation Assets, it is anticipated that for grey seal, they would be deterred from the injury zone and therefore the risk of PTS would be removed. Given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals from these projects in-combination, even with the application of standard industry measures. However, for both the Transmission Assets and the Morgan Offshore Wind Project: Generation Assets, the Applicants have

committed to the development of MMMPs, which will ensure the risk of injury to harbour porpoise from UXO clearance is minimised (see **Table 1.87**). If this requires further mitigation beyond standard industry measures, these will be discussed and agreed with stakeholders as part of the development of the MMMP for the Transmission Assets (CoT64), noting that the Morgan Offshore Wind Project: Generation Assets have committed to developing an Underwater sound management strategy post-consent (Morgan Offshore Wind Limited, 2024).

1.8.5.30 For TTS, the in-combination impact resulting from a high order clearance is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible.

1.8.5.31 In line with guidance from stakeholders (JNCC and Natural England) the EDR approach has also been used for the in-combination assessment of disturbance associated with UXO clearance during the construction phase for harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC (as the closest site, located 28.5 km from the Offshore Order Limits). The EDR approach, as outlined in JNCC (2020), recommends the use of 26 km deterrence range for UXO. The assessment considered UXO clearance could occur at the closest location within the Morgan Offshore Wind Project: Generation Assets and the Transmission Assets to the North Anglesey Marine/Gogledd Môn Forol SAC.

1.8.5.32 Given the distance of the North Anglesey Marine/Gogledd Môn Forol SAC from the Offshore Order Limits (28.5 km) and from the Morgan Offshore Wind Project: Generation Assets (28.3 km; Morgan Offshore Wind Ltd. 2024), the implementation of the 26 km EDR for either project does not result in an overlap with the SAC. Therefore, using the disturbance footprints associated with the Morgan Offshore Wind Project: Generation Assets and the Transmission Assets, this does not result in any potential disturbance across an area of the North Anglesey Marine/Gogledd Môn Forol SAC. Therefore, disturbance associated with UXO clearance from both projects in-combination using the 26 km EDR approach would not exceed the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season.

Scenario 3

1.8.5.33 The in-combination effects assessment for Scenario 3 considers:

- the Transmission Assets;
- the Morecambe Offshore Windfarm: Generation Assets; and
- the Morgan Offshore Wind Project: Generation Assets.

1.8.5.34 During the construction phase of the Transmission Assets, there is potential for increased underwater sound from UXO clearance to occur in-combination with the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets. The assessment of potential sound impacts associated with UXO clearance from the Transmission Assets alone has been presented in **section 1.8.4**. Project

details for potential UXO clearance for the Morecambe Offshore Windfarm: Generation Assets, as presented in the Morecambe Offshore Windfarm: Generation Assets ES, are set out in **paragraph 1.8.5.11** *et seq*. Project details for potential UXO clearance for the Morgan Offshore Wind Project: Generation Assets, as presented in the Morgan Offshore Wind Project: Generation Assets ES are set out in **paragraph 1.8.5.24** *et seq*. and are not reiterated here. The numbers of animals (grey seal and harbour porpoise) with the potential to experience PTS and disturbance (using TTS as a proxy) during high-order clearance from the Transmission Assets in-combination with the Generation Assets is presented in **Table 1.98** and **Table 1.99**, respectively.

Table 1.98: Maximum number of animals with the potential to experience PTS during high-order UXO clearance at the Transmission Assets and Generation Assets.

Project	Species	Maximum charge size (kg)	Metric	Maximum PTS range (m)	Estimated number within PTS range	Mitigation included in EIA
Transmission Assets	Harbour porpoise	907	SPL_{pk}	15,370	169	Measures adopted (**Table 1.87**) (including Outline MMMP (document reference: J18)
	Grey seal		SPL_{pk}	3,015	4	
Morecambe Offshore Windfarm: Generation Assets	Harbour porpoise	354	SPL_{pk}	11,000	616	MMMP
	Grey seal		SPL_{pk}	2,100	1	
Morgan Offshore Wind Project: Generation Assets	Harbour porpoise	907	SPL_{pk}	15,370	195	MMMP and Underwater sound management strategy
	Grey seal		SPL_{pk}	3,015	2	

Table 1.99: Maximum number of animals with the potential to experience disturbance (using TTS-onset as a proxy) during high-order UXO clearance at the Transmission Assets and Generation Assets.

Project	Species	Maximum charge size (kg)	Metric	Maximum TTS range (m)	Estimated number within TTS range
Transmission Assets	Harbour porpoise	907	SPL_{pk}	28,320	572
	Grey seal		SPL_{pk}	6,470	15

Project	Species	Maximum charge size (kg)	Metric	Maximum TTS range (m)	Estimated number within TTS range
Morecambe Offshore Windfarm: Generation Assets	Harbour porpoise	354	SPL_{pk}	20,000	2,037
	Grey seal			16,000	5
Morgan Offshore Wind Project: Generation Assets	Harbour porpoise	907	SPL_{pk}	28,230	661
	Grey seal			6,470	6

1.8.5.35 A spatial MDS would occur where UXO clearance activities coincide at all three projects simultaneously. This is, however, highly unlikely, as UXO clearance activities would likely take place before other construction activities commence, and whilst there may be some overlap in pre-construction activities, UXO clearance at each project will occur as a discrete stage within the overall construction phase. Furthermore, each clearance event results in a very short duration of sound emission (seconds) and therefore the impact will be short in duration and unlikely to overlap. Sequential UXO clearance is therefore more likely. Production of underwater sound during detonation of UXOs at all three projects has the potential to cause behavioural disturbance in marine mammal receptors, however, this effect will be short-lived and reversible. Since behavioural disturbance is a recoverable effect and the duration of impact will be very short, the potential for in-combination impact is considered to be limited.

1.8.5.36 As for Scenarios 1 and 2, the impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and, although the impact itself is reversible (i.e. elevated underwater sound during the detonation event only), the effect of injury on sensitive receptors is permanent. It is predicted that the impact will affect the receptor directly. In line with UXO guidance, assuming the application of standard industry measures for all projects, it is anticipated that for grey seal, animals would be deterred from the injury zone and therefore the risk of PTS to grey seal features of SACs would be removed. For harbour porpoise the PTS ranges from each project are large (see **Table 1.98**); whilst the Morecambe Offshore Windfarm: Generation Assets ES identified that the implementation of mitigation measures within the MMMP for UXO clearance would reduce the risk of any PTS during UXO clearance, there is considered to be a residual risk of PTS to a small number of individuals at both the Morgan Offshore Wind Project: Generation Assets and the Transmission Assets, even with the application of standard industry measures.

1.8.5.37 As the Transmission Assets assessment determined there would be a significant effect in EIA terms, the Transmission Assets may contribute to an in-combination impact, and therefore the Applicants have committed to the development of an MMMP (with an Outline MMMP (CoT64) included as part of the Application; document reference: J18) to reduce the impacts from UXO

clearance, such that there will be no impact for the Transmission Assets and therefore no contribution to in-combination effects. If this requires the development of further mitigation beyond standard industry measures, these will be discussed and agreed with stakeholders as part of the development of the MMMP for the Transmission Assets (CoT64).

1.8.5.38 As for Scenarios 1 and 2, for TTS, the in-combination impact resulting from a high order clearance at the Transmission Assets in-combination with the Generation Assets is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible.

1.8.5.39 In line with guidance from stakeholders (JNCC and Natural England) the 26 km EDR approach has also been used for the in-combination assessment of disturbance associated with UXO clearance during the construction phase for harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC (as the closest site, located 28.5 km from the Offshore Order Limits). As outlined in **paragraphs 1.8.5.22** and **1.8.5.32**, the implementation of a 26 km EDR for the Transmission Assets, the Morgan Offshore Wind Project: Generation Assets and the Morecambe Offshore Windfarm: Generation Assets does not result in any overlap with the North Anglesey Marine/Gogledd Môn Forol SAC (which is located >26 km from these projects). Therefore, disturbance associated with UXO clearance from the Transmission Assets in-combination with the Generation Assets (applying the EDR approach) would not exceed the daily 20% disturbance threshold or the 10% threshold of the relevant area of the site over the season.

Scenario 4a

1.8.5.40 The in-combination effects assessment for Scenario 4a considers:

- Scenario 3 (Transmission Assets and Generation Assets); and
- the Tier 1 projects listed in **Table 1.93.**

1.8.5.41 The assessment considers the Transmission Assets and Generation Assets (Scenario 3) along with other Tier 1 projects which include Mona Offshore Wind Project, Awel y Môr Offshore Wind Farm, White Cross Offshore Wind Farm, and Project Erebus (see **section 1.8.4** for the project alone assessment).

1.8.5.42 **Table 1.100** and **Table 1.101** present the key information for each of these projects (where this information was available), including maximum size of UXO assumed, maximum ranges for PTS and TTS, number of animals affected and key mitigation.

1.8.5.43 Based on the Mona Offshore Wind Project (located 9.73 km from the Offshore Order Limits) maximum spatial scenario, as presented in the Mona Offshore Wind Project ES, there is an anticipated maximum 22 UXOs which may require clearance. While the 907 kg UXO was the maximum design scenario, the Mona Offshore Wind Project ES identified that clearance of UXO with an NEQ of 130 kg is considered the more likely (common) scenario. PTS from UXO clearance at the Mona Offshore Wind Project for

the was predicted to affect up to 206 harbour porpoise and six grey seal based on the injury ranges presented in **Table 1.100**. For TTS, based on the ranges presented in **Table 1.101**, up to 245 harbour porpoise and 26 grey seal were predicted to be affected. Proposed mitigation measures for UXO clearance for the Mona Offshore Wind Project include the application of a UXO-specific MMMP, using low order techniques, where possible, as the primary mitigation measure alongside other measures as may be agreed through the consenting process (such as including the use of MMOs, PAM and ADDs).

1.8.5.44 The MDS for Awel y Môr Offshore Wind Farm (located 28.87 km from the Offshore Order Limits) anticipated up to 10 UXOs requiring clearance, with two clearance events every 24 hours but up to 10 clearances in 10 days. The assessed clearance method was high-order clearance, though low-order is more likely. The charge sizes modelled for the Awel y Môr assessment are lower than the maximum modelled for Transmission Assets, and injury ranges are smaller (see **Table 1.100**). Based on these injury ranges, up to 232 harbour porpoise and three grey seal have the potential to be affected. Awel y Môr Offshore Wind Farm used TTS-onset as a proxy for disturbance but caveated that this is likely to over-estimate true behavioural responses due to UXO comprising a single pulse source sound and not lasting a full diel cycle. Based on the TTS ranges presented in **Table 1.101**, up to 804 harbour porpoise and 13 grey seal have the potential to be affected. The exact mitigation measures contained within the UXO-specific MMMP for Awel y Môr Offshore Wind Farm are yet to be determined and agreed with NRW. Residual impacts for PTS from UXO clearance were therefore considered unlikely for harbour porpoise and grey seal.

