Cambois Connection – Marine Scheme

Report to Inform Appropriate Assessment

Appendix 1: HRA Stage 1 Screening

sse Renewables

Revision Information

Rev	Issue Status	Date	Originator	Checker	Approver
A01	Issued for Use	31/03/2023	JO	EW	EW

Cambois Connection

Habitats Regulations Assessment / Appraisal (HRA) Stage 1 Screening Report

A100796-S01 – HRA Stage 1 Screening Report

sse Renewables

Revision Information

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A02	Approved for Use	31/03/2023	JO	EW	EW

Document Change Summary

Rev	Date	Details of Change
R01 – R03; A01	Jan to Mar-2023	Previous document revisions pursuant to client / legal review

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Glossary

Term	Description
Appropriate Assessment	An assessment to determine the implications of a plan or project on a European site in view of that site's conservation objectives. An Appropriate Assessment forms part of the Habitats Regulations Appraisal/Assessment (HRA) and is required when a project or plan (either alone or in-combination with other plans or projects) is likely to have a significant effect on a European Site.
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). The designation of Special Areas of Conservation (SAC) is required in the UK to ensure the conservation of these habitats. The protection afforded to sites designated prior to EU Exit persists in UK law.
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). The designation of Special Areas of Conservation (SAC) is required in the UK to ensure the conservation of these species. The protection afforded to sites designated prior to EU Exit persists in UK law.
Berwick Bank Wind Farm	Refers to the offshore wind farm from which the Cambois Connection (the Project) will export part of the produced electricity. The consent applications for BBWF are currently being determined.
EU Exit	The withdrawal of the United Kingdom from the European Union.
Cambois Connection	Offshore export cables, onshore export cables, an onshore converter station and associated onshore grid connection at the existing Blyth substation near Cambois in Northumberland. The purpose of this infrastructure is to facilitate the export of a portion of the green electricity from the BBWF, allowing the BBWF to reach its full 4.1GW generation capacity by the early 2030s.
Competent Authority	The term derives from the Habitats Regulations and relates to the exercise of the functions and duties under those Regulations. Competent Authorities are defined in the Habitat Regulations as including "any Minister, government department, public or statutory undertaker, public body of any description or person holding a public office". In the context of a plan or project, the Competent Authority is

Term	Description
	the authority with the power or duty to determine whether or not the proposal can proceed (SNH, 2014).
European Site	A Special Area of Conservation (SAC), or candidate SAC (cSAC); a Special Protection Area (SPA); a site listed as a site of community importance (SCI) as per Scottish Planning Policy (SPP); a possible SAC (pSAC) or potential SPA (pSPA). All Ramsar sites are also protected in the same manner as European sites and included under the HRA process as a result of guidance in the National Planning Policy Framework (NPPF) and National Planning Framework 4 (NPF4).
Habitats Regulations	The Conservation of Habitats and Species Regulations 2017 and the Conservation of Offshore Marine Habitats and Species Regulations 2017, which are collectively referred to as the 'Habitats Regulations'.
Habitat Regulations Appraisal / 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 (LSE) 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.
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 (SNH, 2014).
Marine Scheme	Proposed infrastructure and activities required as part of the Cambois Connection below Mean High Water Springs (MHWS).
Migratory waterbirds	Species of waders and waterfowl that are ecologically dependant on wetlands and which make regular migrations along the coast of the UK and/or non-breeding individuals that overwinter in the UK.
National Site Network	The National Site Network comprises SPAs and SACs designated or (proposed) on EU Exit and which formerly formed part of the Natura

Term	Description
	2000 network. The term 'National Site Network' is used in each of the Habitats Regulations and the terms refers to the same network of sites defined under the Habitats Regulations.
Natura 2000 network	A coherent European ecological network of SACs and SPAs comprising sites located within European Union Member States.
Onshore Scheme	Proposed infrastructure and activities required as part of the Cambois Connection landward of the Mean Low Water Springs (MLWS).
Ramsar Site	Wetlands of international importance designated under the Ramsar Convention.
Seabirds	Birds that spend most of their lives feeding and living on the open ocean, coming ashore only for breeding.
Special Area of Conservation (SAC)	Special Areas of Conservation (SACs) are designated for the conservation of certain plant and animal species listed in the Habitats Directive.
Site of Community Importance (SCI)	Defined in the Habitats Directive as a site which, in the biogeographical region or regions to which it belongs, contributes significantly to the maintenance or restoration at a favourable conservation status of a natural habitat type in Annex I, or of a species in Annex II and may also contribute significantly to the coherence of the Natura 2000 network (or National Site Network). The site may also contribute significantly to the maintenance of biological diversity within the biogeographic region or regions concerned. For animal species ranging over wide areas, SCIs shall correspond to the places within the natural range of such species which represent the physical or biological factors essential to their life and reproduction.
Special Protection Area (SPA)	Special Protection Areas (SPAs) are sites that are designated to protect rare or vulnerable birds (as listed on Annex I of the Directive 2009/147/EC on the conservation of wild birds), as well as regularly occurring migratory species.
Statutory Nature Conservation Bodies' (SNCBs)	The UK Statutory Nature Conservation Bodies' (SNCBs) are Natural England, Natural Resources Wales, NatureScot, the Northern Ireland Environment Agency, the Joint Nature Conservation Committee, and the Department of Agriculture, Environment and Rural Affair's statutory advisory body, the Council for Nature Conservation and the Countryside.

Acronyms

Acronym	Description
AEOI	Adverse Effects on the Integrity
BBWF	Berwick Bank Wind Farm
BBWFL	Berwick Bank Wind Farm Limited
CIEEM	Chartered Institue of Ecology and Environmental Management
DDV	Drop Down Video
EC	European Commission
EIAR	Environmental Impact Assessment Report
EGL	Eastern Green Link
EMF	Electromagnetic Field
EPS	European Protected Species
EU	European Union
HDD	Horizontal Directional Drilling
HRA	Habitats Regulations Appraisal/Assessment
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IAMMWG	Inter Agency Marine Mammal Working Group
IROPI	Imperative Reasons of Overriding Public Interest
JNCC	Joint Nature Conservation Committee
LSE	Likely Significant Effects

Acronym	Description
MARPOL	International Convention for the Prevention of Pollution from Ships
MFE	Mass-Flow Excavator
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MS-LOT	Marine Scotland – Licencing Operations Team
MU	Management Unit
NCC	Northumberland County Council
NPF4	National Planning Framework 4
NSIP	Nationally Significant Infrastructure Project
OCT	Open Cut Trench
PINS	Planning Inspectorate
PLGR	Pre-Lay Grapnel Run
pSPA	Potential Special Protection Area
pSAC	Possible Special Area of Conservation
PTS	Permanent Threshold Shift
pUXO	Potential Unexploded Ordnance
RIAA	Report to inform Appropriate Assessment
ROV	Remotely Operated Vehicle
SAC	Special Area of Conservation

Acronym	Description
SBP	Sub-Bottom Profiling
SCOS	Special Committee on Seals
SD	Standard Deviation
SEGL	Scotland to England Green Link
SMU	Seal Management Units
SNCBs	Statutory Nature Conservation Bodies'
SNH	Scottish Natural Heritage (now called NatureScot)
SOPEP	Shipboard Oil Pollution Emergency Plan
SPA	Special Protection Area
SSER	SSE Renewable Developments (UK) Limited
SuDS	Sustainable Urban Drainage System
TJB	Transition Joint Bay
TTS	Temporary Threshold Shift
UK	United Kingdom
UXO	Unexploded Ordnance
USBL	Ultra Short Base Line
WeBS	Wetland Bird Survey
ZOI	Zone of Influence

Units

Unit	Description
%	Percentage
dB	Decibels
GW	Gigawatt (power)
Hz	Hertz
km	Kilometres (distance)
m	Metre (distance)
nm	Nautical mile (distance)

1. Introduction

1.1. Overview

1. In line with the UK's statutory target to achieve net zero greenhouse gas emissions by the year 2050, Berwick Bank Wind Farm Limited (BBWFL) (hereafter referred to as 'the Applicant') is planning to submit applications for the development of offshore export cables, onshore export cables, an onshore converter station and an associated grid connection at Cambois, Northumberland (hereafter referred to as the 'Cambois Connection' / 'the Project').

2. The purpose of the Project is to facilitate the export of green energy from the Berwick Bank Wind Farm (BBWF) (being determined separately[1]), located in the outer Firth of Forth, to the identified grid connection at Cambois, Northumberland.

3. This Habitats Regulations Assessment/Appraisal[2] (HRA) Screening Report has been prepared on behalf of the Applicant by Xodus Group Ltd (Xodus). This report, in combination with the Report to Inform Appropriate Assessment (RIAA), will inform the HRAs in support of the Environmental Statements (ES) for the Marine Scheme and Onshore Scheme of the Project.

4. The Marine Scheme ES will support the Marine Licence applications to the Marine Scotland Licensing Operations Team (MS-LOT) and the Marine Management Organisation (MMO) under the Marine and Coastal Access Act 2009. The Onshore Scheme ES will support a Planning Application to Northumberland County Council (NCC) under Section 57 of the Town and Country Planning Act 1990.

5. It is considered that whilst the applications to MS-LOT the MMO and NCC are distinct and divided by the geographical jurisdictions within Scottish and English waters and onshore, it is appropriate to carry out a single HRA Screening exercise and present a single HRA Screening Report (and subsequent Report to Inform Appropriate Assessment (RIAA) for the Project (including both the Marine Scheme and Onshore Scheme) to support the applications.

6. Informed by pre-application advice from the Competent Authorities (MS-LOT, MMO and NCC), the advice from statutory stakeholders (NatureScot and Natural England) and owing to the fact that all of the relevant European Sites (from a HRA perspective) are marine in focus and/or the potential for qualifying features to interact with the Marine Scheme, the Applicant has prepared a single, over-arching HRA Screening Report which will support applications of both the Onshore Scheme and Marine Scheme. This over-arching HRA Screening Report will support the fulfilment of each obligation outlined by the Competent Authorities under Regulation 63 of the Conservation of Habitats and Species Regulations (2017)[3].

7. Notwithstanding, to aid decision making and reviews by Competent Authorities and stakeholders within different jurisdictions, relevant distinctions between aspects of the Marine Scheme in

[1] An application for consent under Section 36 of the Electricity Act 1989 (as amended) was submitted to MS-LOT in December 2022.

[2] In Scotland, the term Habitats Regulations *Appraisal* is used whilst in England, the term Habitats Regulations *Assessment* is used. Recognising the consistency in process across both jurisdictions, 'HRA' therefore applies to both.

[3] Regulation 63 outlines the approach to assessment of implications of a plan or project for European Sites and European offshore marine sites and identifies the need for appropriate assessment for a plan or project in view of a European Sites conservation objectives.

Scottish waters and English waters have been made as well as for the Onshore Scheme; for example if potential effects are relevant to each jurisdiction (such as potential effects at the Landfall which is in English waters).

1.2. The Project

8. The requirement for the Project is driven by the need to deliver the maximum generating capacity from the BBWF by the early 2030s. The export of green energy from offshore renewable energy assets is critical for assisting the Scottish and United Kingdom's (UK) Governments in the achievement of net zero targets and the reduction of greenhouse gas emissions (as outlined in section 3).

9. The Project comprises two proposals, or 'Schemes' which are illustrated in Figure 1-1:

- **Marine Scheme:** The Applicant is proposing the construction of High Voltage Direct Current (HVDC) offshore export cables from within the BBWF array area in the outer Firth of Forth (Scotland) to a proposed landfall at Cambois, Northumberland (England). Those aspects of the Project seaward of Mean High Water Springs (MHWS) are defined as part of the Marine Scheme.
- **Onshore Scheme:** The Applicant is proposing the construction of a cable landfall, onshore High Voltage Direct Current (HVDC) cables, a new onshore converter station, High Voltage Alternating Current (HVAC) grid cables from the new onshore converter station to the existing Blyth National Grid substation near Cambois and works to integrate the Onshore Scheme into the National Grid at the existing substation. Those aspects of the Project onshore and extending down to the seaward-extent of the landfall at Mean Low Water Springs (MLWS) are defined as part of the Onshore Scheme.

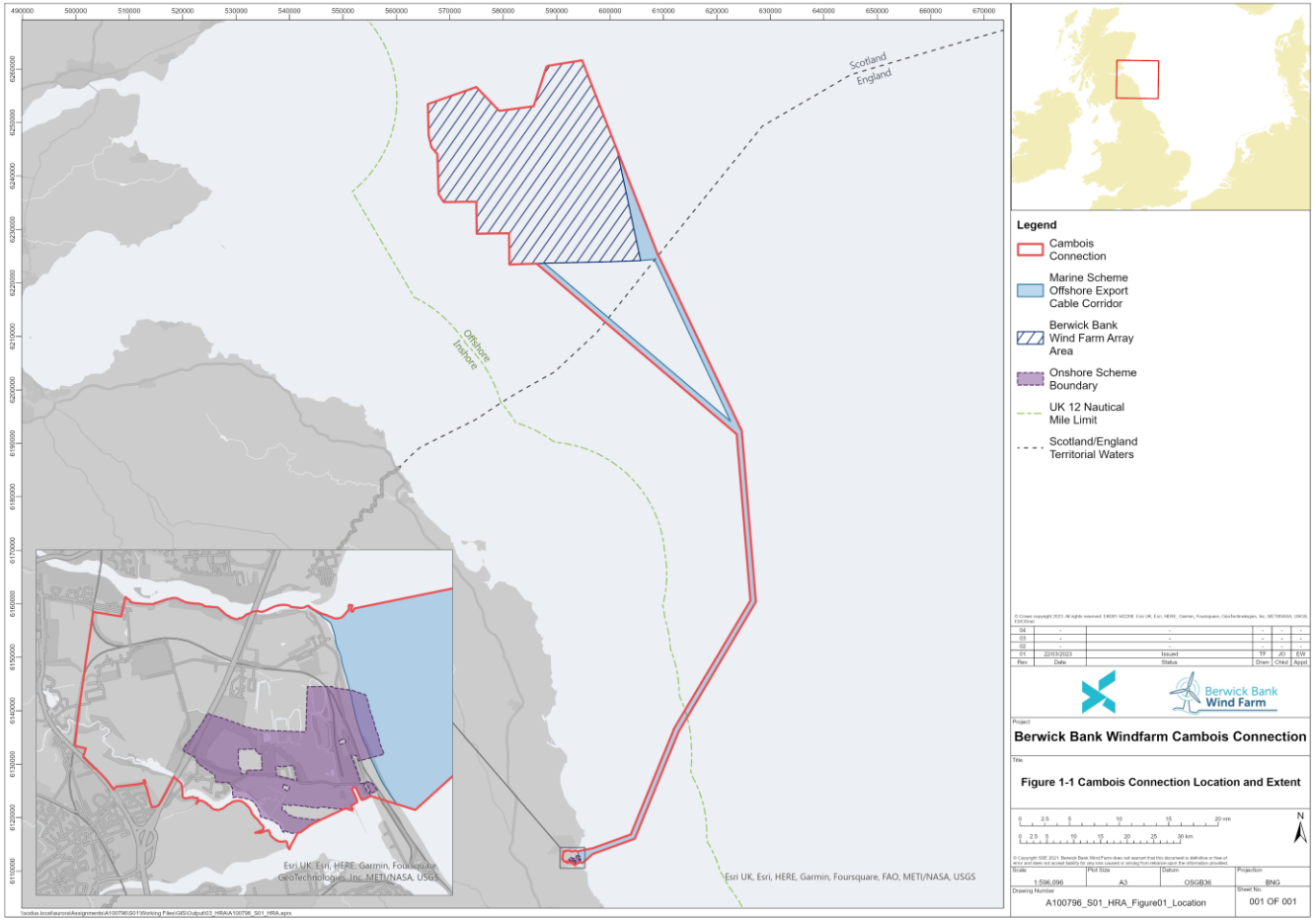

Figure 1-1 Cambois Connection Location and Extent

10. Site specific surveys are underway for the Marine Scheme and Onshore Scheme, with completion anticipated by Q3 2023. It is anticipated that construction of the Project will commence in 2029.

11. Respective Scoping Reports for the Marine Scheme and Onshore Scheme were submitted to both MS-LOT and the MMO, and NCC, in November 2022 to support a request for a formal Scoping Opinion in relation to the Project (Berwick Bank Offshore Wind Farm Cambois Connection – Firth of Forth Marine Scheme Scoping Report (SSER, 2022(a)) and Berwick Bank Offshore Wind Farm Cambois Connection – Firth of Forth Onshore Scheme Scoping Report (SSER, 2022(b))).

12. Further information describing the Marine Scheme and Onshore Scheme is provided in section 1.3 and 1.4 respectively. The parameters outlined in this section are considered the maximum design parameters for the Project and therefore present a conservative, precautionary approach for the purpose of this HRA Screening.

13. Full detail on the Project is provided in section 2 below.

2. Project Description

2.1. Marine Scheme Project Description

14. It should be noted that where relevant the Project Description is described in relation to aspects of the Marine Scheme located in Scottish Waters, English Waters and as a whole to aid understanding.

15. The Marine Scheme will support the transmission of green energy generated by the BBWF (located in Scottish waters) to the grid connection in England (Blyth substation) via subsea HVDC cables (offshore export cables). Key parameters are summarised as follows:

- The offshore export cables will be installed along a route with a broad north-south alignment with an approximate maximum length of 180 km (30km within Scottish waters and 150 km within English waters|);
- The maximum width of the offshore export cable corridor will be approximately 1 km, extending to up to 3.4 km in width east of the BBWF array area boundary:
- The cables will be laid in a maximum of four trenches with a maximum width of approximately 2 m per trench, and a maximum disturbance width of approximately 25 m per trench;
- The landfall construction is expected to take up to 15 months;
- The duration of the cable-laying works are expected to take up to 18 months;
- The offshore export cables will be installed using a combination of methods, including burial (the preferred method of installation).

16. The construction of the offshore export cables for the Marine Scheme will include a range of activities including pre-installation surveys, seabed preparation and clearance, installation of offshore export cables, construction of crossing infrastructure (where required), installation of cable protection where required and installation of the offshore export cables where they make landfall at Cambois, Northumberland. Key activities associated with the cable installation are summarised below.

2.1.1. Pre-Installation Surveys

17. These pre-installation surveys are applicable to both Scottish and English waters.

18. The extent of any pre-installation surveys, insofar as those which are classified as ‘licensable’ for the purposes of the Marine and Coastal Access Act 2009, is currently unknown. It is anticipated that some pre-installation surveys would be required ahead of the cable installation process; they may include:

- Confirmatory geophysical and/or benthic surveys, building on the geophysical and benthic surveys currently being undertaken in 2022 and 2023 along the offshore export cable route to inform the ES;
- Confirmatory geotechnical surveys, where additional samples are required to help support data in a specific area of the seabed or where the surveys currently being undertaken have identified an area for further investigation;
- Targeted archaeological surveys; and
- Surveys of Unexploded Ordnance (UXO), or potential UXO (pUXO) involving Remotely Operated Vehicles (ROVs) and/or divers.

19. These and any other identified comparable survey required for the Project will be carried out using a range of available methodologies at the time of cable installation; this is expected to include but is not necessarily limited to Multi-Beam Echo Sounder (MBES), Side-Scan Sonar, Drop-Down Video (DDV), ROV/diver-based surveys, magnetometer surveys, grab sampling and core sampling.

2.1.2. Pre-Installation Activities

20. These pre-installation activities are applicable to both Scottish and English waters.

21. Prior to the installation of the offshore export cables, obstacles will need to be cleared from the offshore export cable route; it is anticipated that several cable route clearance techniques will be required along the length of the offshore export cable route. Anticipated techniques required may include: a subsea plough (to be towed across the surface of the seabed), a pre-lay grapnel run (PLGR), and use of boulder grab techniques. Boulders will also be removed along the offshore export cable route and, where areas cannot be avoided (e.g., where areas of higher boulder density are present), pre-sweeping may be required to allow for the effective burial of the cable.

22. Where a plough is deployed, this will involve either displacement or non-displacement methods to ensure that the installation area is clear of boulders, debris and other obstacles. Where a PLGR is used, this will involve a heavy grapnel with a series of specially designed hooks along the centreline of the route. This technique will help gather debris to ensure an adequate base installation area ahead of cable installation itself.

23. If areas of sand waves or similar are present along the offshore export cable route, some limited pre-sweep clearance may be carried out to ensure a level and stable installation area ahead of cable installation itself. This is likely to be achieved through the method of dredge and dispersal to flatten sand waves, however the use of a Mass-Flow Excavator (MFE) may be employed where larger sand waves are encountered.

2.1.3. Unexploded Ordnance

24. The approach to UXO is applicable to both Scottish and English waters.

25. The development of the offshore export cable corridor has been informed by consideration of a range of environmental, technical and commercial criteria; this has included consideration of UXO risk at a high level and based on available information in advance of offshore surveys. This has sought to, where possible, avoid areas of particularly high UXO risk (i.e., areas where based on modern history and available datasets, there is a higher likelihood that a UXO would be encountered).

26. Informed by the ongoing survey activities, the Applicant will seek to further refine the offshore export cable route such that it avoids areas of highest UXO risk, and indeed individual potential targets which have been identified through survey outputs / engineering studies.

27. Notwithstanding, some UXO investigation may be required along the offshore export cable route in advance of construction. If required, this is expected to include.

- More detailed investigation of pUXO including invasive / penetrative techniques if required;
- Use of ROVs and/or divers to investigate the pUXO;
- Excavation of seabed sediment from around the pUXO to ascertain potential risk, and/or the requirement for clearance; and
- Movement of the pUXO.