1.8.5.45 The number of UXO requiring clearance and duration of UXO clearance operations at White Cross Offshore Wind Farm (located 311.28 km from the Offshore Order Limits) was unknown at the time of publication of the ES. The charge sizes modelled for the White Cross Offshore Wind Farm assessment are lower than the maximum modelled for Transmission Assets, and injury ranges are smaller. Based on maximum PTS ranges from UXO presented in **Table 1.100**, the number of animals predicted to experience PTS as a result of high-order clearance is 349 harbour porpoise and up to two grey seals. For low-order clearance up to 11 harbour porpoise, and less than one individual for grey seal were predicted to experience PTS. For TTS, based on the ranges presented in **Table 1.101** for a high-order clearance**,** up to 1,154 harbour porpoise and 96 grey seal have the potential to be disturbed. Proposed mitigation measures for UXO clearance include the use of low-order clearance techniques, such as deflagration; high order clearance would only be undertaken in the event that all other options are not possible, following the identified mitigation hierarchy.

1.8.5.46 Project Erebus anticipated one UXO clearance via low-order deflagration but included assessment for high-order clearances for completeness. The number of marine mammals expected to experience PTS-onset as a result of low-order clearance was <1 for all species and charge sizes, apart from 0.5 kg and 2 kg NEQ, which could result in PTS in up to two and five harbour porpoises, respectively. For high-order clearance, which is not in the project

design for Project Erebus, up to 212 harbour porpoises could be affected by PTS (**Table 1.100**). For disturbance (assessed using TTS-onset as a proxy) from either low-order or high-order UXO clearance, Project Erebus concluded that the impact was unlikely to significantly affect any marine mammal receptors, stating that since TTS onset as a proxy for disturbance is expected to be an over-estimate of the actual biological consequences, the ranges presented are highly precautionary (Blue Gem Wind, 2020).

1.8.5.47 A spatial MDS would occur where UXO clearance activities coincide at the respective projects considered in the CEA. This is, however, highly unlikely, as due to safety reasons UXO clearance activities would take place before other construction activities commence. Sequential UXO clearance is therefore more likely for Tier 1 projects noting, however, that there may be some overlap in pre-construction activities of Mona Offshore Wind Project and Awel y Môr Offshore Wind Farm with Transmission Assets and Generation Assets, based on indicative construction timelines. 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 a very short duration of sound emission (seconds), therefore the impact will be short in duration and unlikely to overlap. Construction of Project Erebus is likely to be completed the year before the commencement of construction activities at Transmission Assets and therefore is not likely to overlap with associated UXO clearance. Given the project design for use of low-order UXO clearance techniques only for Project Erebus and the likely use of low-order clearance techniques during UXO clearance for White Cross Offshore Windfarm, in-combination impacts are considered unlikely.

1.8.5.48 The maximum number of harbour porpoise potentially affected by PTS from these projects in-combination in the regional marine mammal study area (defined in Volume 2, Chapter 4: Marine mammals of the ES; document reference: F2.4) is 1979 animals, however this is using modelled high-order UXO clearance for Project Erebus which is very unlikely to occur in practice (the maximum UXO charge weight expected in the area is 331 kg, and the project is seeking consent for one low-order clearance with a maximum of 2 kg NEQ) and is based upon high-order clearance at the Transmission Assets, Generation Assets and Mona Offshore Wind Project. Therefore, with measures applied at all projects (e.g. use of low order clearance only for Project Erebus, MMMP for Awel y Môr Offshore Wind Farm, White Cross Offshore Wind Farm and Mona Offshore Wind Project and Underwater sound management strategy for Mona Offshore Wind Project; see **Table 1.100** and **Table 1.101**) the residual risk of injury to marine mammals from these projects in-combination is likely to be very small.

Table 1.100: Maximum number of animals with the potential to experience PTS during high-order UXO clearance at Tier 1 projects, in-combination.

Project	Species	Maximum charge size (kg)	Metric	Maximum PTS range (m)	Estimated number within PTS range	Mitigation included in EIA
Transmission Assets	Harbour porpoise	907	SPL_{pk}	15,370	169	Measures adopted (including Outline MMMP (CoT64; document reference: J18) (see **Table 1.87**). Secured under DCO Schedules 14 & 15, Part 2- Condition 20(1)(b) (UXO clearance).
	Grey seal		SPL_{pk}	3,015	4	
Morecambe Offshore Windfarm: Generation Assets	Harbour porpoise	354	SPL_{pk}	11,000	616	MMMP
	Grey seal		SPL_{pk}	2,100	1	
Morgan Offshore Wind Project: Generation Assets	Harbour porpoise	907	SPL_{pk}	15,370	195	MMMP and Underwater sound management strategy
	Grey seal		SPL_{pk}	3,015	2	
Mona Offshore Wind Project	Harbour porpoise	907	SPL_{pk}	15,370	206	MMMP and Underwater sound management strategy
	Grey seal		SPL_{pk}	3,015	6	
Awel y Môr Offshore Wind Farm	Harbour porpoise	164	SPL_{pk}	8,600	232	UXO-specific MMMP
	Grey seal		SPL_{pk}	1,600	3	
White Cross Offshore Wind Farm	Harbour porpoise	309	SPL_{pk}	11,000	349	MMMP (including low-order detonation and ADD)
	Grey seal			2,000	2	
Project Erebus	Harbour porpoise	525	SPL_{pk}	13,000	212	Low-order deflagration
	Grey seal		SPL_{pk}	2,500	1	

1.8.5.49 Production of underwater sound during clearance of UXOs as a part of Tier 1 projects as well as the Transmission Assets and Generation Assets have the potential to cause behavioural disturbance (using TTS-onset as a proxy) in marine mammal receptors; however, this effect will be short-lived and reversible. Since behavioural disturbance is a recoverable and the duration of impact will be very short, the potential for in-combination impact is considered to be limited, even for multiple Tier 1 projects. It is assumed whilst some ecological functions could be inhibited in the short-term due to behavioural disturbance (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 1.101: Maximum number of animals with the potential to experience behavioural disturbance (using TTS-onset as a proxy) during high-order UXO clearance at Tier 1 projects, in-combination.

Project	Species	Maximum charge size (kg)	Metric	Maximum range (m)	Estimated number within the range
Transmission Assets	Harbour porpoise	907	SPL_{pk}	28,320	572
	Grey seal		SPL_{pk}	6,470	15
Morecambe Offshore Windfarm: Generation Assets	Harbour porpoise	354	SPL_{pk}	20,000	2,037
	Grey seal			16,000	5
Morgan Offshore Wind Project: Generation Assets	Harbour porpoise	907	SPL_{pk}	28,230	661
	Grey seal			6,470	6
Mona Offshore Wind Project	Harbour porpoise	907	SPL_{pk}	28,230	245
	Grey seal		SEL_{cum}	6,470	26
Awel y Môr Offshore Wind Farm	Harbour porpoise	164	SPL_{pk}	16,000	804
	Grey seal		SPL_{pk}	310	13
White Cross Offshore Wind Farm	Harbour porpoise	309	SPL_{pk}	20,000	1,154
	Grey seal			16,000	96
Project Erebus	Harbour porpoise	525	SPL_{pk}	23,000	665
	Grey seal			20,000	52

1.8.5.50 Given the information presented in the paragraphs above, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and, although the impact itself is reversible (i.e. elevated underwater sound during the clearance event only), the effect of injury on sensitive receptors is permanent. In line with UXO guidance (JNCC, 2010), 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 and considered negligible for grey seal. For harbour porpoise, PTS ranges are large and there is considered to be a residual risk of PTS to a small number of individuals, even with the application of standard industry measures. With the aim to reduce the residual risk of injury to harbour porpoise from the project alone, embedded mitigation will be adopted as part of the Transmission Assets. Where further measures are required to mitigate potential impacts beyond standard industry measures, these will be discussed and agreed with

stakeholders as part of the development of the MMMP for the Transmission Assets (see **Table 1.87**).

1.8.5.51 As outlined in JNCC (2020) (see **paragraph 1.8.4.19**), the use of 26 km deterrence range for the assessment of disturbance from UXO clearance is recommended for harbour porpoise SACs. The assessment considered UXO detonation could occur at the closest location within the Offshore Order Limits, Generation Assets and the other relevant Tier 1 projects to the North Anglesey Marine/Gogledd Môn Forol SAC (as the closest SAC designated for harbour porpoise). As stated for Scenario's 1 and 2 (see **paragraphs 1.8.5.22** and **1.8.5.32**), the implementation of a 26 km EDR for the Transmission Assets and Generation Assets does not result in any overlap with the North Anglesey Marine/Gogledd Môn Forol SAC. Given the large distance of White Cross Offshore Wind Farm and Project Erebus (235.1 km and 199.8 km, respectively) from the North Anglesey Marine/Gogledd Môn Forol SAC, there is no overlap of the 26 km EDR from these projects with this SAC.

1.8.5.52 The implementation of a 26 km EDR for Awel y Môr Offshore Wind Farm would result in potential disturbance within 0.24% (based on a footprint of disturbance of 13.26 km^2) within the total North Anglesey Marine/Gogledd Môn Forol SAC area of 3,249 km^2 of the SAC (Awel y Môr Offshore Wind Farm Limited, 2022).

1.8.5.53 The implementation of a 26 km EDR for the Mona Offshore Wind Project could result in an overlap of 66.06 km^2 overlap with the North Anglesey Marine/Gogledd Môn Forol SAC, which corresponds to 2.03% of the SAC.

1.8.5.54 Therefore, both Mona Offshore Wind Project and Awel y Môr, using the 26 km EDR approach may result in an overlap with the North Anglesey Marine/Gogledd Môn Forol SAC, equating to 2.27% of the 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; however it should be noted that the Transmission Assets would not contribute to this in-combination effect at all.

1.8.5.55 The next closest SAC designated for harbour porpoise is located 62.7 km away from the Offshore Order Limits. Therefore, with the implementation of a 26 km EDR for the Transmission Assets and Generation Assets in-combination with the relevant Tier 1 projects, there will be no overlap with the North Channel SAC or any other SACs designated for harbour porpoise. As such, disturbance associated with UXO detonation will not exceed the daily 20% disturbance threshold or the 10% threshold of the relevant area of these SACs over the season.