28. UXO will be avoided via cable routeing where possible. However, if further mitigation such as clearance or detonation is required, this would be subject to a separate Marine Licence application as supported by an environmental assessment and European Protected Species (EPS) licence and EPS risk assessments as required.

29. The clearance and disposal of UXO / pUXO is **not** included within the scope of the Marine Scheme (in both Scottish and English waters) for a number of reasons. This is principally because there is limited information available at this stage of the Marine Scheme surrounding the exact locations of UXO / pUXO and therefore a meaningful assessment would not be possible, combined with the fact that cable projects are typically able to avoid UXO meaning that UXO clearance very unlikely to be required. This approach is considered appropriate and is consistent with approaches adopted for similar UK marine cable projects (such as Eastern Link 1). If UXO clearance is required, it will be subject to future Marine Licence application, and associated environmental assessment. In the event UXO clearance is required it will be undertaken in line with relevant industry best practice guidance including the Marine Environment: Unexploded Ordnance Clearance Joint Interim Position Statement (UK Government, 2022), including the provision and implementation of appropriate marine mammal mitigation.

2.1.4. Cable Installation

30. The approach to cable installation is applicable to both Scottish and English waters.

31. At this early stage, the exact configuration of the offshore export cables is unknown. However, the maximum design parameters are expected to comprise two monopole systems of up to four cables installed in separate trenches alongside each other. Each of the cable circuits will be accompanied by a fibre optic cable, attached to the HVDC cable and contained within its trench. The purpose of the fibre optic cable is to adequately monitor their performance over the operational lifetime of the Project.

32. The cables will be buried at a minimum burial depth of 0.5 m and a maximum burial depth of 3 m[4], where possible, depending on seabed conditions. The cable trenches will have a maximum width of 2 m per cable circuit.

33. It is expected that the offshore export cables will be buried along the majority of the route. Where cable burial is not possible based on seabed conditions or where third party crossings are required, additional cable protection methods will be adopted as discussed below to ensure cables are buried to the minimum burial depth of 0.5 m.

34. The installation of the offshore export cables is expected to be achieved through the following methods:

- MFE: A method of trenching and/or deburial which can be used to precisely excavate material without direct interaction with the seabed by using a specialist MFE tool;
- Jet trenching: Jet trenching tools use water jets to fluidise the seabed which allows the cable to sink into the seabed under its own weight. Jet trenching tools are most effective in soft, fine grained sediments (e.g. sands and soft clays). Jet trenching machines can be towed, free swimming or tracked;
- Mechanical trencher: Mechanical trenchers are usually mounted on tracked vehicles and use chainsaw or wheeled arms with teeth or chisels to cut a defined trench. They are suitable for

[4] The 3 m maximum depth is the depth of burial at installation and does not account for sand wave and sediment mobility.

a range of sediments including hard/coarse seabed, although they are less effective in glacial tills or boulder clays as the boulders can damage the teeth; and

- Cable ploughs: Cable ploughs are usually towed either from a vessel or vehicle on the seabed. There are two types of plough: displacement plough which creates a V shaped trench into which the cable can be laid; or the non-displacement plough which brings the cable into the soil. Cable ploughs can used for a range of sediments.

35. The main options being considered for the burial of the offshore export cables are as follows:

- Separate cable lay and burial campaigns (the cable is buried by a plough or trencher after it has been placed on the seabed (post-lay burial);
- Simultaneous cable lay and burial with a plough or trencher; and
- Separate trench and burial campaigns (in this case, the trench would be pre-cut by a plough or trencher and the cable laid, followed by backfill by plough, natural backfill or rock placement over the cable).

2.1.5. Cable Protection Methods

36. The cable protection methods discussed below are applicable to both Scottish and English waters.

37. Cable routeing is the principal method of avoiding hazards and sensitive features of the seabed. Detailed investigation into seabed conditions along the route of offshore export cables also allows for selection of preferred installation corridors where there is the greatest confidence in success of burial in the seabed. The Applicant is committed to achieving burial as the preferred method along the route where this is possible based on local seabed conditions.

38. In areas where there is insufficient sediment to cover or bury the offshore export cables, and at crossings with third party infrastructure, additional cable protection may be required. At this early stage, it is expected that cable protection may include the following options:

- Rock placement;
- Concrete mattresses (frequently used to protect offshore export cables, to construct crossings over existing subsea cables and pipelines);
- Sand/rock/grout bags (smaller bags filled with sand/rock/grout can be used to provide localised protection; and
- Cable physical protection (additional protection can be provided in the form of articulated half shells generally made of polyurethane (PU) or cast-iron).

39. The Applicant is aware of the potential need for crossings with third party infrastructure; discussions are ongoing with asset owners regarding the necessary proximity / crossing agreements which will be sought between the Applicant and each asset owner. Further information surrounding the volume, location and type of crossings required along the offshore export cable route will be set out in the Environmental Statement informing the RIAA and Marine Licence Applications for the Marine Scheme.

2.1.6. Offshore Export Cable Landfall

40. This section is applicable to English waters only.

41. In order to bring the offshore export cables ashore at Cambois, a landfall will need to be developed; this is a key interface between the Marine Scheme (below MHWS) and the Onshore Scheme (above MLWS). The development of a landfall will require construction work within the

marine environment (i.e., below MHWS) as well as onshore work (i.e., above MLWS). At this early stage, the exact location of the proposed landfall is not yet known but it will be along the Cambois coastline, as depicted within Figure 1-1. The description of the landfall techniques below is not specific to a single location, and they will be relevant along the Cambois coastline, irrespective of exactly which site is chosen for the landfall.

42. The exact alignment of the offshore export cables at the landfall location will be informed by the outputs from surveys being undertaken and a range of environmental, technical and commercial criteria.

43. At the landfall, a transition joint bay (TJB) will be required to house the interface joint between the offshore export cables for the Marine Scheme and the underground cables for the Onshore Scheme. The TJB will comprise a concrete, box-like structure which will be used to safely and securely 'anchor' the cables together. Following connection of the cables within the TJB, the TJB will be backfilled to protect the joint and the area will then be reinstated, leaving little to no sign of construction after natural cover (i.e., grass or other) is in place. Either a single, large TJB will be used for all cables (anticipated to be the likely configuration) or one TJB will be installed for each of the cables. As part of the landfall construction process, a temporary construction compound will be required close to the landfall site as well as some limited temporary access roads.

44. Regarding the landfall methodology, there are two techniques which can be used to install the cable at the landfall:

- Option 1: Trenchless techniques, such as Horizontal Directional Drilling (HDD); and
- Option 2: Open-Cut Trench (OCT).

45. Horizontal Directional Drilling (HDD) is a trenchless method of drilling generally used for installation of underground utilities which does not require any direct works. HDD techniques are commonly used at the landfall section of cable routes, within the intertidal area (i.e., between MHWS and MLWS). HDD installation can either be completed through a shore-led or marine-led campaign; it is more typical for HDD to be completed via a shore-led campaign, which involves the establishment of drilling compound (above MHWS), drilling of boreholes to accommodate cable ducts, installation of cables within the ducts and supporting activity below MLWS where the cables 'break-out' into the marine environment.

46. The OCT process involves the excavation of a trench for cable installation using mechanical excavators and supporting plant equipment down to (approximately) MLWS. Excavated material would be temporarily retained on the Cambois coastline (alongside the working area) for future backfill. As part of the OCT process, a cofferdam may be required; this is a sheet-piled structure installed to protect the OCT from excessive water ingress.

47. Landfall installation is anticipated to be undertaken across24 h a day to minimise the overall completion of works.

2.1.7. Vessels

48. It is anticipated that the vessels required to complete cable installation works may include:

- Cable lay vessels, including specialist jack-up / shallow-hull barges;
- Pre-lay support vessels
- Post-lay support vessels, such as those associated with cable protection / rock placement, where required;
- Guard vessels; and
- Support vessels.

2.1.8. Operation and Maintenance

49. The description of the approach to operation and maintenance is applicable to both Scottish waters and English waters.

50. Once in place and buried (where possible), offshore export cables do not typically require regular routine maintenance. It is likely that routine inspection of the offshore export cables will be periodically required annually to monitor condition and burial throughout the life of the Marine Scheme. Any inspections would be undertaken using offshore surveys, including the use of ROVs. Where inspection work concludes that work may be required along any length of the offshore export cable route, maintenance would be carried out. This may involve re-positioning of rock protection or placement of additional rock protection.

2.1.9. Decommissioning

51. The description of the approach to decommissioning is applicable to both Scottish waters and English waters.

52. The lease for cables installed within waters governed by The Crown Estate and Crown Estate Scotland are generally granted for a set term after which projects are required to be decommissioned. For the purpose of this HRA Screening the Applicant assumes that the decommissioning will occur 35 years after final commissioning of Berwick Bank Wind Farm.

53. At the end of the operational lifetime of the Marine Scheme it is proposed that all infrastructure will be removed in line with current decommissioning guidance from Marine Scotland (2022) and the Department for Business, Energy and Industrial Strategy (2019). This approach will be reviewed at the time of decommissioning following the most up to date and best available guidance. Impacts arising during the decommissioning phase of the Marine Scheme are expected to be similar to or less than those anticipated during the installation phase. Any potential impacts would be temporary and would occur over a short period, however there is still the potential for impact to the offshore environment, which will be considered within the RIAA.

2.2. Onshore Scheme Project Description

54. The Onshore Scheme will facilitate the transmission of green energy exported from the BBWF to the National Grid via onshore HVDC cables from the transition joint bays at the landfall to a new onshore converter station. A maximum of four HVDC cables are proposed from the landfall to the converter station, with installation anticipated to include a combination of methods (i.e., OCT, trenchless techniques such as HDD and bridge crossings). From the onshore converter station, HVAC cables will be installed (no overhead lines are proposed) to connect into the existing Blyth National Grid substation.

2.2.1. Landfall

55. As described above for the Marine Scheme, in order to bring the offshore export cables ashore at Cambois, a landfall will need to be developed; elements of the landfall which fall within the Scope of the Onshore Scheme are described below.

56. A temporary compound will be established above MHWS adjacent to the TJB (as described above, the location where the HVDC offshore export cables from the Marine Scheme will be joined with the HVDC onshore export onshore export cables for the Onshore Scheme).

57. The temporary secure drilling compound is anticipated to include a construction compound which will house the HDD drilling rig and other construction equipment, and welfare facilities.

58. Once the cables have been installed, the TJB will be backfilled and reinstated, and the drilling compound will be disestablished and reinstated. Based on the Applicant's experience completing similar comparable works, the reinstatement process is anticipated to be swift and thorough and after a short period of time, the trenchless technique works will not be discernible.

2.2.2. Export Cables (HVDC)

59. From the TJB, HVDC cables will be installed to connect into the converter station. No overhead lines are planned for the Onshore Scheme. Joint bays are typically required every 500 – 1,000 m to string together the export cable sections, depending on manufacturing specification of the supplier.