1.8.5.56 The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible.

Scenario 4b

1.8.5.57 The in-combination effects assessment for Scenario 4b considers:

- Scenario 4a; and
- the Tier 2 projects listed in **Table 1.93.**

1.8.5.58 For all Tier 2 projects considered in the in-combination assessment, EIA Scoping Reports do not provide detailed information on UXO clearance activities. These projects are expected to involve similar construction activities to those described for the Transmission Assets and Generation Assets, including UXO clearance activities. These projects have been considered in the in-combination assessment below based on information currently available in the public domain (including construction timescales), to ensure a precautionary approach is adopted.

1.8.5.59 Projects are likely to have effects similar to the Transmission Assets and Generation Assets and will likely apply similar mitigation measures (e.g. MMMPs or separate marine licenses) to avoid injury; but at this stage a more detailed assessment cannot be presented. Dublin Array Offshore Wind Farm, North Irish Sea Array Offshore Wind Farm, Oriel Offshore Wind Farm and Arklow Bank Wind Park Phase 2 (see **Table 1.93** for the distances of each project to the Offshore Order Limits) have not assessed UXO clearance in their EIAs as this is not anticipated to be required for these projects and so are not discussed further in this section.

1.8.5.60 Adopting a precautionary approach, and assuming application of standard industry measures (such as MMOs, PAM and ADDs), the assessment considered the magnitude of impact for a high order clearance.

1.8.5.61 The EIA Scoping Report for Inis Ealga Marine Energy Park (located 326.54 km from the Offshore Order Limits) proposed that UXO is scoped into the EIA. Construction is planned in 2028 (as per the Inis Ealga Scoping Report), therefore it is unlikely there will be overlap in UXO clearance with the Transmission Assets and Generation Assets should construction start in 2026, as UXO clearance for the Transmission Assets and Generation Assets is likely to be carried out before the beginning of the construction period for Inis Ealga Marien Energy Park. Furthermore, due to the distance from the Offshore Order Limits (326.54 km) there is minimal spatial overlap in UXO PTS and behavioural disturbance ranges and limited potential for in-combination effects (Inis Ealga Marine Energy Part Ltd., 2022).

1.8.5.62 The Llŷr Projects (Llŷr 1/Llŷr 2; located 291.8 km and 286.9 km, respectively from the Offshore Order Limits) EIA Scoping Report confirms UXO surveys will be undertaken before construction and suggested the potential for UXO clearance will be high. The 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 Transmission Assets and Generation Assets. This, in combination with the distance from the Offshore Order Limits (291.8 km and 286.9 km) means there is minimal spatial overlap in UXO PTS and behavioural disturbance ranges and limited potential for in-combination effects (Floventis Energy, 2022).

1.8.5.63 The North Celtic Sea Offshore Wind Farm EIA Scoping Report (located 276.9 km from the Offshore Order Limits) assumes that UXO clearance may result in injury and/or disturbance to marine mammals from underwater sound (North Celtic Sea Wind Limited, 2023). However, the timeline for the construction phase of the North Celtic Sea Offshore Wind Farm is unknown and therefore the temporal overlap with the Transmission Assets and Generation Assets UXO clearance is not possible to assess. However, given that the North Celtic Sea Offshore Wind Farm will be located 276.9 km from the Offshore Order Limits, there will likely be no spatial overlap of sound contours and therefore in-combination impacts are unlikely.

1.8.5.64 Injury and disturbance due to UXO clearance has also been scoped in for further consideration as a potential impact to marine mammals in North Channel Wind 1 and 2 Projects EIA Scoping Report (North Channel Wind Limited, 2023). The construction of North Channel Wind 1 and 2 Projects is planned to take place in 2029 and since UXO clearance is assumed to take place at the onset of the construction phase (commencing in 2027 at Transmission Assets and 2026 at Generation Assets), temporal overlap and therefore in-combination impacts are unlikely.

1.8.5.65 The EIA Scoping Report for Shelmalere Offshore Wind Farm (located 200.89 km from the Offshore Order Limits) concluded that a detailed UXO survey would be undertaken post-consent, ahead of construction activities (planned for 2023), and therefore UXO clearance activities will not overlap with the Transmission Assets or Generation Assets (Shelmare Offshore Wind Farm Ltd., 2022). Construction activities are planned from 2028, therefore it is unlikely there will be overlap in UXO clearance with the Transmission Assets and Generation Assets. This, in combination with the distance from the Offshore Order Limits (approximately 200.89 km) means minimal spatial overlap in UXO PTS and behavioural disturbance ranges and limited potential for in-combination effects.

1.8.5.66 The Simply Blue Emerald EIA Scoping Report (located 359.2 km from the Offshore Order Limits) assumes that if UXO clearance will be required, disposal could be a significant source of underwater sound and this impact has been scoped in for further consideration in the EIA process (Emerald Floating Wind, 2023). The EIA Scoping Report anticipated that a number of mitigation measures could be applied, including methods to reduce underwater sound from the project, such as the use of low order clearance for UXO disposal. Nevertheless, the timeline for the construction phase of the Simply Blue Emerald project is unknown and therefore temporal overlap with the Transmission Assets and Generation Assets UXO clearance is not possible to assess. However, considering that Simply Blue Emerald will be located approximately 359.2 km from the Offshore Order Limits, spatial overlap of sound contours and therefore in-combination impacts are unlikely.

1.8.5.67 Codling Wind Park EIA Scoping Report (located 114.23 km from the Offshore Order Limits) does not explicitly scope in sound from UXO clearance but does identify that an MMMP will be considered for any potential UXO clearance work. The construction phase is planned to be complete by 2027 and therefore some temporal overlap with the Transmission Assets and Generation Assets construction is possible (Codling Wind Park Limited,

2020). Despite the lack of information, the smaller proposed extent (fewer UXOs within the area) and location to the east of Ireland (approximately 114.23 from the Offshore Order Limits) means there is limited potential for spatial overlap of sound contours and therefore limited potential for in-combination effects with Codling Wind Park.

1.8.5.68 ENI Hynet CCS Scoping report mentioned that UXO clearance was scoped out as the potential for displacement and disturbance to marine mammal species from UXO clearance was scoped out due to the historical oil and gas developments in the area. They mentioned it would be unlikely that UXO's needed to be removed and/or detonated had not already been encountered as the area has been utilised for decades. (Liverpool Bay CCS Ltd., 2022)

1.8.5.69 Given the information presented in the paragraphs above, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and, although the impact itself is reversible (i.e. elevated underwater sound during the clearance event only), the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for each project, it is anticipated that grey seal would be deterred from the injury zone and therefore the risk of PTS would be reduced. For harbour porpoise, whilst predicted PTS ranges are not available for Tier 2 projects, PTS ranges are expected to be similar to those identified for Tier 1 projects in Scenario 4a. There is therefore considered to be a residual risk of PTS to a small number of individuals for Tier 1 and Tier 2 projects in-combination. However, as set out above, it is assumed that any residual risks to harbour porpoise will be appropriately mitigated and agreed with stakeholders prior to UXO clearance, in line with the approach for the Transmission Assets (see **paragraphs 1.8.5.29** and **1.8.5.50**).

1.8.5.70 For TTS, the in-combination impact is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and the effect of behavioural disturbance is reversible.

Scenario 4c

1.8.5.71 The in-combination effects assessment for Scenario 4c considers:

- Scenario 4b; and
- the Tier 3 projects listed in **Table 1.93.**

1.8.5.72 The construction of the Transmission Assets and Generation Assets (Scenario 3), together with construction phase of Tier 1, Tier 2 and Tier 3 projects may lead to in-combination injury and disturbance to marine mammals from underwater sound generated during UXO clearance.

1.8.5.73 Available data for Tier 3 projects is limited. Tier 3 projects were screened in precautionarily based on their location in relation to the Offshore Order Limits, though there is limited/no information on the construction/operation dates or whether UXO clearance will be considered in respective EIA assessments. It should be acknowledged that there is a potential for UXO clearance activities to be taking place intermittently across the Irish Sea and

wider Celtic Sea, however, the impacts are anticipated to be of very short duration (i.e. elevated underwater sound during the clearance event only) and it is assumed that any projects undertaking UXO clearance will adopt standard mitigation measures in line with UXO guidance (e.g. JNCC, 2010). Further, temporal and/or spatial overlap with Tier 3 projects cannot be discounted, although at the current time it is not possible to undertake any kind of meaningful assessment. As such, the in-combination impact for Tier 1, Tier 2 and Tier 3 projects combined is concluded to be no different to the conclusions of the in-combination assessment presented for Scenario 4b.

1.8.5.74 Therefore the in-combination impact is predicted to be the same as for Scenario 4b, described in **paragraph 1.8.5.69** for PTS and **paragraph 1.8.5.70** for TTS.

North Anglesey Marine/Gogledd Môn Forol SAC

Harbour porpoise

1.8.5.75 Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4) 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 animals would be deterred from the injury zone and therefore the risk of PTS would be reduced. Further, it is assumed that any residual risks to harbour porpoise from in-combination UXO clearance will be appropriately mitigated and agreed with stakeholders prior to UXO clearance for all projects. 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 clearance 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.

1.8.5.76 In line with guidance from stakeholders (JNCC and Natural England) the EDR approach has also been used for the assessment of disturbance associated with in-combination UXO clearance during the construction phase for harbour porpoise features of the North Anglesey Marine/Gogledd Môn Forol SAC. The assessments presented for Scenarios 1 to 4c (see **paragraphs 1.8.5.10** to **1.8.5.74**) concluded that using the information available at the time of writing, the maximum disturbance footprints associated with projects in-combination would result in maximum potential disturbance across an area equating to 2.27% of the total area of the North Anglesey Marine/Gogledd Môn Forol SAC. This, therefore, would not exceed the daily 20% disturbance threshold[12] or the 10% threshold of the relevant area of the site over the season[34], however it should be noted that the Transmission Assets would not contribute to this in-combination effect at all.

1.8.5.77 The next closest SAC designated for harbour porpoise is the North Channel SAC, located 62.7 km away from the Offshore Order Limits, which is also

outside of the 26 km EDR range. Therefore, with the implementation of a 26 km EDR, there will be no overlap with the North Channel SAC or any other SACs designated for harbour porpoise and disturbance associated with UXO detonation will not contribute to or exceed the daily 20% disturbance threshold[12] or the 10% threshold of the relevant area of the SAC over the season[34].

Conclusions

1.8.5.78 Adverse effects on the harbour porpoise feature which undermine the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC will not occur as a result of in-combination injury and disturbance from elevated underwater sound during UXO clearance during the construction phase of the Transmission Assets in-combination with other projects. An assessment of the potential in-combination impact 'injury and disturbance from elevated underwater sound during UXO clearance' against each relevant conservation objective (as presented in **paragraphs 1.8.2.7** to **1.8.2.8**) is presented in **Table 1.102** (Scenarios 1-3) and **Table 1.103** (Scenarios 4a-4c). 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 North Anglesey Marine/Gogledd Môn Forol SAC for in-combination injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase for Scenarios 1-3

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The species is a viable component of the site	The in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.8.5.11** to **1.8.5.22**, potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for both projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. This risk of injury to harbour porpoise will be	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As assessed in detail in **paragraphs 1.8.5.23** to **1.8.5.32** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for both projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. This risk of injury to harbour porpoise will be	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.8.5.34** to **1.8.5.39** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for the Transmission Assets and Generation Assets, most individuals would be deterred from the injury

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	further reduced with the application of mitigation measures, adopted for both projects as part of MMMPs. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with this Scenario 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.	further reduced with the application of mitigation measures, adopted for both projects as part of MMMPs. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with this Scenario 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.	zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. This risk of injury to harbour porpoise will be reduced with the application of mitigation measures, adopted for all projects as part of MMMPs. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with this Scenario 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.

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
There is no significant disturbance of the species	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.11** and **1.8.5.22.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. In addition, given the distance of the Transmission Assets and Morecambe Offshore Windfarm: Generation Assets from the North Anglesey Marine/Gogledd Môn Forol SAC (>26 km), and from applying the 26 km EDR approach, the PTS and/or TTS range of the potential impact associated this Scenario is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.23** and **1.8.5.32.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. In addition, given the distance of the Transmission Assets and Morgan Offshore Wind Project: Generation Assets from the North Anglesey Marine/Gogledd Môn Forol SAC (>26 km), and from applying the 26 km EDR approach, the PTS and/or TTS range of the potential impact associated with this Scenario is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.34** to **1.8.5.39.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. In addition, given the distance of the Transmission Assets and Generation Assets from the North Anglesey Marine/Gogledd Môn Forol SAC (>26 km), and from applying the 26 km EDR approach, the PTS and/or TTS range of the potential impact associated with this Scenario is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore,

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.	the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.	disturbance as a result of in-combination UXO clearance is unlikely to be significant.
The supporting habitats and processes relevant to harbour porpoise 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 clearance from the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of Scenario 1, 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. Therefore, underwater sound from UXO clearance associated with tScenario 1 will not hinder the	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound effects from UXO clearance from the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets, 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.	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets and the Morgan Offshore Wind Project: Generation Assets 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Generation Assets, 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.

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	condition of supporting habitats and processes or reduce the availability of prey.	Therefore, underwater sound from UXO clearance associated with Scenario 2 will not hinder the condition of supporting habitats and processes or reduce the availability of prey.	Therefore, underwater sound from UXO clearance associated with the Transmission Assets and the Generation Assets in-combination will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

Table 1.103: Conclusions against the conservation objectives of the North Anglesey Marine/Gogledd Môn Forol SAC for in-combination injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase for Scenarios 4a-4c

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The species is a viable component of the site	The in-combination effects assessment for Scenario 4a considers: • Scenario 3 (Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.40** to **1.8.5.56** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. With the aim to reduce the residual risk of injury to harbour porpoise from the project alone, embedded mitigation	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.57** to **1.8.5.70** potential in-combination effects include injury (PTS) and disturbance (TTS). For all Tier 2 projects considered in the in-combination assessment, EIA Scoping Reports do not provide detailed information on UXO clearance activities. These projects are expected to involve similar UXO clearance activities, apply similar mitigation measures and have similar effects to those described for the Transmission Assets and Generation Assets and other Scenario 4a projects for both PTS and TTS. Although limited information is available, the impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and, although the impact itself is reversible the effect of injury on sensitive	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.71** to **1.8.5.74** potential in-combination effects include injury (PTS) and disturbance (TTS). There is limited/no information on the construction/operation dates or whether UXO clearance will be considered in respective EIA assessments for the Tier 3 projects considered. However, UXO clearance activities are anticipated to be of very short duration. As such, although temporal and/or spatial overlap with Tier 3 projects cannot be discounted, at the current time it is not possible to undertake any kind of meaningful assessment. As such the in-combination impact for Scenario 4c is concluded to be no different to the conclusions of the in-combination assessment presented for Scenario 4b. In line with industry best practice guidance for UXO clearance, assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	will be adopted as part of the Transmission Assets (see **Table 1.87**). The risk of injury to harbour porpoise will be further reduced with the application of mitigation measures adopted for other projects (e.g. as part of MMMPs). The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with Scenario 4a 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.	receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals from these projects in-combination. However, this is expected to be avoided/reduced through the implementation of mitigation measures for each project. Therefore, elevated underwater sound during UXO clearance associated with Scenario 4b 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.	number of individuals from these projects in-combination which would be expected to be avoided/reduced through the implementation of mitigation measures for each project.

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
There is no significant disturbance of the species	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.40** and **1.8.5.56.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. As a result (and given the distance of the Transmission Assets and Generation Assets from the North Anglesey Marine/Gogledd Môn Forol SAC; 28.5 km at closest point), and from applying the EDR approach for relevant Tier 1 projects, the PTS and/or TTS range of the potential impact associated with Scenario 4a is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.57** and **1.8.5.70.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. As a result (and given the distance of the Transmission Assets and Generation Assets from the North Anglesey Marine/Gogledd Môn Forol SAC; 28.5 km at its closest point), the PTS and/or TTS range of the potential impact associated with Scenario 4b is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.71** and **1.8.5.74.** Although there is limited available information, the in-combination impact of TTS is predicted to be the same as for Scenario 4b. Therefore, the PTS and/or TTS range of the potential impact associated with Scenario 4c is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The supporting habitats and processes relevant to harbour porpoise 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 clearance from Scenario 4a 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of this impact, 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. Therefore, underwater sound from UXO clearance associated with Scenario 4a will not hinder the condition of supporting habitats and processes or reduce the availability of prey.	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from Scenario 4b 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of this impact, 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. Therefore, underwater sound from UXO clearance associated with Scenario 4b will not hinder the condition of supporting habitats and processes or reduce the availability of prey.	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario 4c 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of this impact, 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. Therefore, underwater sound from UXO clearance associated with Scenario 4cwill not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.5.79 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 injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets in-combination with other plans/projects.

North Channel SAC

Harbour porpoise

1.8.5.80 The North Channel SAC is located at an increased distance to the Transmission Assets (62.7 km north west from the Offshore Order Limits; **Figure 1.6**) than the North Anglesey Marine/Gogledd Môn Forol SAC (28.5 km south west from the Offshore Order Limits; **Figure 1.6**), assessed in **paragraphs 1.8.5.75** to **1.8.5.79.** As the North Channel SAC is located at an increased distance from the Offshore Order Limits than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.5.81 Adverse effects on the Annex II marine mammal features which undermine the conservation objectives of the North Channel SAC will not occur as a result of in-combination injury and disturbance from elevated underwater sound during UXO clearance during the construction phase of the Transmission Assets in-combination with other projects. An assessment of the potential in-combination impact 'injury and disturbance from elevated underwater sound during UXO clearance' against each relevant conservation objective (as presented in **paragraphs 1.8.2.13** to **1.8.2.14**) is presented in **Table 1.104** (Scenarios 1-3) and **Table 1.105** (Scenarios 4a-4c). 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 North Channel SAC for injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase for Scenarios 1-3

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The species is a viable component of the site	The in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets As outlined in detail in **paragraphs 1.8.5.11** to **1.8.5.22**, potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for both projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. This risk of injury to harbour porpoise will be further reduced with the application of	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As assessed in detail in **paragraphs 1.8.5.23** to **1.8.5.32** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for both projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. This risk of injury to harbour porpoise will be further reduced with the application of mitigation measures, adopted for both projects as part of MMMPs.	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.8.5.34** to **1.8.5.39** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. This risk of injury to harbour porpoise will be reduced with the application of

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	mitigation measures, adopted for both projects as part of MMMPs. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with Scenario 1 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.	The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with Scenario 2 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.	mitigation measures, adopted for all projects as part of MMMPs. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with Scenario 3 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	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.11** and **1.8.5.22.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration,	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.23** and **1.8.5.32.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.34** to **1.8.5.39.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. In addition, given the distance of the Transmission Assets and Morecambe Offshore Windfarm: Generation Assets from the North Channel SAC (>26 km), and from applying the 26 km EDR approach, the PTS and/or TTS range of the potential impact associated with Scenario1 is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.	and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. In addition, given the distance of Transmission Assets and Morgan Offshore Wind Project: Generation Assets from the North Channel SAC (>26 km) and from applying the 26 km EDR approach, the PTS and/or TTS range of the potential impact associated with Scenario 2 is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.	duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. In addition, given the distance of the Transmission Assets and Generation Assets from the North Channel SAC (>26 km), and from applying the 26 km EDR approach, the PTS and/or TTS range of the potential impact associated with Scenario 3 is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant
The supporting habitats and processes relevant to harbour porpoise 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 Scenario 1 to result in	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound effects from UXO clearance from Scenario 2 to result in adverse effects	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from Scenario 3 to result in

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	adverse effects on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets, 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. Therefore, underwater sound from UXO clearance associated with Scenario 1 will not hinder the condition of supporting habitats and processes or reduce the availability of prey.	on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets, 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. Therefore, underwater sound from UXO clearance associated with Scenario 2 will not hinder the condition of supporting habitats and processes or reduce the availability of prey.	adverse effects on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets and the Morgan Offshore Wind Project: Generation Assets, 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. Therefore, underwater sound from UXO clearance associated with Scenario 3 will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

Table 1.105: Conclusions against the conservation objectives of the North Channel SAC for in-combination injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase for Scenarios 4a-4c

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The species is a viable component of the site	The in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.40** to **1.8.5.56** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. With the aim to reduce the residual risk of injury to harbour porpoise from the project alone, embedded mitigation will be adopted	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.57** to **1.8.5.70** potential in-combination effects include injury (PTS) and disturbance (TTS). For all Tier 2 projects considered in the in-combination assessment, EIA Scoping Reports do not provide detailed information on UXO clearance activities. These projects are expected to involve similar UXO clearance activities, apply similar mitigation measures and have similar effects to those described for the Transmission Assets , Generation Assets and other Scenario 4a projects for both PTS and TTS. Although limited information is available, the impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and, although the impact itself is reversible the effect of injury on sensitive receptors is permanent. In line with UXO	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.71** to **1.8.5.74** potential in-combination effects include injury (PTS) and disturbance (TTS). There is limited/no information on the construction/operation dates or whether UXO clearance will be considered in respective EIA assessments for the Tier 3 projects considered. However, UXO clearance activities are anticipated to be of very short duration. As such, although temporal and/or spatial overlap with Tier 3 projects cannot be discounted, at the current time it is not possible to undertake any kind of meaningful assessment. As such the in-combination impact for Scenario 4c is concluded to be no different to the conclusions of the in-combination assessment presented for Scenario 4b. In line with industry best practice guidance for UXO clearance,