60. The methods for cable installation will be either OCT or trenchless technique, such as HDD, as is detailed in the section above. When trenching, the cable trenches will be located within the working corridor, which will also include any access tracks, excavated material and other equipment/machinery. Certain sections of the working corridor may be wider, if required, for temporary parking, storage and cable pulling equipment. Temporary working areas will also be required along the cable route for the cable installation works, such as those required for pulling pits to support the cable installation process.

61. The maximum length of the onshore export cables is currently unknown and is subject to ongoing routeing work. This detail will be provided within the forthcoming Planning Application for the Onshore Scheme to NCC. However, for the purposes of this HRA Screening Report, potential impacts associated with the onshore export cables have been considered within this screening assessment a precautionary approach has been followed which considers the potential for a range of functionally linked land to be used by the Onshore Scheme.

2.2.3. Grid Cables (HVAC)

62. From the converter station, a maximum of six HVAC cables will be installed to connect into the existing National Grid substation at Blyth. No overhead lines are planned for the Onshore Scheme. The approach to installation of the grid cables is expected to be consistent with those described above for the onshore export cables. The maximum length of the grid cables is currently unknown however in line with section 2.2.2, as the Project will have with such a short distance between the anticipated converter station location and the Blyth substation, the outstanding definition of the maximum length of onshore grid cables (HVAC) length will not alter the judgments made herein.

2.2.4. Converter Station

63. The Onshore Scheme will require a new converter station to convert HVDC electricity into HVAC, such that it can be used for onward distribution on the UK energy network via the existing National Grid substation at Blyth.

64. At this early stage the exact configuration of the converter station is not known. Notwithstanding, based on the development of comparable UK projects of a similar capacity, it is anticipated that the converter station will comprise building(s) to house electrical equipment required to convert HVDC electricity to HVAC electricity, including transformers and AC switchgear, along with controls and communications, offices and welfare facilities. The site will be secured with fencing and will include landscaping and on-site sustainable urban drainage systems (SuDS). The maximum footprint of the converter station building(s) is approximately 75,000 m^2 and a maximum height of 30 m.

2.2.5. Works to integrate into the National Grid substation

65. At this early stage in the development of the Onshore Scheme, the Applicant intends to utilise the existing National Grid substation at Blyth. This will require some limited cable connecting works to 'handover' the grid cables to National Grid at the boundary fence of the existing substation. At this stage, these construction methods are expected to be consistent with those described above.

2.2.6. Operation and Maintenance

66. Following commissioning, it is assumed that the Onshore Scheme will operate continuously (24 hours a day, seven days a week) except during planned shutdowns for maintenance. The converter station will be designed to remain in situ during the lifetime of the Onshore Scheme, which is expected to be 35 years.

67. There will be a limited amount of traffic to and from the substation for general operation and maintenance purposes. It is anticipated that the Onshore Scheme will not be permanently staffed. Unexpected faults may lead to increased traffic volumes depending on the type of fault.

68. Routine activities on the underground cable system during the operational phase may include adhoc visits to the manholes as required for inspection/maintenance purposes. Non-routine activities could include repair of damage to cable or replacement of failed cable joint arising from Climate Change, both now and in the future. Noting that the converter station will be largely unmanned, this will include adequate provision for surface water retention and drainage infrastructure.

2.2.7. Decommissioning

69. For the purpose of this HRA Screening the Applicant assumes that the decommissioning will occur 35 years after the final commissioning of the Berwick Bank Wind Farm and will take 18-24 months to complete.

70. The methodology for decommissioning will be similar to that described above for construction, but in reverse. It is anticipated that all the infrastructure will be removed with the exception of buried ducting, the foundations of the substation and any bridge crossings outwith the top 1 m of the reinstated surface level.

71. It is anticipated that a Decommissioning Plan will be required by a planning condition, to be approved by NCC prior to the commencement of decommissioning activities.

2.3. Purpose of this Report

72. This HRA Screening Report has been prepared to inform the HRA process for the Project. Specifically, this document provides the supporting information to enable the evaluation of potential pathways for the presence of an LSE on the qualifying features and conservation objectives of sites designated as part of the National Site Network (hereafter collectively referred to as 'European Sites') which display potential connectivity with the Project. Potential effects of the Project during the construction, operation and maintenance and decommissioning phases are considered as part of this HRA Screening Report.

73. Informed by pre-application advice from the Competent Authorities (MS-LOT, MMO and NCC), the advice from statutory stakeholders (NatureScot and Natural England) and owing to the fact that all of the relevant European Sites (from a HRA perspective) are marine in focus and/or the potential for qualifying features to interact with the Marine Scheme, the Applicant has prepared a single, over-arching HRA Screening Report which will support applications of both the Onshore Scheme and Marine Scheme. This over-arching HRA Screening Report will support the fulfilment of each obligation outlined by the Competent Authorities under Regulation 63 of the Conservation of Habitats and Species Regulations (2017). As previously outlined where applicable distinctions have been made between aspects of the Project which are located within Scottish waters, English waters and onshore.

2.4. Structure of this Report

74. This HRA Screening Report has been prepared to provide the basis for review and feedback from the Competent Authorities on the potential pathways for LSE on relevant European Sites and their qualifying features as a result of the Project. The report follows the structure outlined in Table 2-1.

Table 2-1 Structure of HRA Screening Report

Section Number	Title
Section 1	Introduction
Section 2	Project Description
Section 3	Legislation and Policy
Section 4	Approach to HRA Stage One: Screening for Likely Significant Effects
Section 5	Step 1: Identification of European Sites for HRA Screening
Section 6	Step 2: Identification of potential impacts on relevant sites and qualifying features

3. Legislation and Policy

3.1. International Commitments

75. The requirement to consider the potential effects of a plan or project on a European Site is outlined as part of the international commitments of the following pieces of European Union (EU) legislation:

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended in the Habitats Regulations) (applicable to Marine Licence applications out to the 12 nautical mile (NM) limit);
- The Conservation of Offshore Marine Habitats and Species Regulations 2017 (applicable to Marine Licence applications between 12 nm and 200 nm);
- The Conservation of Habitats and Species Regulations 2017 (as amended) (applicable to applications for Section 36 consent);
- The Conservation on Wetlands of International Importance especially as Waterfowl Habitat (the 'Ramsar Convention') (as implemented through the Habitats Regulations)
- European Directive 92/43/EEC on the 'Conservation of Natural Habitats and Wild Fauna and Flora' (referred to as the 'Habitats Directive'); and
- Council Directive 2009/147/EC (Birds Directive) and the Conservation of Wild Birds (the codified version of Council Directive 79/409/EEC on the conservation of wild birds) (referred to as the 'Wild Birds Directive').

76. Sites designated under these directives are collectively referred to as European Sites and are comprised of habitats and species of regional, national and European importance and include: Special Areas of Conservation (SAC); candidate SAC (cSAC); Special Protection Areas (SPA); sites listed as a site of community importance (SCI); possible SACs (pSAC) and potential SPAs (pSPA). All Ramsar sites are also Natura 2000 sites (taken as European sites, see paragraph 80 below).

77. The Habitats Directive and the Birds Directive have been transposed into Scottish and English Law through The Conservation (Natural habitats, &c.) Regulations 1994 (as amended) and The Conservation of Habitats and Species Regulations 2017 respectively. The Conservation of Offshore Marine Habitats and Species Regulations 2017 transpose the Habitats Directive into Scottish and English Law for offshore waters.

78. These regulations are collectively referred to as the 'Habitats Regulations'.

79. Following the UK's exit from the European Union (EU) in January 2020, the European Union (Withdrawal Agreement) Act 2020 was transposed into English and Scottish Law through The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 and The Conservation (Natural Habitats, &c.) (EU Exit) (Scotland) (Amendment) Regulations 2019 respectively. Amendments made to the Habitats Regulations through these regulations should be considered as part of HRA Screening.

3.2. European Sites Post EU Exit

80. European sites are commonly referred to as Natura 2000 sites (as part of the Natura 2000 Network).

81. Following the UK's exit from the EU (referred to as EU Exit) in January 2020, the UK was no longer part of the Natura 2000 Network. Hereafter, all sites within the UK and the EU are referred

to as European Sites, with Natura 2000 Network sites collectively referred to as the UK's 'National Site Network'. The National Site Network encompasses all European Sites within the UK that were designated pre-EU Exit (i.e., those sites which were already designated under the Habitats and Birds Directives) or proposed to the European Commission pre-EU Exit and any new protected sites designated under the Habitats and Birds Regulations under an amended designation process.

3.3. Statutory Requirements for the Assessment

82. The Habitats Regulations require for an assessment of the implications of a plan or project on a European Site's conservation objectives to be undertaken by the Competent Authority prior to giving consent (please see the following Regulations under each piece of legislation:

- Regulation 63 of The Conservation of Habitats and Species Regulations 2017 (as applicable in England for the Onshore Scheme); and
- Regulation 28 of The Conservation of Offshore Marine Habitats and Species regulations 2017 (as applicable in Scotland and England for the Marine Scheme)[5].

83. The wording of these Regulations are very similar and outline the requirements for HRA assessment, stating that (e.g. Regulation 28 of the Conservation of Offshore Marine Habitats and Species regulations 2017):

'(1)Before decision to undertake, or give any consent, permission or other authorisation for, a relevant plan or project, a competent authority must make an appropriate assessment of the implications for the plan or project for the site in view of that site's conservation objectives[…] (5)…the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European offshore marine site or European site (as the case may be)'.

84. The Habitat Regulations also require that (e.g. Regulation 28 of the Conservation of Offshore Marine Habitats and Species Regulations 2017):

'(3) A person applying to a competent authority for any consent, permission or other authorisation for a plan or project in the offshore marine area must provide such information as the competent authority may reasonably require (a) to enable it to determine whether an assessment under paragraph (1) is required; or (b) for the purposes of the assessment under paragraph (1)'.

3.4. The HRA Process

85. In the UK, the requirements of the Habitats Regulations are extended to consider the potential effect of a plan or project on Ramsar sites (as identified under the Ramsar Convention on Wetland of International Importance). Despite recent changes to the Habitats Regulations post EU Exit, the approach to HRA remains unchanged (Scottish Government, 2020). This HRA assessment has been carried out with reference to the general European Commission (EC) guidance on HRA (European Commission, 2001), general guidance on HRA published by the UK Government in 2021 (UK Government, 2021) (hereafter referred to as 'joint guidance'). This assessment also considered guidance from the MMO (2014).

[5] As there are no aspects of the Cambois Connection within Scottish territorial waters (0-12 nm), the Conservation (Natural Habitats, &c.) Regulations 1994 are not applicable.

86. The Project is not a Nationally Significant Infrastructure Project (NSIP) and therefore is not subject to the Planning Act 2008 nor will it be consented through a Development Consent Order. Notwithstanding, the stages outlined in the Planning Inspectorate (PINS) Advice Note 10 (The Planning Inspectorate, 2022) can be used as a useful source of staged guidance. This guidance is not mandatory or statutory, however it will be followed voluntarily to inform the HRA process (in the absence of any other appropriate similar guidance it is considered appropriate to follow for the Project).