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	as part of the Transmission Assets (see **Table 1.87**). This risk will be further reduced with the application of mitigation measures adopted for other projects (e,g, as part of MMMPs). The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with Scenario4a 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.	guidance, assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals from these projects in-combination. However, this is expected to be avoided/reduced through the implementation of mitigation measures for each project. Therefore, elevated underwater sound during UXO clearance associated with Scenario 4b 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.	assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals from these projects in-combination which would be expected to be avoided/reduced through the implementation of mitigation measures for each project.
There is no significant disturbance of the species	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.40** and **1.8.5.56.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.57** and **1.8.5.70.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.71** and **1.8.5.74.** Although there is limited available information, the in-combination impact of TTS is predicted to be the same as for Scenario 4b. Therefore, the PTS and/or TTS range of the potential impact associated with

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. As a result (and given the distance of the Transmission Assets and Generation Assets from the North Channel SAC; 62.7 km at the closest point), and from applying the EDR approach for the relevant Tier 1 projects, the PTS and/or TTS range of the potential impact associated with Scenario 4a is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.	only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. As a result (and given the distance of the Transmission Assets and Generation Assets from the North Channel SAC; 62.7 km at the closest point), the PTS and/or TTS range of the potential impact associated with Scenario 4b is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.	Scenario 4cis not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.
The supporting habitats and processes relevant to harbour porpoise 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 clearance from Scenario 4a 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 clearance). With respect to prey	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from Scenario 4b 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 clearance). With respect to prey	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from Scenario 4c 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 clearance). With respect to prey

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	species, although some short-term disturbance is predicted to potential prey fish species as a result of this impact, 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. Therefore, underwater sound from UXO clearance associated with Scenario 4a will not hinder the condition of supporting habitats and processes or reduce the availability of prey.	species, although some short-term disturbance is predicted to potential prey fish species as a result of this impact, 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. Therefore, underwater sound from UXO clearance associated with Scenario 4b will not hinder the condition of supporting habitats and processes or reduce the availability of prey.	species, although some short-term disturbance is predicted to potential prey fish species as a result of this impact, 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. Therefore, underwater sound from UXO clearance associated with Scenario 4c will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.5.82 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 injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets in-combination with other projects.

Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC

Grey seal

1.8.5.83 Volume 2, Chapter 4: Marine mammals of the ES (document reference: F2.4) 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 grey seal, most 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 clearance 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

1.8.5.84 Adverse effects on the grey seal feature which undermine the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC will not occur as a result of in-combination injury and disturbance from elevated underwater sound during UXO clearance during the construction phase of the Transmission Assets in-combination with other projects. An assessment of the potential in-combination impact 'injury and disturbance from elevated underwater sound during UXO clearance' against each relevant conservation objective (as presented in **paragraphs 1.8.2.21** to **1.8.2.23**) is presented in **Table 1.106** (Scenarios 1-3) and **Table 1.107** (Scenarios 4a-4c). 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 Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC for injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase for Scenarios 1-3

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The population is maintaining itself on a long-term basis as a viable component of its natural habitat **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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.8.5.11** to **1.8.5.22**, potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for both projects, most individuals would be deterred from the injury zone and therefore the risk of PTS would be low. This risk of injury to grey seal will be further reduced with the application of mitigation measures, adopted for both projects as part of MMMPs.	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As assessed in detail in **paragraphs 1.8.5.23** to **1.8.5.32** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for both projects, most individuals would be deterred from the injury zone and therefore the risk of PTS would be low. This risk of injury to grey seal will be further reduced with the application of mitigation measures, adopted for both projects as part of MMMPs.	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.8.5.34** to **1.8.5.39** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for each project, most individuals would be deterred from the injury

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some 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, elevated underwater sound during UXO clearance associated with this Scenario will not affect the population is maintaining itself on a long-term basis or prevent grey seal from being a viable component of its natural habitat. In addition, given the distance of Transmission Assets from the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (111.2 km), the PTS and/or TTS ranges of the potential impact associated with the Transmission Assets is unlikely to extend to the SAC. The Transmission Assets will, therefore, not contribute to an in-combination impact. Therefore, the populations of grey seal within the site are such that the natural ranges of	The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some 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, elevated underwater sound during UXO clearance associated with this Scenario will not affect the population is maintaining itself on a long-term basis or prevent grey seal from being a viable component of its natural habitat. In addition, given the distance of Transmission Assets from the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (111.2 km), the PTS and/or TTS ranges of the potential impact associated with the Transmission Assets is unlikely to extend to the SAC. The Transmission Assets will, therefore, not contribute to an in-combination impact. Therefore, the populations of 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	zone and therefore the risk of PTS would be low. This risk of injury to grey seal will be further reduced with the application of mitigation measures, adopted for all projects as part of MMMPs. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some 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, elevated underwater sound during UXO clearance associated with this Scenario will not affect the population is maintaining itself on a long-term basis or prevent grey seal from being a viable component of its natural habitat. In addition, given the distance of Transmission Assets from the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (111.2 km), the

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	the population is not being reduced or likely to be reduced for the foreseeable future as a result of Scenario 1.	foreseeable future as a result of Scenario 2.	PTS and/or TTS ranges of the potential impact associated with the Transmission Assets is unlikely to extend to the SAC. The Transmission Assets will, therefore, not contribute to an in-combination impact. Therefore, the populations of 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 Transmission Assets in-combination with the Generation Assets.
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 given that there is no pathway for underwater sound in-combination effects from UXO clearance from Scenario 1 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets, effects	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound effects from UXO clearance from Scenario2 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets, effects are not considered to be significant or long-term	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from Scenario 3 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	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. Therefore, underwater sound from UXO clearance associated with Scenario 1 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.	ensuring that the project will not affect prey species populations being maintained in the long term. Therefore, underwater sound from UXO clearance associated with Scenario 2 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.	with the Generation Assets, 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. Therefore, underwater sound from UXO clearance associated with Scenario 3 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.

Table 1.107: Conclusions against the conservation objectives of the Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC for in-combination injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase for Scenarios 4a-4c

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The population is maintaining itself on a long-term basis as a viable component of its natural habitat **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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.40** to **1.8.5.56,** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone and therefore the risk of PTS would be low. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration,	The in-combination effects assessment for Scenario 2 considers: • Scenario 4a; and • the Tier 2 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.57** to **1.8.5.70,** potential in-combination effects include injury (PTS) and disturbance (TTS). For all Tier 2 projects considered in the in-combination assessment, EIA Scoping Reports do not provide detailed information on UXO clearance activities. These projects are expected to involve similar UXO clearance activities, apply similar mitigation measures and have similar effects to those described for the Transmission Assets alone and Scenario 4a for both PTS and TTS. Although limited information is available, the impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and, although the impact itself is reversible the effect of injury on sensitive receptors is permanent. In line with UXO	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.71** to **1.8.5.74,** potential in-combination effects include injury (PTS) and disturbance (TTS). There is limited/no information on the construction/operation dates or whether UXO clearance will be considered in respective EIA assessments for the Tier 3 projects considered. However, UXO clearance activities are anticipated to be of very short duration. As such, although temporal and/or spatial overlap with Tier 3 projects cannot be discounted, at the current time it is not possible to undertake any kind of meaningful assessment. In line with industry best practice guidance for UXO clearance, assuming standard industry measures applied for all projects, most individuals would be deterred from the

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. 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, elevated underwater sound during UXO clearance associated with this Scenario will not affect the survivability and reproductive potential of grey seal using the SAC and grey seal will remain a viable component of their natural habitats. In addition, given the distance of Transmission Assets and Generation Assets from the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (111.2 km at the closest point), the PTS and/or TTS ranges of the potential impact associated with the Transmission Assets and Generation Assets are unlikely to extend to the SAC. The Transmission Assets and Generation Assets will, therefore, not contribute to an in-combination impact. Therefore, the populations of grey seal within the site are such that the natural ranges of the population is not being reduced or likely to be	guidance, assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone and therefore the risk of PTS would be low. This risk of injury to grey seal is expected to be further reduced through the implementation of mitigation measures for each project. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. 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, elevated underwater sound during UXO clearance associated with this Scenario will not affect the survivability and reproductive potential of grey seal using the SAC and grey seal will remain a viable component of their natural habitats. In addition, given the distance of Transmission Assets and Generation Assets from the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC	injury zone and therefore the risk of PTS would be low. As for Scenario 4b, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. 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. Given the above, the in-combination impact for Scenario 4c is concluded to be no different to the conclusions of the in-combination assessment presented for Scenario 4b.

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	reduced for the foreseeable future as a result of Scenario 4a.	(111.2 km at the closest point), the PTS and/or TTS ranges of the potential impact associated with the Transmission Assets and Generation Assets are unlikely to extend to the SAC. The Transmission Assets and Generation Assets will, therefore, not contribute to an in-combination impact. Therefore, the populations of 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 Scenario 4b.	
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 given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a, effects are not considered to be significant or long-term ensuring that the project will not	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4b, effects are not considered to be significant or long-term ensuring that the project will not	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4c, effects are not considered to be significant or long-term ensuring that the project will not

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	affect prey species populations being maintained in the long term. Therefore, underwater sound from UXO clearance associated with Scenario 4a 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.	affect prey species populations being maintained in the long term. Therefore, underwater sound from UXO clearance associated with Scenario 4b 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.	affect prey species populations being maintained in the long term. Therefore, underwater sound from UXO clearance associated with Scenario 4c 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.

1.8.5.85 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 Llŷn a'r Sarnau SAC as a result of injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets in-combination with other projects.