87. Joint guidance (UK Government, 2021) has identified a three-stage process to HRA assessment, as outlined below. It may not be necessary to complete all stages, depending on the conclusion reached at each stage. These stages are:

- Stage One: HRA Screening for Likely Significant Effects;
- Stage Two: Report to Inform Appropriate Assessment; and
- Stage Three: Derogation.

88. Whilst the PINS guidance (The Planning Inspectorate, 2017) and the joint guidance (UK Government, 2021) have discrete differences, they are considered complimentary to each other and both have been used to inform this HRA Screening. At this point, this HRA Screening Report has been prepared in support of Stage One of the HRA process. If required as a result of Stage One, Stage Two will be completed alongside the ES, with the results presented in full as part of the RIAA.

3.4.1. Stage One: HRA Screening for Likely Significant Effects

89. The purpose of Stage One is to identify European Sites which have potential connectivity with the Project and to identify which aspects of the Project, in the absence of secondary mitigation (see section 3.4.4), have the potential to result in pathways for LSE[6] on the qualifying features and conservation objectives of a European Site, either alone or in-combination with other plans or projects. Where a potential pathway for LSE is identified, these sites will be taken forward for further assessment as part of Stage Two. Where LSE cannot be identified for a European Site, it will be ruled out for further assessment.

90. The assessment approach for Stage One adopted in this Screening Report is detailed in section 4.

3.4.2. Stage Two: Report to Inform Appropriate Assessment (RIAA)

91. As part of Stage Two, it is required that each LSE of the Project is considered alone and in-combination with other existing or planned projects and plans within the zone of influence (ZOI)[7] on the integrity of the European Sites screened in for assessment during Stage One. The habitats and species of qualifying interest and the conservation objectives of the European Site should be considered as part of the assessment.

[6] A significant effect should be considered likely if it cannot be excluded on the basis of objective information and it might undermine a site's conservation objectives (UK Government, 2019).

[7] Where the ZOI is defined as the spatial area over which receptors may be affected by biophysical changes as a result of the Project and associated activities, a definition which is in accordance with the CIEEM guidance for ecological impact analysis (CIEEM, 2019). Whilst it is acknowledged that this definition is specific to and derived from EIA guidance, it is considered appropriate to application within HRA screening.

3.4.3. Stage Three: Derogation

92. If it cannot be concluded that no 'adverse effects on the integrity (AEOI) of a European Site, the site will be taken forward for consideration as part of Stage Three. There are three tests at this stage to be followed in order: 1) consideration of alternative solutions; 2) consideration of Imperative Reasons of Overriding Public Interest (IROPI); and 3) application of compensatory measures. Each test must be passed for each relevant European Site for a derogation to be granted.

3.4.4. Mitigation

93. This HRA Screening Report has been prepared in consideration of relevant case law concerning the Habitats Regulations, including the judgement of the European Court of Justice in the People Over Wind and Sweetman case in 2018 (Case C323/17) which clarified the stage in a HRA process when mitigation measures can be taken into account when assessing impacts on a European site.

94. This case stated that:

'…in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications, for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site' (Paragraph 40).'

95. Following the judgement of Case C323/17, NatureScot (formerly Scottish Natural Heritage (SNH)) provided guidance relating to how mitigation should be considered as part of the HRA process in Scotland (SNH, 2019). NatureScot interpreted the judgement from the European Court of Justice as stating that mitigation measures that intend to avoid or reduce harmful effects to a European Site cannot be considered at the screening stage. However, embedded mitigation measures which are not specifically designed to avoid or reduce effects on a European Site, but do so incidentally, can be considered. Therefore, there must be a distinction between these two types of mitigation.

96. In response to this guidance, this HRA Screening Report does not consider mitigation measures that are specifically implemented to reduce or avoid effects on a European Site. Measures which the Applicant would adopt as a matter of course and which are not focused on the management of potential effects but incidentally reduce or avoid effects on European Sites are considered for undertaking Screening for LSE; this is consistent with the approach agreed with Statutory Nature Conservation Bodies' (SNCBs) for the BBWF (SSER, 2022c). An example of this type of measure includes compliance with the International Convention for the Prevention of Pollution from Ships (MARPOL) regulations. The Applicant would be committed to ensuring compliance with these regulations and whilst they may incidentally reduce potential effects, they are not specifically being adopted to manage effects on European Sites.

4. Approach to HRA Stage One - Screening for Likely Significant Effects

97. This section applies to both the Marine Scheme (in Scottish water and English waters) and Onshore Scheme.

4.1. Screening Process

98. This section describes the assessment approach adopted throughout this HRA Screening Report. European Sites and their qualifying features which will be assessed as part of this HRA Screening Report include:

- SACs designated for Annex I habitats;
- SACs designated for diadromous fish species and features;
- SACs designated for marine mammal species and features; and
- SPAs and Ramsar Sites designated for ornithological species and features.

4.1.1. Identification of European Sites and Features with Connectivity to the Project

99. The European Sites that will be considered in this report are those which are deemed to have potential connectivity with the Project. The identification of these sites has been completed in line with the following process:

- Identification of the range of potential effects of the Project on a European Site, its qualifying features and conservation objectives and the identification of any potential pathways for LSE; and
- Determination of potential connectivity of these European Sites with the Project, i.e., whether qualifying features or conservation objectives within the boundary of the European Site will be impacted by activities associated with the Project outside of the European Site boundary. It is acknowledged that certain qualifying species, specifically mobile species, can - and will - move outside the boundaries of a European Site - due to migration or foraging for example - and still be impacted by the Project, which also represents connectivity between the Project and a European Site.

100. Any potential connectivity between the Project and a European Site will be influenced by the nature of the receptor being assessed. The foraging, behavioural, breeding or migratory characteristics of a species will influence the potential pathways for LSE on the qualifying species. Each receptor topic considered as part of this HRA Screening Report has been assessed on a case-by-case basis. The distance measured from the Project to a European Site has been measured from the outer boundary of the Project to the outer boundary of the European Site.

4.1.2. Determination of Likely Significant Effects

101. Where a potential pathway for LSE between the Project and a European Site is identified, further assessment of the potential impacts can result in a conclusion of no LSE. The determination of no LSE can be drawn if:

- The qualifying feature(s) or species of interest would, as a result of their foraging, behavioural, breeding or migratory characteristics, be determined as having limited sensitivity to the activities proposed as part of the Project; and/or
- The qualifying feature(s) or species of interest are likely to be affected by activities proposed as part of the Project, however these affects will not impact the integrity of the conservation objectives of the European Site.

102. The assessment of no LSE considers the effect pathway and the nature of the qualifying feature(s) or species. Where it is concluded that there is no potential for LSE on a European Site, its qualifying features or conservation objectives, the European Site will be screened out for further assessment.

5. Step 1: Identification of European Sites and features with connectivity to the Project

103. The following assessment of LSE considers the European Sites with potential connectivity to the Project and the pathways which have the potential to result in LSE on qualifying features or species. Table 5-3 summarises the European Sites, qualifying features and species and potential pathways for LSE arising from activities associated with the Project and has made a distinction between which aspects of the project (the Marine Scheme in Scottish waters, the Marine Scheme in English waters, and the Onshore Scheme) are applicable to each European Site.

5.1. SACs Designated for Annex I Habitats

104. The assessment for sites designated for the conservation of Annex I habitats considers:

- Any European Sites with boundaries which directly overlap with the boundary of the Project; and
- Any European Site which is within the ZOI of activities proposed as part of the Project.

105. When considering the ZOI for Annex I habitats, any activities associated with the Project which may result in potential pathways for LSE are anticipated to be highly localised and temporary. Potential impact pathways are considered to be:

- Temporary habitat loss or disturbance, and long term habitat loss – the ZOI for this pathway is dependent on the seabed or land preparation requirements and selection of individual construction tools but it would be limited to an area of seabed or land within the footprint of the Project (i.e., the boundary presented within Figure 1-1);
- Increases in suspended sediment concentrations and sediment deposition – construction tools can lead to turbid plumes which, depending on the nature of the seabed conditions along the route and sediment particle size, can persist for hours to sometimes days, depending on the specific fraction encountered along the route;
- Release of sediment bound contaminants – during construction there is a risk of resuspension of buried contaminants;
- Removal of hard structures due to pre-installation route preparation activities; and
- During decommissioning, loss of species or habitats that have colonised Project infrastructure (e.g. cable protection material, where required).

106. Depending on the location of the activity within the Project boundary, these impacts can extend into adjacent waters which form part of a European Site (i.e., hydrological linkage whereby, for example, the release of sediment bound contaminants can extend into adjacent waters). Based on a combination of professional judgement and experience from recent comparable infrastructure projects, the potential ZOI of impacts associated with the Project on Annex I Habitats is considered to be limited to the area within 2 km of the Project. This 2 km ZOI is based on the likely impact pathways for Annex I habitats and the ZOI from the Project.

107. Durham Coast SAC – designated for vegetated sea cliffs – was identified by Natural England and requested for consideration within this HRA Screening Report for the Project. Following consideration of potential pathways for LSE on Annex 1 habitats and the ZOI, it is concluded that there are no pathways for potential LSE from the Project on Durham Coast SAC due to the nature of Project activities and the intervening distance (approximately 20 km), and it has therefore been screened out of further consideration.

108. There are no terrestrial or marine SACs designated for the conservation of Annex I habitats within the ZOI. For this reason, there is not considered to be any potential pathways of LSE on SACs designated for Annex I habitats.

5.2. SACs Designated for Diadromous Fish Species and Features

109. The assessment of sites designated for the conservation of diadromous fish species or features considers:

- European Sites which have a boundary which directly overlaps with the boundary of the Project; and
- Sites which are designated for diadromous fish species whose migratory routes have the potential to interact with the ZOI for the Project.

110. 'Diadromous' is a term used to describe species which spend a part of their lifecycle in freshwater and part of it in the marine environment. There are two categories of diadromous fish – catadromous and anadromous. Catadromous fish hatch or are born in the marine environment, but then migrate to freshwater environments where they spend the majority of their lives reaching maturity. Anadromous fish species are born in freshwater habitats but immediately swim to sea where they spend most of their lives, before returning to freshwater rivers to spawn.

111. Given the mobile nature of diadromous fish species, this assessment considers SACs designated for the conservation of diadromous fish species which have potential connectivity with both the Project and considers potential pathways for LSE on SACs designated for diadromous fish species and features as part of the marine and terrestrial environment.

112. Potential impact pathways for LSE on SACs designated for diadromous fish species and features are considered to be limited to the Marine Scheme and include:

- Increases in suspended sediment concentrations and sediment deposition – construction tools can lead to turbid plumes which, depending on the nature of the seabed conditions along the route and sediment particle size, can persist for hours and sometimes days, depending on the specific fraction encountered along the route;
- Underwater noise – the sources of underwater noise relevant to the Project include pre-installation surveys, the offshore export cable installation process (including the use of any subsea tooling), placement of cable protection where required, underwater noise arising from installation vessels and operations around the landfall area at Cambois; and
- Electromagnetic fields (EMF) from offshore export cables during operation.

113. There are not considered to be any potential impact pathways between the Onshore Scheme and SACs with diadromous fish as qualifying features.

114. Based on anticipated impact pathways for diadromous fish species, the ZOI of impacts associated with the Project on SACs designated for diadromous fish species and features is considered to be limited to the area within 5 km of the Marine Scheme (as stated above, impact pathways are considered to be limited to those arising from the Marine Scheme only). This is based on industry guidance (JNCC, 2020)[8], professional judgment and experience from recent comparable infrastructure projects, and is considered to be highly precautionary.

[8] It is important to note that this industry guidance is designed to be used to support the assessment of significance associated with geophysical survey activities developed in relation to the Southern North Sea SAC and a specific marine mammal – the harbour

5.3. SACs Designated for Marine Mammal Species and Features

115. This section outlines the approach to the identification of sites designated for the conservation of marine mammal species. The initial screening criteria that have been used to identify European Sites with potential connectivity with the Project include:

- European Sites which have a boundary that will directly overlap with the boundary of the Project; and
- Sites which are designated for marine mammal species which may interact with the ZOI for the Project.

116. Potential impact pathways for LSE on SACs designated for marine mammal species and features are considered to be:

- Temporary disturbance to prey species, which may indirectly impact foraging ability and success of marine mammals;
- Changes to water quality, specifically increases in suspended sediment concentrations and sediment deposition – construction tools can lead to turbid plumes which, depending on the nature of the seabed conditions along the route and sediment particle size, can persist for hours to sometimes days dependent on the fraction encountered along the route;
- Underwater noise – principally, the sources of underwater noise relevant to the Project include pre-installation surveys, the actual cable installation process itself (including the use of any subsea tooling), placement of cable protection where required, underwater noise arising from installation vessels and operations around the landfall area at Cambois; and
- Disturbance and displacement from vessel presence – during both construction and operation and maintenance there is the potential for Project vessels to cause disturbance through vessel movement, noise or vessel lighting. The assessment of marine mammals will also consider the Inter Agency Marine Mammal Working Group (IAMMWG) Management Unit (MU) and Special Committee On Seals (SCOS) seal management units (SMU) which will overlap with the spatial area of the Project

117. Based on anticipated impact pathways for marine mammal species, the ZOI of impacts associated with the Project on SACs designated for marine mammal species is considered to be limited to the area within 5 km of the Project. This is based on industry guidance (JNCC, 2020) for the assessment of significance associated with geophysical survey activities developed in relation to the Southern North Sea SAC, professional judgment and experience from recent comparable infrastructure projects, and is considered to be highly precautionary.

118. This assessment of SACs designated for the conservation of marine mammal species and features considers those which are either wholly- (i.e., harbour porpoise and bottlenose dolphin) or semi- (i.e., European otter) reliant on the marine environment for a period of their life cycle. For this reason, the following assessment will consider potential pathways for LSE on SACs designated for marine mammal species and features as part of the marine and terrestrial environment.

porpoise (*Phocoena phocoena*); the use of this ZOI is considered highly precautionary for fish species based on the extent and nature of sources of underwater noise.

5.4. SPAs Designated for Ornithological Species and Features

119. This section outlines the approach to the identification of sites designated for the conservation of ornithological species and features. The initial screening criteria that has been used to identify ornithological species and features with potential connectivity with the Project include:

- A European Site that has an ornithological species or feature as at least one of its qualifying features and that directly overlaps with the Project;
- A European Site that has an ornithological species or feature as at least one of its qualifying features where the mean maximum foraging range of the species (km) + 1 standard deviation (SD) of the mean (±1 SD) overlaps with the Project, in accordance with the standard advice from JNCC (2012) and contemporaneous regulatory guidance associated (Woodward et al, 2019); and
- A European Site that has an ornithological species or feature as at least one of its qualifying features where the migratory range of the species overlaps with the Project.

120. The standard advice from JNCC on the assessment of potential connectivity between a plan or development and ornithological features should consider the mean maximum foraging range of a species ± 1 SD. It is recognised that seabirds associated with other SPAs may also have connectivity with the Project (i.e., species with extensive mean maximum foraging ranges such as Manx shearwater and gannet), however it is not possible to attribute these species to a specific European Site. Additionally, taking this example further, existing data suggests that Manx shearwater have a low foraging density within the North Sea (Stone, Webb and Tasker, 1994) and densities of gannet declining with distance from the associated colony (Camphuysen C.J., 2011).

121. The assessment of ornithological species and features considers SPAs which are wholly or partially within the marine environment and migratory terrestrial species which may use land associated with the Onshore Scheme as feeding, roosting or resting ground (constituting ‘functionally linked land’).

122. Bird species present in the UK have been broadly categorised into four high-level groups for the purpose of this HRA screening assessment. These groups are:

- Breeding seabirds;
- Non-breeding seabirds;
- Migratory seabirds; and
- Migratory terrestrial birds (including water birds and waders).

123. Potential impact pathways for LSE on SPAs designated for ornithological species and features are considered to be:

- Disturbance and displacement from vessel / plant presence– during construction and operation there is the potential for operation of Project vessels / plant equipment to cause disturbance through visual disturbance, noise or lighting, though this is considered to be temporary and short-term during construction, and limited during operation due to the nature of maintenance works anticipated;
- Direct habitat loss during construction or operation and maintenance – considering the relatively small footprint of the Project in comparison to the extent of marine and onshore habitats available nearby, it is not considered that any extent of habitat loss as a result of the Project would have effects on SPA ornithological populations. For the construction phase specifically, this is considered temporary and short-term; and
- Changes to prey availability – indirect impacts may occur as a result of changes in prey distribution, availability or abundance, through both the construction phase and operation.

124. To determine the potential for connectivity for ornithological features, the criteria outlined in paragraph 119 was used to identify European Sites to be taken forward for the assessment of potential pathways for LSE.

5.4.1. Breeding Seabirds

125. There are a number of breeding seabird species associated with the coastal and marine habitats of the UK, with colonies of breeding seabirds distributed along all coastlines. While associated with breeding colonies, seabirds may forage at great distances (with foraging ranges dependent on the species and nature of the prey). The Project could potentially have effects on seabirds that are qualifying features of a number of SPAs, as the area within which the Project is located may be utilised by these seabirds when foraging or commuting.

126. When establishing the distribution of breeding seabirds, it is important to consider their mean maximum foraging ranges to identify the likely presence of a species within a marine area. To determine the potential for connectivity, several SPAs on the east coast of Scotland and England were considered[9] to identify a 'proxy' group of seabird species whose foraging ranges could then be identified, so that potential connectivity with European Sites could be identified. Those qualifying seabird species for those SPAs and their mean-max foraging ranges are provided in Table 5-1.

[9] Including but not limited to: Northumberland Marine SPA, Northumbria Coast SPA/Ramsar Site, Outer Firth of Forth and St Andrews Bay Complex SPA, Coquet Island SPA, Farne Islands SPA, Lindisfarne SPA/Ramsar

Table 5-1 Mean maximum breeding season foraging ranges for qualifying seabird species (Woodward *et al*., 2019) also showing 1SD.

Qualifying Bird Species	Mean Maximum Foraging Range (km)	Qualifying Bird Species	Mean Maximum Foraging Range (km)
Kittiwake (*Rissa tridactyla*)	156.1 ± 144.5	Guillemot (*Uria aalge*)	73.2 ± 80.5
Black-headed gull (*Chroicocephalus ridibundus*)	18.5*	Fulmar (*Fulmarus glacialis*)	542.3 ± 657.9
Common gull (*Larus canus*)	50.0*	Razorbill (*Alca torda*)	88.7 ± 75.9
Great black-backed gull (*Larus marinus*)	73.0*	Puffin (*Fratercula arctica*)	137.1 ± 128.3
Herring gull (*Larus argentatus*)	58.8 ± 26.8	Red-throated diver (*Gavia stellata)*	9.0*
Lesser black-backed gull (*Larus fuscus*)	127.0 ± 109	Manx shearwater (*Puffinus puffinus*)	1346.0 ± 1018.7
Little tern (*Sternula albifrons*)	5.0*	Cormorant (*PhalacrocoracidaePhalacrocorax carbo*)	25.6 ± 8.3
Common tern (*Sterna hirundo*)	17.6 ± 9.1	Gannet (*Morus bassanus*)	315.2 ± 194.2
Arctic tern (*Sterna paradisea*)	25.7 ± 14.8		
*No SD available for mean maximum value			

5.4.2. Non-breeding Seabirds

127. During the non-breeding season, seabird distribution is extensive throughout coastal and marine environments, with foraging activities and migratory routes located throughout and between exclusive economic zones. It is anticipated that, in the non-breeding season, population densities of seabird species will be lower (when assessed against anticipated size of breeding colonies associated with a European Site during the breeding season).

5.4.3. Migratory Seabirds

128. Seabird species that occur within an SPA only during their breeding season before returning to sea or moving on to other habitats are considered migratory species. These species have some potential to interact with the Project as a result of their migratory routes or through the use of functionally linked land associated with the Onshore Scheme.

5.4.4. Migratory Terrestrial Birds

129. The movement of migratory terrestrial birds (i.e., waders, waterfowl, raptors and passerines) is characterised by long distance flights between coastal or terrestrial habitats during periods of unfavourable weather or seasons. The majority of these migrations occur across broad fronts at high altitudes and only when birds (such as waders and waterfowl) encounter unfavourable weather conditions will they descend to lower heights and reach a suitable staging area. There are two migratory terrestrial birds which are qualifying features of the nearby Northumberland Marine SPA and Ramsar that have potential connectivity to the Onshore Scheme and Marine Scheme. These have been identified through Wetland Bird Survey (WeBS) survey counts undertaken over a five-year period at Cambois, as shown in Table 5-.

Table 5-2 Migratory terrestrial birds annual peak numbers for the Cambois to Newbiggin survey area (Wetland Bird Survey (WeBS), 2022)

Species	Year				
	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Turnstone (*Arenaria interpres*)	0	5	29	38	42
Purple Sandpiper (*Calidris maritima*)	0	0	29	5	31

5.5. Transboundary Effects

130. As part of this HRA screening assessment, the potential for transboundary effects has been considered in order to ensure all obligations of each of the competent authorities can be fulfilled.

131. The nature of the Project as described above means that the ZOIs associated with both the Marine Scheme and the Onshore Scheme are highly limited. Considering the only aspect of the Project which could foreseeably have the potential for any form of transboundary effect (the

Marine Scheme), the maximum ZOI is ~ 5 km (an initial highly precautionary estimate used to inform the consideration of underwater noise).