Pembrokeshire Marine/Sir Benfro Forol SAC

Grey seal

1.8.5.86 The Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance to the Transmission Assets (233.7 km south west from the Offshore Order Limits; **Figure 1.6**) than the Lleyn Peninsula and the Sarnau/Pen Llyn a`r Sarnau SAC (111.2 km south from the Offshore Order Limits; **Figure 1.6**), assessed in **paragraphs 1.8.5.83** to **1.8.5.85**. As the Pembrokeshire Marine/Sir Benfro Forol SAC is located at an increased distance from the Transmission 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

1.8.5.87 Adverse effects on the grey seal feature which undermine the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC will not occur as a result of in-combination injury and disturbance from elevated underwater sound during UXO clearance during the construction phase of the Transmission Assets in-combination with other projects. An assessment of the potential in-combination impact 'injury and disturbance from elevated underwater sound during UXO clearance' against each relevant conservation objective (as presented in **paragraphs 1.8.2.36** to **1.8.2.43**) is presented in **Table 1.108** (Scenarios 1-3) and **Table 1.109** (Scenarios 4a-4c). 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 Pembrokeshire Marine/Sir Benfro Forol SAC for injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase for Scenarios 1-3

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The population is maintaining itself on a long-term basis as a viable component of its natural habitat **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 in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets. As outlined in detail in **paragraphs 1.8.5.11** to **1.8.5.22**, potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for both projects, most individuals would be deterred from the injury zone and therefore the risk of PTS would be low. This risk of injury to grey seal will be further reduced with the application of mitigation measures, adopted for both projects as part of MMMPs.	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As assessed in detail in **paragraphs 1.8.5.23** to **1.8.5.32** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for both projects, most individuals would be deterred from the injury zone and therefore the risk of PTS would be low. This risk of injury to grey seal will be further reduced with the application of mitigation measures, adopted for both projects as part of MMMPs.	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.8.5.34** to **1.8.5.39** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for each project, most individuals would be deterred from the injury zone and therefore the risk of PTS would be low. This risk of injury to grey seal will be further reduced with

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some 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, elevated underwater sound during UXO clearance associated with this Scenario will not affect the population is maintaining itself on a long-term basis or prevent grey seal from being a viable component of its natural habitat. In addition, given the distance of Transmission Assets from the Pembrokeshire Marine/Sir Benfro Forol SAC (233.7 km), the PTS and/or TTS ranges of the potential impact associated with the Transmission Assets is unlikely to extend to the SAC. The Transmission Assets will, therefore, not contribute to an in-combination impact. Therefore, the populations of grey seal within the site are such that the	The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some 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, elevated underwater sound during UXO clearance associated with this Scenario will not affect the population is maintaining itself on a long-term basis or prevent grey seal from being a viable component of its natural habitat. In addition, given the distance of Transmission Assets from the Pembrokeshire Marine/Sir Benfro Forol SAC (233.7 km), the PTS and/or TTS ranges of the potential impact associated with the Transmission Assets is unlikely to extend to the SAC. The Transmission Assets will, therefore, not contribute to an in-combination impact. Therefore, the populations of grey seal within the site are such that the	the application of mitigation measures, adopted for all projects as part of MMMPs. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some 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, elevated underwater sound during UXO clearance associated with this Scenario will not affect the population is maintaining itself on a long-term basis or prevent grey seal from being a viable component of its natural habitat. In addition, given the distance of Transmission Assets from the Pembrokeshire Marine/Sir Benfro Forol SAC (233.7 km), the PTS and/or TTS ranges of the potential impact associated with the Transmission Assets is unlikely to extend to the SAC. The Transmission Assets will, therefore, not contribute

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	natural ranges of the population is not being reduced or likely to be reduced for the foreseeable future as a result of Scenario 1.	natural ranges of the population is not being reduced or likely to be reduced for the foreseeable future as a result of Scenario 2.	to an in-combination impact. Therefore, the populations of 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 Scenario 3.
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 given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets, 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.	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound effects from UXO clearance from this Scenario 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets, 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.	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets and the Morgan Offshore Wind Project: Generation Assets, effects are not considered to be significant or long-term ensuring that the project will not affect prey species

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	Therefore, underwater sound from UXO clearance associated with Scenario 1 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.	Therefore, underwater sound from UXO clearance associated with Scenario 2 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.	populations being maintained in the long term. Therefore, underwater sound from UXO clearance associated with Scenario 3 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.

Table 1.109: Conclusions against the conservation objectives of the Pembrokeshire Marine/Sir Benfro Forol SAC for in-combination injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase for Scenarios 4a-4c

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The population is maintaining itself on a long-term basis as a viable component of its natural habitat **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 in-combination effects assessment for Scenario 4a considers: • Scenario 3 (Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.40** to **1.8.5.56** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone and therefore the risk of PTS would be low. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and	The in-combination effects assessment for Scenario 2 considers: • Scenario 4a; and • the Tier 2 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.57** to **1.8.5.70,** potential in-combination effects include injury (PTS) and disturbance (TTS). For all Tier 2 projects considered in the in-combination assessment, EIA Scoping Reports do not provide detailed information on UXO clearance activities. These projects are expected to involve similar UXO clearance activities, apply similar mitigation measures and have similar effects to those described for the Transmission Assets alone and Scenario 4a for both PTS and TTS. Although limited information is available, the impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and, although the impact itself is reversible the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for all projects,	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.71** to **1.8.5.74,** potential in-combination effects include injury (PTS) and disturbance (TTS). There is limited/no information on the construction/operation dates or whether UXO clearance will be considered in respective EIA assessments for the Tier 3 projects considered. However, UXO clearance activities are anticipated to be of very short duration. As such, although temporal and/or spatial overlap with Tier 3 projects cannot be discounted, at the current time it is not possible to undertake any kind of meaningful assessment. In line with industry best practice guidance for UXO clearance, assuming standard industry measures applied for all projects, most individuals would be deterred from the

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	effect of behavioural disturbance is reversible. 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, elevated underwater sound during UXO clearance associated with this Scenario will not affect the survivability and reproductive potential of grey seal using the SAC and grey seal will remain a viable component of their natural habitats. In addition, given the distance of Transmission Assets and Generation Assets from the Pembrokeshire Marine/Sir Benfro Forol SAC (233.7 km at the closest point), the PTS and/or TTS ranges of the potential impact associated with the Transmission Assets and Generation Assets are unlikely to extend to the SAC. The Transmission Assets and Generation Assets will, therefore, not contribute to an in-combination impact. Therefore, the populations of 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 Scenario 4a.	most individuals would be deterred from the injury zone and therefore the risk of PTS would be low. This risk of injury to grey seal is expected to be further reduced through the implementation of mitigation measures for each project. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. 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, elevated underwater sound during UXO clearance associated with this Scenario will not affect the survivability and reproductive potential of grey seal using the SAC and grey seal will remain a viable component of their natural habitats. In addition, given the distance of Transmission Assets and Generation Assets from the Pembrokeshire Marine/Sir Benfro Forol SAC (233.7 km at the closest point), the PTS and/or TTS ranges of the	injury zone and therefore the risk of PTS would be low. As for Scenario 4b, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. 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. Given the above, the in-combination impact for Scenario 4c is concluded to be no different to the conclusions of the in-combination assessment presented for Scenario 4b.

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
		potential impact associated with the Transmission Assets and Generation Assets are unlikely to extend to the SAC. The Transmission Assets and Generation Assets will, therefore, not contribute to an in-combination impact. Therefore, the populations of 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 Scenario 4b.	
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 given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4a, 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.	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4b, 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. Therefore, underwater sound from	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario 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 clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets and Generation Assets in-combination with the projects considered under Scenario 4c, 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.

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	Therefore, underwater sound from UXO clearance associated with Scenario 4a 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.	UXO clearance associated with Scenario 4b 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.	Therefore, underwater sound from UXO clearance associated Scenario 4c 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.

1.8.5.88 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 injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets in-combination with other projects.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

Harbour porpoise

1.8.5.89 The Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located at an increased distance to the Transmission Assets (296.9 km south west from the Offshore Order Limits; **Figure 1.6**) than the North Anglesey Marine/Gogledd Môn Forol SAC (28.5 km south west from the Offshore Order Limits; **Figure 1.6**), assessed in **paragraphs 1.8.5.75** to **1.8.5.78.** As the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC is located at an increased distance from the Transmission Assets than the North Anglesey Marine/Gogledd Môn Forol SAC, it is considered that effects would be of similar if not lower magnitude.

Conclusions

1.8.5.90 Adverse effects on the harbour porpoise feature which undermine the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC will not occur as a result of in-combination injury and disturbance from elevated underwater sound during UXO clearance during the construction phase of the Transmission Assets in-combination with other projects. An assessment of the potential in-combination impact ‘injury and disturbance from elevated underwater sound during UXO clearance’ against each relevant conservation objective (as presented in **paragraphs 1.8.2.48** to **1.8.2.49**) is presented in **Table 1.110** (Scenarios 1-3) and **Table** 1.111 (Scenarios 4a-4c). 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 Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC for injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase for Scenarios 1-3

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
The species is a viable component of the site	The in-combination effects assessment for Scenario 1 considers: • the Transmission Assets; and • the Morecambe Offshore Windfarm: Generation Assets As outlined in detail in **paragraphs 1.8.5.11** to **1.8.5.22**, potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for both projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. This risk of injury to harbour porpoise will be further reduced with the application of	The in-combination effects assessment for Scenario 2 considers: • the Transmission Assets; and • the Morgan Offshore Wind Project: Generation Assets. As assessed in detail in **paragraphs 1.8.5.23** to **1.8.5.32** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for both projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. This risk of injury to harbour porpoise will be further reduced with the application of	The in-combination effects assessment for Scenario 3 considers: • the Transmission Assets; • the Morecambe Offshore Windfarm: Generation Assets; and • the Morgan Offshore Wind Project: Generation Assets. As outlined in detail in **paragraphs 1.8.5.34** to **1.8.5.39** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. This risk of injury to harbour porpoise will be reduced with

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	mitigation measures, adopted for both projects as part of MMMPs. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with Scenario 1 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.	mitigation measures, adopted for both projects as part of MMMPs. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with Scenario 2 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.	the application of mitigation measures, adopted for all projects as part of MMMPs. The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with Scenario 3 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	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.11** and **1.8.5.22.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.23** and **1.8.5.32.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.34** to **1.8.5.39.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. In addition, given the distance of the Transmission Assets and Morecambe Offshore Windfarm: Generation Assets from the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC (>200 km), and from applying the 26 km EDR approach, the PTS and/or TTS range of the potential impact associated with this Scenario is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant	and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. In addition, given the distance of Transmission Assets and Morgan Offshore Wind Project: Generation Assets from the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC (>200 km) and from applying the EDR approach, the PTS and/or TTS range of the potential impact associated with this Scenario is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.	duration, intermittent and both the impact itself (i.e. elevated underwater sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. In addition, given the distance of the Transmission Assets and Generation Assets from the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC (>200 km) and from applying the 26 km EDR approach, the PTS and/or TTS range of the potential impact associated with this Scenario is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant
The supporting habitats and processes relevant to harbour porpoise 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 clearance from this Scenario to result in	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound effects from UXO clearance from this Scenario to result in adverse	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario to result in

Conservation objective	Scenario 1: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets	Scenario 2: Transmission Assets + Morgan Offshore Wind Project: Generation Assets	Scenario 3: Transmission Assets + Morecambe Offshore Windfarm: Generation Assets and Morgan Offshore Wind Project: Generation Assets
	adverse effects on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Morecambe Offshore Windfarm: Generation Assets, 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. Therefore, underwater sound from UXO clearance associated with Scenario 1 will not hinder the condition of supporting habitats and processes or reduce the availability of prey.	effects on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Morgan Offshore Wind Project: Generation Assets, 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. Therefore, underwater sound from UXO clearance associated with 2 Scenario will not hinder the condition of supporting habitats and processes or reduce the availability of prey.	adverse effects on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater sound associated with UXO clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of the Transmission Assets in-combination with the Generation Assets, 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. Therefore, underwater sound from UXO clearance associated with Scenario 3 will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

Table 1.111: Conclusions against the conservation objectives of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC for in-combination injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase for Scenarios 4a-4c

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
The species is a viable component of the site	The in-combination effects assessment for Scenario 4a considers: • Scenario 3 (The Transmission Assets and Generation Assets); and • the Tier 1 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.40** to **1.8.5.56** potential in-combination effects include injury (PTS) and disturbance (TTS). In summary, the in-combination impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and although the impact itself is reversible, the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals. With the aim to reduce the residual risk of injury to harbour porpoise from the project alone, embedded mitigation will be adopted	The in-combination effects assessment for Scenario 4b considers: • Scenario 4a; and • the Tier 2 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.57** to **1.8.5.70** potential in-combination effects include injury (PTS) and disturbance (TTS). For all Tier 2 projects considered in the in-combination assessment, EIA Scoping Reports do not provide detailed information on UXO clearance activities. These projects are expected to involve similar UXO clearance activities, apply similar mitigation measures and have similar effects to those described for the Transmission Assets alone and Scenario 4a for both PTS and TTS. Although limited information is available, the impact of PTS is predicted to be of local to regional spatial extent, very short-term duration, intermittent and, although the impact itself is reversible the effect of injury on sensitive receptors is permanent. In line with UXO guidance, assuming standard industry	The in-combination effects assessment for Scenario 4c considers: • Scenario 4b; and • the Tier 3 projects listed in **Table 1.93.** As assessed in detail in **paragraphs 1.8.5.71** to **1.8.5.74** potential in-combination effects include injury (PTS) and disturbance (TTS). There is limited/no information on the construction/operation dates or whether UXO clearance will be considered in respective EIA assessments for the Tier 3 projects considered. However, UXO clearance activities are anticipated to be of very short duration. As such, although temporal and/or spatial overlap with Tier 3 projects cannot be discounted, at the current time it is not possible to undertake any kind of meaningful assessment. As such the in-combination impact for Scenario 4c is concluded to be no different to the conclusions of the in-combination assessment presented for Scenario 4b. In line with industry best practice guidance for UXO clearance,

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	as part of the Transmission Assets (see **Table 1.87**). The risk to harbour porpoise will; be further reduced with the application of mitigation measures adopted for other projects (e.g. as part of MMMPs). The in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, 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, elevated underwater sound during UXO clearance associated with Scenario 4a 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.	measures applied for all projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals from these projects in-combination. However, this is expected to be avoided/reduced through the implementation of mitigation measures for each project. Therefore, elevated underwater sound during UXO clearance associated with Scenario 4b 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.	assuming standard industry measures applied for all projects, most individuals would be deterred from the injury zone. However, given the large PTS ranges for harbour porpoise, there may be a residual risk of PTS to a small number of individuals from these projects in-combination which would be expected to be avoided/reduced through the implementation of mitigation measures for each project.
There is no significant disturbance of the species	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.40** and **1.8.5.56.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.57** to **1.8.5.70.** As stated above, the in-combination impact of TTS is predicted to be of regional spatial extent, short-term duration, intermittent and both the impact itself (i.e. elevated underwater	The impact of disturbance is assessed for this Scenario between **paragraphs 1.8.5.71** to **1.8.5.74.** Although there is limited available information, the in-combination impact of TTS is predicted to be the same as for Scenario 4b.

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. As a result (and given the distance of the Transmission Assets and Generation Assets from the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC; 296.9 km at the closest point), and applying the EDR approach for relevant Tier 1 projects, the PTS and/or TTS range of the potential impact associated with Scenario 4a is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.	sound during the clearance event only) and effect of behavioural disturbance is reversible. Whilst some ecological functions could be inhibited in the short-term due to large TTS ranges, these are reversible on recovery of the animals hearing and therefore not considered likely to lead to any long-term effects on the individual. As a result (and given the distance of the Transmission Assets and Generation Assets from the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC; 296.9 km at the closest point), the PTS and/or TTS range of the potential impact associated with Scenario 4b is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.	Therefore, the PTS and/or TTS range of the potential impact associated with Scenario 4c is not expected to surpass 20% of relevant area disturbed in any given day[12] or 10% of the relevant area of the site over a season[34]. Therefore, disturbance as a result of in-combination UXO clearance is unlikely to be significant.
The supporting habitats and processes relevant to harbour porpoise 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 clearance from this Scenario to result in adverse effects on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario to result in adverse effects on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater	Habitats and processes will not be affected by underwater sound given that there is no pathway for underwater sound in-combination effects from UXO clearance from this Scenario to result in adverse effects on the habitats of harbour porpoise (i.e. there will be no habitat loss/disturbance from underwater

Conservation objective	Scenario 4a: Scenario 3 (Transmission Assets and Generation Assets) +Tier 1	Scenario 4b: Scenario 4a + Tier 2	Scenario 4c: Scenario 4b + Tier 3
	sound associated with UXO clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of this impact, 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. Therefore, underwater sound from UXO clearance associated with Scenario 4a will not hinder the condition of supporting habitats and processes or reduce the availability of prey.	sound associated with UXO clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of this impact, 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. Therefore, underwater sound from UXO clearance associated with Scenario 4b will not hinder the condition of supporting habitats and processes or reduce the availability of prey.	sound associated with UXO clearance). With respect to prey species, although some short-term disturbance is predicted to potential prey fish species as a result of this impact, 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. Therefore, underwater sound from UXO clearance associated with Scenario 4c will not hinder the condition of supporting habitats and processes or reduce the availability of prey.

1.8.5.91 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 injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets in-combination with other projects.

Sites assessed in line with the iterative approach

1.8.5.92 As outlined in **paragraphs 1.8.1.2** to **1.8.2.4**, following the iterative approach adopted for this HRA Stage 2 ISAA - Part 2 SAC Assessments, the closest SAC to the Offshore Order Limits within the relevant MU for each Annex II marine mammal feature has been subject to a full assessment above. A full assessment has also been undertaken for the SACs located in English and Northern Irish waters. All remaining European sites for Annex II marine mammal features, which were screened into this HRA Stage 2 ISAA - Part 2 SAC Assessments (see **Table 1.81**), are located at a greater distance from the Offshore Order Limits 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 1.8.5.78** to **1.8.5.91** are, therefore, deemed to be applicable for the remaining sites presented below in **paragraphs 1.8.5.93** to **1.8.5.97**.

West Wales Marine/Gorllewin Cymru Forol SAC

1.8.5.93 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 (located 28.5 km and 62.7 km from the Offshore Order Limits, respectively; **paragraphs 1.8.5.78** to **1.8.5.79** and **1.8.5.80** to **1.8.5.82**), it can be concluded that there is **no risk of an adverse effect on the integrity** of the West Wales Marine/Gorllewin Cymru Forol (located 111.4 km from the Offshore Order Limits) SAC as a result of injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets in-combination with other projects.

Rockabill to Dalkey Island SAC

1.8.5.94 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 (located 28.5 km and 62.7 km from the Offshore Order Limits, respectively; **paragraphs 1.8.5.78** to **1.8.5.79** and **1.8.5.80** to **1.8.5.82**), it can be concluded that there is **no risk of an adverse effect on the integrity** of the Rockabill to Dalkey Island SAC (located 123.6 km from the Offshore Order Limits) as a result of injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets in-combination with other projects.

Lambay Island SAC

1.8.5.95 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC (located 111.2 km from the Offshore Order Limits; **paragraphs 1.8.5.84** to **1.8.5.85**), it can be concluded that there is **no risk of an adverse effect on the integrity** of the Lambay Island SAC (located 130.4 km from the Offshore Order Limits) as a result of injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets in-combination with other projects.

Cardigan Bay/Bae Ceredigion SAC

1.8.5.96 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC (located 111.2 km from the Offshore Order Limits; **paragraphs 1.8.5.84** to **1.8.5.85**), it can be concluded that there is **no risk of an adverse effect on the integrity** of the Cardigan Bay/Bae Ceredigion SAC (located 183.4 km from the Offshore Order Limits) as a result of injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets in-combination with other projects.

Saltee Islands SAC

1.8.5.97 On the basis of the conclusions of the assessments presented for the grey seal features of the Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC (located 111.2 km from the Offshore Order Limits; **paragraphs 1.8.5.84** to **1.8.5.85**), it can be concluded that there is **no risk of an adverse effect on the integrity** of the Saltee Islands SAC (located 259.3 km from the Offshore Order Limits) as a result of injury and disturbance from elevated underwater sound during UXO clearance with respect to the construction phase of the Transmission Assets in-combination with other projects.

1.9 Summary

1.9.1 Effects on site integrity

1.9.1.1 A summary of the assessments presented in this HRA Stage 2 ISAA - Part 2 SAC Assessments, considering the relevant SACs, is provided in the sections below. **Table 1.112** presents the conclusions of adverse effects on integrity in relation to the Transmission Assets alone and in-combination with other plans and projects.

Annex I habitats (offshore and coastal)

Shell Flat and Lune Deep SAC

1.9.1.2 Based on the information presented in **sections 1.6.3** and **1.6.4**, **no adverse effect on integrity** of the Shell Flat and Lune Deep SAC, with specific regard to the qualifying Annex I habitat (offshore and coastal) feature for which LSE could not be excluded, is predicted as a result of the Transmission Assets, either alone or in-combination with other plans and projects.

Annex II diadromous fish

Dee Estuary/Aber Dyfrdwy SAC

1.9.1.3 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 Transmission Assets, either alone or in-combination with other plans and projects.