132. Published governmental guidance recognises that the potential for transboundary effects is usually anticipated in the case of generating stations and specifically, large-scale offshore wind developments (DECC, 2015; The Planning Inspectorate, 2022). The Project is not a generating station and will not give rise to activities which could foreseeably lead to a transboundary effect in all phases of development.

133. The HRA screening assessment undertaken by the Applicant for the BBWF considered the potential for transboundary effects on 19 transboundary sites (SSER, 2021). The BBWF HRA screening assessment concluded that for all of the 19 transboundary sites considered, all relevant effect-pathways were extremely weak, such that only negligible (if even detectable) effects would be apparent. As a confirmatory exercise, the 19 sites were all re-reviewed by the Applicant for the Project and owing to the limited suite of potential impacts associated with the Project and the factors described above, no transboundary effects were identified.

134. On this basis, transboundary effects are not considered further within this HRA screening document.

5.6. Summary of European Sites Considered for Assessment

135. All European Sites (Table 5-3) located within the ZOIs and those that are considered to have potential connectivity for the qualifying species defined in sections 5.1 to 5.4 above have been considered as part of this HRA screening assessment, including those which do not directly overlap with the spatial footprint of the Marine Scheme and Onshore Scheme. Furthermore, additional sites have been included to consider the mobile nature of the fish, marine mammal and bird species for which a number of sites are designated, and which have the potential to interact with the Project beyond the ZOI. These European Sites have also been identified to consider the impacts of potential pathways which extend beyond the footprint and defined ZOI of the Onshore Scheme and Marine Scheme. Additionally, European Sites that have been identified by consultees, such as Natural England, during pre-application engagement have also been included for Step 2. A map of relevant European Sites is presented in Figure 5-1.

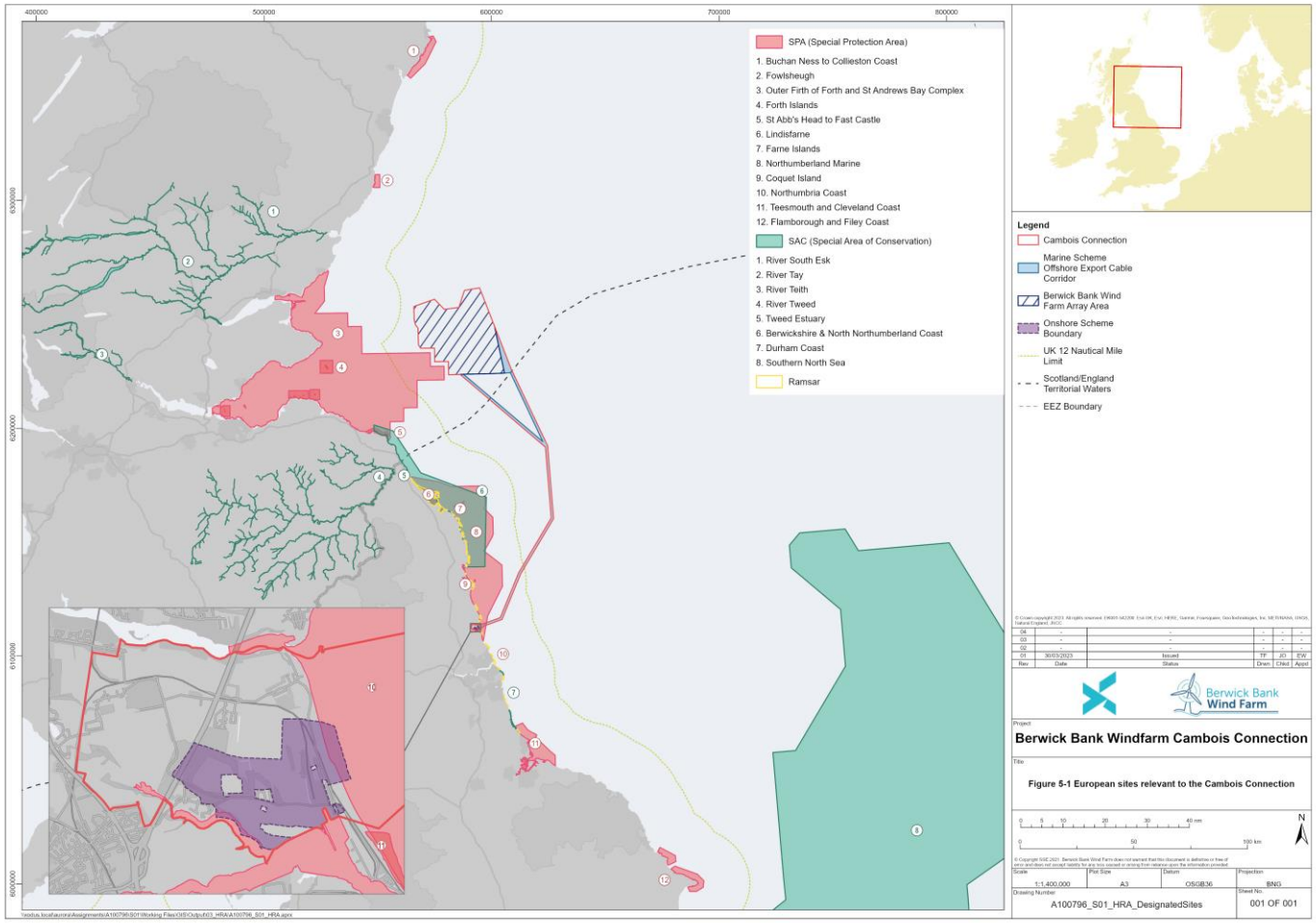

Figure 5-1 European Sites relevant to the Cambois Connection

Table 5-3 Summary of European Sites considered for HRA screening

European Site	Approximate Distance and Direction to European Site (km)[10]	Qualifying Features and/or Species	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
SACs Designated for Annex I Habitats					
Durham Coast SAC[11]	117 km (S) from Scottish Marine Scheme 18 km (W) from English Marine Scheme 18 km (N) from Onshore Scheme	• Vegetated sea cliffs	x	x	x
SACs Designated for Diadromous Fish Species and Features					
Tweed Estuary SAC	46 km (W) from Scottish Marine Scheme 48 km (W) from English Marine Scheme 73 km (N) from Onshore Scheme	• River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*)	✓	✓	x

[10] The distance measured from the Project to a European Site has been measured from the outer boundary of the Project to the outer boundary of the European Site and represents the closest approximate distance between the boundaries.

[11] As detailed in section 5.1, there are no pathways for potential LSE from the Project on Durham Coast SAC and it has been screened out of further consideration, however it is included within this summary table for completeness and to address Natural England's request for consideration.

European Site	Approximate Distance and Direction to European Site (km)[10]	Qualifying Features and/or Species	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
River Tweed SAC	48 km (SW) from Scottish Marine Scheme 40 km (W) from English Marine Scheme 40 km (N) from Onshore Scheme	• Atlantic salmon (*Salmo salar*) • River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*)	✓	✓	x
River South Esk SAC	50 km (NW) from Scottish Marine Scheme 101 km (NW) from English Marine Scheme 183 km (N) from Onshore Scheme	• Atlantic salmon (*Salmo salar*) • Freshwater pearl mussel (*Maragaritifera margaritifera*)	✓	✓	x
River Tay SAC	61 km (NW) from Scottish Marine Scheme 109 km (NW) from English Marine Scheme 173 km (N) from Onshore Scheme	• Atlantic salmon (*Salmo salar*) • River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*)	✓	✓	x
River Teith SAC	127 km (W) from Scottish	• Atlantic salmon (*Salmo salar*)	✓	✓	x

European Site	Approximate Distance and Direction to European Site (km)[10]	Qualifying Features and/or Species	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Marine Scheme 157 km (NW) from English Marine Scheme 185 km (N) from Onshore Scheme	• River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*)			
SACs Designated for Marine Mammals Species and Features					
Berwickshire and North Northumberland Coast SAC	35 km (S) from Scottish Marine Scheme 18 km (W) from English Marine Scheme 26 km (N) from Onshore Scheme	• Grey seal (*Halichoerus grypus*)	✓	✓	x
River Tweed SAC	48 km (SW) from Scottish Marine Scheme 40 km (W) from English Marine Scheme 40 km (N) from Onshore Scheme	• Otter (*Lutra lutra*)	✓	✓	x
River Tay SAC	61 km (NW) from Scottish	• Otter (*Lutra lutra*)	✓	x	x

European Site	Approximate Distance and Direction to European Site (km)[10]	Qualifying Features and/or Species	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Marine Scheme 109 km (NW) from English Marine Scheme 173 km (N) from Onshore Scheme				
Southern North Sea SAC	144 km (SE) from Scottish Marine Scheme 104 km (SE) from English Marine Scheme 140 km (SE) from Onshore Scheme	• Harbour porpoise (*Phocoena phocoena*)	✓	✓	x
SPAs Designated for Ornithological Species and Features					
Northumberland Marine SPA	38 km (S) from Scottish Marine Scheme 0 km (direct overlap) with English Marine Scheme 0 km (direct overlap) with Onshore Scheme	• Guillemot (*Uria aalge*) (Breeding) • Common tern (*Sterna hirundo*) (Breeding) • Little tern (*Sterna albifrons*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Arctic tern (*Sterna paradisaea*) (Breeding) • Puffin (*Fratercula arctica*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding)	✓	✓	✓

European Site	Approximate Distance and Direction to European Site (km)[10]	Qualifying Features and/or Species	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
		• Seabird assemblage (breeding) including the components: - Cormorant (*Phalacrocoracidae*) - Shag (*Gulosus aristotelis*) - Black-headed gull (*Chroicocephalus ridibundus*) - Kittiwake (*Rissa tridactyla*)			
Northumbria Coast SPA/Ramsar Site	48 km (S) from Scottish Marine Scheme 0 km (direct overlap) with English Marine Scheme 0 km (direct overlap) with Onshore Scheme	• Little tern (*Sterna albifrons*) (Breeding) • Turnstone (*Arenaria interpres*) (Non-breeding) • Purple sandpiper (*Calidris maritima*) (Non-breeding) • Arctic tern (*Sterna paradisaea*) (Breeding)	✓	✓	✓
Outer Firth of Forth and St Andrews Bay Complex SPA	2 km (W) from the Scottish Marine Scheme 22 km (W) from the English Marine Scheme 92 km (N) from the Onshore Scheme	• Common tern (*Sterna hirundo*) (Breeding) • Arctic tern (*Sterna paradisea*) (Breeding) • Red-throated diver (*Gavia stellata*) (Non-breeding) • Slavonian grebe (*Podiceps auritus*) (Non-breeding) • Common eider (*Somateria mollissima*) (Non-breeding) • Northern gannet (*Morus bassanus*) (Breeding) • Little gull (*Hydrocoloeus minutus*) (Non-breeding) • Waterfowl assemblage (non-breeding) including the components:	✓	✓	x