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

1.9.1.4 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 Transmission Assets, either alone or in-combination with other plans and projects.

River Ehen SAC

1.9.1.5 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 and freshwater pearl mussel features for which LSE could not be excluded, is predicted as a result of the Transmission Assets, either alone or in-combination with other plans and projects.

River Kent SAC

1.9.1.6 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 freshwater pearl mussel feature for which LSE could not be excluded, is predicted as a result of the Transmission Assets, either alone or in-combination with other plans and projects.

River Derwent and Bassenthwaite Lake SAC

1.9.1.7 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 Lake 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 Transmission Assets, either alone or in-combination with other plans and projects.

Solway Firth SAC

1.9.1.8 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 Transmission Assets, either alone or in-combination with other plans and projects.

Afon Gwyrfai a Llyn Cwellyn SAC

1.9.1.9 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 Transmission Assets, either alone or in-combination with other plans and projects.

River Bladnoch SAC

1.9.1.10 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 Transmission Assets, either alone or in-combination with other plans and projects.

River Eden SAC

1.9.1.11 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 Transmission Assets, either alone or in-combination with other plans and projects.

Annex II marine mammals

North Anglesey Marine/Gogledd Môn Forol SAC

1.9.1.12 Based on the information presented in **sections 1.8.4** and **1.8.5**, **no adverse effect on integrity** of the North Anglesey Marine/Gogledd Môn Forol SAC, with specific regard to the qualifying Annex II marine mammal feature for which LSE could not be excluded, is predicted as a result of the Transmission Assets, either alone or in-combination with other plans and projects.

North Channel SAC

1.9.1.13 Based on the information presented in **sections 1.8.4** and **1.8.5**, **no adverse effect on integrity** of the North Channel SAC, with specific regard to the qualifying Annex II marine mammal feature for which LSE could not be excluded, is predicted as a result of the Transmission Assets, either alone or in-combination with other plans and projects.

Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC

1.9.1.14 Based on the information presented in **sections 1.8.4** and **1.8.5**, **no adverse effect on integrity** of the Lleyn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC, with specific regard to the qualifying Annex II marine mammal feature for which LSE could not be excluded, is predicted is predicted as a result of the Transmission Assets, either alone or in-combination with other plans and projects.

Lambay Island SAC

1.9.1.15 Based on the information presented in **sections 1.8.4** and **1.8.5**, **no adverse effect on integrity** of the Lambay Island SAC, with specific regard to the qualifying Annex II marine mammal feature for which LSE could not be excluded, is predicted is predicted as a result of the Transmission Assets, either alone or in-combination with other plans and projects.

West Wales Marine/Gorllewin Cymru Forol SAC

1.9.1.16 Based on the information presented in **sections 1.8.4** and **1.8.5**, **no adverse effect on integrity** of the West Wales Marine/Gorllewin Cymru Forol SAC, with specific regard to the qualifying Annex II marine mammal feature for which LSE could not be excluded, is predicted as a result of the Transmission Assets, either alone or in-combination with other plans and projects.

Cardigan Bay/Bae Ceredigion SAC

1.9.1.17 Based on the information presented in **sections 1.8.4** and **1.8.5**, **no adverse effect on integrity** of the Cardigan Bay/Bae Ceredigion SAC, with specific regard to the qualifying Annex II marine mammal feature for which LSE could not be excluded, is predicted as a result of the Transmission Assets, either alone or in-combination with other plans and projects.

Pembrokeshire Marine/Sir Benfro Forol SAC

1.9.1.18 Based on the information presented in **sections 1.8.4** and **1.8.5**, **no adverse effect on integrity** of the Pembrokeshire Marine/Sir Benfro Forol SAC, with specific regard to the qualifying Annex II marine mammal feature for which LSE could not be excluded, is predicted as a result of the Transmission Assets, either alone or in-combination with other plans and projects.

Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC

1.9.1.19 Based on the information presented in **sections 1.8.4** and **1.8.5**, **no adverse effect on integrity** of the Bristol Channel Approaches/Dynesfeydd Môr Hafren SAC, with specific regard to the qualifying Annex II marine mammal feature for which LSE could not be excluded, is predicted as a result of the Transmission Assets, either alone or in-combination with other plans and projects.

Rockabill to Dalkey Island SAC

1.9.1.20 Based on the information presented in **sections 1.8.4** and **1.8.5**, **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 Transmission Assets, either alone or in-combination with other plans and projects.

Saltee Islands SAC

1.9.1.21 Based on the information presented in **sections 1.8.4** and **1.8.5**, **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 Transmission Assets, either alone or in-combination with other plans and projects.

Table 1.112: Summary of conclusions of the Appropriate Assessment for the Transmission Assets alone and in-combination with other plans and projects

European Site	Relevant qualifying features	Project phase	Potential impact	Commitment number	Further mitigation	Conclusion – Transmission Assets alone	Conclusion – Transmission Assets in-combination with other plans and projects
Annex I habitats (offshore and coastal)							
Shell Flat and Lune Deep SAC	Sandbanks which are slightly covered by sea water all the time	Construction/ decommissioning	• increased SSCs and associated deposition.	CoT45 CoT47 CoT49 CoT54 CoT65 CoT116	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
		Operation and maintenance	• increased SSCs and associated deposition.		None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
Annex II diadromous fish							
Dee Estuary/Aber Dyfrdwy SAC	Sea lamprey River lamprey	Construction	• underwater sound from UXO clearance impacting fish and shellfish receptors.	CoT 64	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
		Operation and maintenance	• EMF from subsea electrical cabling.	CoT 45 CoT 54	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

European Site	Relevant qualifying features	Project phase	Potential impact	Commitment number	Further mitigation	Conclusion – Transmission Assets alone	Conclusion – Transmission Assets in-combination with other plans and projects
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	Atlantic salmon Sea lamprey River lamprey	Construction	• underwater sound from UXO clearance impacting fish and shellfish receptors.	CoT 64	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
		Operation and maintenance	• EMF from subsea electrical cabling.	CoT 45 CoT 54	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
River Ehen SAC	Atlantic salmon Freshwater pearl mussel	Construction	• underwater sound from UXO clearance impacting fish and shellfish receptors.	CoT 64	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
		Operation and maintenance	• EMF from subsea electrical cabling.	CoT 45 CoT 54	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
River Kent SAC	Freshwater pearl mussel	Construction	• underwater sound from UXO clearance impacting fish and shellfish receptors.	CoT 64	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
		Operation and maintenance	• EMF from subsea electrical cabling.	CoT 45 CoT 54	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

European Site	Relevant qualifying features	Project phase	Potential impact	Commitment number	Further mitigation	Conclusion – Transmission Assets alone	Conclusion – Transmission Assets in-combination with other plans and projects
River Derwent and Bassenthwaite Lake SAC	Sea lamprey River lamprey Atlantic salmon	Construction	• underwater sound from UXO clearance impacting fish and shellfish receptors.	CoT 64	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
		Operation and maintenance	• EMF from subsea electrical cabling.	CoT 45 CoT 54	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
Solway Firth SAC	Sea lamprey River lamprey	Construction	• underwater sound from UXO clearance impacting fish and shellfish receptors.	CoT 64	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
		Operation and maintenance	• EMF from subsea electrical cabling.	CoT 45 CoT 54	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
Afon Gwyrfai a Llyn Cwellyn SAC	Atlantic salmon	Construction	• underwater sound from UXO clearance impacting fish and shellfish receptors.	CoT 64	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
		Operation and maintenance	• EMF from subsea electrical cabling.	CoT 45 CoT 54	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

European Site	Relevant qualifying features	Project phase	Potential impact	Commitment number	Further mitigation	Conclusion – Transmission Assets alone	Conclusion – Transmission Assets in-combination with other plans and projects
River Bladnoch SAC	Atlantic salmon	Construction	• underwater sound from UXO clearance impacting fish and shellfish receptors.	CoT 64	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
		Operation and maintenance	• EMF from subsea electrical cabling.	CoT 45 CoT 54	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
River Eden SAC	Sea lamprey River lamprey Atlantic salmon	Construction	• underwater sound from UXO clearance impacting fish and shellfish receptors.	CoT 64	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
		Operation and maintenance	• EMF from subsea electrical cabling.	CoT 45 CoT 54	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
Annex II marine mammals							
North Anglesey Marine/Gogledd Môn Forol SAC	Harbour porpoise	Construction	• injury and disturbance from elevated underwater sound during UXO clearance.	CoT64	None proposed beyond existing commitments	No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

European Site	Relevant qualifying features	Project phase	Potential impact	Commitment number	Further mitigation	Conclusion – Transmission Assets alone	Conclusion – Transmission Assets in-combination with other plans and projects
North Channel SAC	Harbour porpoise	Construction	• injury and disturbance from elevated underwater sound during UXO clearance.			No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
Llŷn Peninsula and the Sarnau/Pen Llŷn a'r Sarnau SAC	Grey seal	Construction	• injury and disturbance from elevated underwater sound during UXO clearance.			No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
Lambay SAC	Grey seal	Construction	• injury and disturbance from elevated underwater sound during UXO clearance.			No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
West Wales Marine/Gorllewin Cymru Forol SAC	Harbour porpoise	Construction	• injury and disturbance from elevated underwater sound during UXO clearance.			No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

European Site	Relevant qualifying features	Project phase	Potential impact	Commitment number	Further mitigation	Conclusion – Transmission Assets alone	Conclusion – Transmission Assets in-combination with other plans and projects
Cardigan Bay/Bae Ceredigion SAC	Grey seal	Construction	• injury and disturbance from elevated underwater sound during UXO clearance.			No adverse effect on the integrity of the site..	No adverse effect on the integrity of the site..
Pembrokeshire Marine/Sir Benfro Forol SAC	Grey seal	Construction	• injury and disturbance from elevated underwater sound during UXO clearance.			No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
Bristol Channel Approaches/Dynesfeyd d Môr Hafren SAC	Harbour porpoise	Construction	• injury and disturbance from elevated underwater sound during UXO clearance.			No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.
Rockabill to Dalkey Island SAC	Harbour porpoise	Construction	• injury and disturbance from elevated underwater sound during UXO clearance.			No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

European Site	Relevant qualifying features	Project phase	Potential impact	Commitment number	Further mitigation	Conclusion – Transmission Assets alone	Conclusion – Transmission Assets in-combination with other plans and projects
Saltee Islands SAC	Grey seal	Construction	• injury and disturbance from elevated underwater sound during UXO clearance.			No adverse effect on the integrity of the site.	No adverse effect on the integrity of the site.

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