European Site	Approximate Distance and Direction to European Site (km)[10]	Qualifying Features and/or Species	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
		- Long-tailed duck (*Clangula hyemalis*) - Common scoter (*Melanitta nigra*) - Velvet scoter (*Melanitta fusca*) - Common goldeneye (*Bucephala clangula*) - Red- breasted merganser (*Mergus serrator*) • Seabird assemblage (breeding) including the components: - Atlantic puffin (*Fratercula arctica*) - Kittiwake (*Rissa tridactyla*) - Manx shearwater (*Puffinus puffinus*) - Guillemot (*Uria aalge*) - Herring gull (*Larus argentatus*) • Seabird assemblage (non-breeding) including the components: - Black-headed gull (*Chroicocephalus ridibundus*) - Common gull (*Larus canus*) - Herring gull (*Larus argentatus*) - Guillemot (*Uria aalge*) - Shag (*Gulosus aristotelis*) - Kittiwake (*Rissa tridactyla*) - Razorbill (*Alca torda*)			
Coquet Island SPA	79 km (S) from the Scottish Marine Scheme 16 km (NW) from the English	• Common tern (*Sterna hirundo*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding) • Arctic tern (*Sterna paradisaea*) (Breeding)	✓	✓	x

European Site	Approximate Distance and Direction to European Site (km)[10]	Qualifying Features and/or Species	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Marine Scheme 20 km (N) from the Onshore Scheme	• Seabird assemblage (Breeding) including the components: - Atlantic puffin (*Fratercula arctica*) - Kittiwake (*Rissa tridactyla*) - Black- headed gull (*Chroicocephalus ridibundus*) - Fulmar (*Fulmarus glacialis*) - Herring gull (*Larus argentatus*) - Lesser black-backed gull (*Larus fuscus)*			
Farne Islands SPA	46 km (S) from the Scottish Marine Scheme 35 km (W) from the English Marine Scheme 52 km (N) from the Onshore Scheme	• Guillemot (*Uria aalge*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding) • Common tern (*Sterna hirundo*) (Breeding) • Arctic tern (*Sterna paradisaea*) (Breeding) • Seabird assemblage (Breeding) including the components: - Kittiwake (*Rissa tridactyla*) - Shag (*Gulosus aristotelis*) - Cormorant (*Phalacrocoracidae*) - Atlantic puffin (*Fratercula arctica*) - Black- headed gull (*Chroicocephalus ridibundus*) - Fulmar (*Fulmarus glacialis*) - Great black-backed gull (*Larus marinus)* - Lesser black-backed gull (*Larus fuscus)*	✓	✓	x

European Site	Approximate Distance and Direction to European Site (km)[10]	Qualifying Features and/or Species	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
		- Herring gull (*Larus argentatus*) - Razorbill (*Alca torda*)			
St Abb's Head to Fast Castle SPA	37 km (SW) from Scottish Marine Scheme 46 km (W) from English Marine Scheme 90 km (N) from Onshore Scheme	• Seabird assemblage (Breeding) including the components: - Guillemot (*Uria aalge*) - Razorbill (*Alca torda*) - Herring gull (*Larus argentatus*) - Shag (*Gulosus aristotelis*) - Kittiwake (*Rissa tridactyla*)	✓	✓	x
Lindisfarne SPA/Ramsar Site	46 km (SW) from Scottish Marine Scheme 42 km (W) from English Marine Scheme 52 km (N) from Onshore Scheme	• Bar-tailed godwit (*Limosa lapponica*) (Non-breeding) • Common scoter (*Melanitta nigra*) (Non-breeding) • Dunlin (*Calidris alpina*) (Non-breeding) • Eider (*Somateria mollissima*) (Non-breeding) • Golden plover (*Pluvialis apricaria*) (Non-breeding) • Grey plover (*Pluvialis squatarola*) (Non-breeding) • Greylag goose (*Anser anser*) (Non-breeding) • Light-bellied brent goose (*Branta bernicla hrota*) (Non-breeding) • Little tern (*Sterna albifrons*) (Non-breeding) • Long-tailed duck (*Clangula hyemalis*) (Non-breeding) • Red-breasted merganser (*Mergus serrator*) (Non-breeding)	✓	✓	x

European Site	Approximate Distance and Direction to European Site (km)[10]	Qualifying Features and/or Species	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
		• Redshank (*Tringa tetanus*) (Non-breeding) • Ringed plover (*haradriusCharadrius hiaticula*) (Non-breeding) • Roseate tern (*Sterna dougallii*) (Non-breeding) • Sanderling (*Calidris alba*) (Non-breeding) • Shelduck (*Tadorna tadorna*) (Non-breeding) • Waterbird assemblage (Non-breeding) • Whooper swan (*Cygnus cygnus*) (Non-breeding) • Wigeon (*Mareca uratus*) (Non-breeding)			
Teesmouth and Cleveland Coast SPA	142 km (S) from Scottish Marine Scheme 45 km (S) from English Marine Scheme 45 km (S) from Onshore Scheme	• Little tern (*Sterna albifrons*) (Breeding) • Common tern (*Sterna hirundo*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Redshank (*Tringa tetanustotanus)* (Non-breeding) • Waterbird assemblage (Non-breeding)	✓	✓	x
Forth Islands SPA	38 km (W) from Scottish Marine Scheme 70 km (W) from English Marine Scheme 121 km (N) from	• Gannet *(Morus bassanus)* (Breeding) • Puffin (*Fratercula arctica*) (Breeding) • Lesser black-backed gull (*Larus fuscus*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding) • Common tern (*Sterna hirundo*) (Breeding)	✓	✓	x

European Site	Approximate Distance and Direction to European Site (km)[10]	Qualifying Features and/or Species	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Onshore Scheme	• Arctic tern (*Sterna paradisea*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Shag (*Gulosus aristotelis*) (Breeding) • Seabird assemblage (Breeding) including the components: - Guillemot (*Uria aalge*) - Razorbill (*Alca torda*) - Kittiwake (*Rissa tridactyla*) - Herring gull (*Larus argentatus*) - Cormorant (*Phalacrocoracidae*)			
Fowlsheugh SPA	54 km (N) from Scottish Marine Scheme 99 km (N) from English Marine Scheme 197 km (N) from Onshore Scheme	• Seabird assemblage (Breeding) including the components: - Razorbill (*Alca torda*) - Fulmar (*Fulmarus glacialis*) - Herring gull (*Larus argentatus*) - Kittiwake (*Rissa tridactyla*) - Guillemot (*Uria aalge*)	✓	✓	x
Buchan Ness to Collieston Coast SPA	96 km (N) from Scottish Marine Scheme 136 km (N) from English Marine Scheme 243 km (N) from	• Seabird assemblage (Breeding) including all the components: - Fulmar (*Fulmarus glacialis*) - Herring gull (*Larus argentatus*) - Shag (*Gulosus aristotelis*) - Kittiwake (*Rissa tridactyla*) - Guillemot (*Uria aalge*)	✓	✓	x

European Site	Approximate Distance and Direction to European Site (km)[10]	Qualifying Features and/or Species	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Onshore Scheme				
Flamborough and Filey Coast SPA	211 km (S) from Scottish Marine Scheme 122 km (S) from English Marine Scheme 125 km (S) from Onshore Scheme	• Kittiwake (*Rissa tridactyla*) (Breeding) • Gannet (*Morus bassanus*) (Breeding) • Razorbill (*Alca torda*) (Breeding) • Guillemot (*Uria aalge*) (Breeding) • Seabird assemblage (Breeding) including the components: - Fulmar (*Fulmarus glacialis*) - Atlantic puffin (*Fratercula arctica*) - Herring gull (*Larus argentatus*) - Shag (*Gulosus aristotelis*) - Cormorant (*Phalacrocoracidae*)	✓	✓	x

6. Step 2: Identification of Potential Impacts on Relevant Sites and Qualifying Features

136. Building upon the sites identified within section 5, this section of the assessment identifies the potential impact pathways on relevant European Sites and their qualifying features arising from the Project. Table 6-1 summarises the potential impact pathways for LSE on designated sites taken forward for Step 2 and their applicability to the Marine Scheme for both its Scottish and English sections, and to the Onshore Scheme.

Table 6-1 Summary of potential impact pathways for LSE on designated species or features which have been taken forward for Step 2

Impact Pathway	Impact Descriptor	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme	Marine Mammals	Ornithology	Diadromous Fish
Construction Phase / Decommissioning Phase							
Disturbance and/or Displacement from Foraging or Roosting Area (onshore)	• Presence of plant equipment and machinery • Noise and light from construction activities	x	x	✓	No	Yes	No
Temporary habitat loss / disturbance (offshore)	• Abrasion/disturbance of the substrate on the surface of the seabed • Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion	✓	✓	x	Yes (prey species impacts)	Yes (prey species impacts)	No
Increases in suspended sediment concentrations and sediment deposition (Changes to water quality)	• Smothering and siltation rate changes (Light – Heavy) • Changes in suspended solids (water clarity) • Deoxygenation	✓	✓	x	Yes	Yes (prey species impacts)	Yes

Impact Pathway	Impact Descriptor	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme	Marine Mammals	Ornithology	Diadromous Fish
Release of sediment bound contaminant (Changes to water quality)	• Hydrocarbon and polyaromatic hydrocarbon (PAH) contamination. • Synthetic compound contamination (incl. pesticides, antifoulants, pharmaceuticals). • Transition elements and organo-metal (e.g. tributyl tin (TBT)) contamination.	✓	✓	x	Yes	Yes (prey species impacts)	Yes
Indirect effects (in relation to abundance or availability of prey species)	• Changes in prey distribution, availability or abundance in the marine environment.	✓	✓	x	Yes	Yes	No
Underwater Noise	• Changes to baseline noise under the surface of the sea	✓	✓	x	Yes	No	Yes
Vessel Disturbance	• Disturbance arising from light and movement	✓	✓	x	Yes	Yes	No
Vessel Collision Risk	• Risk of collision between construction vessels and animals	✓	✓	x	Yes	No	No

Impact Pathway	Impact Descriptor	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme	Marine Mammals	Ornithology	Diadromous Fish
Operation and Maintenance Phase							
Electromagnetic Field (EMF)	• Changes to magnetic fields within the vicinity of offshore export cables	✓	✓	x	No	No	Yes
Long-term habitat loss	• Habitat structure changes – removal of substratum (extraction) • Penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion • Physical change (to another seabed type) • Physical change (to another sediment type) • Physical loss (to land or freshwater habitat)	✓	✓	✓	No	Yes	Yes (Marine Scheme only)
Disturbance and displacement	• Offshore, disturbance arising from vessel light and movement • Onshore, disturbance from plant machinery and equipment	✓	✓	✓	Yes	Yes	No
Vessel Collision Risk	• Risk of collision between construction vessels and animals	✓	✓	x	Yes	No	No

6.1. Construction Phase

137. This section outlined whether potential impacts are associated with the Marine Scheme, the Marine Scheme in Scottish waters, the Marine Scheme in English waters, the Onshore Scheme or the Project as a whole.

6.1.1. Disturbance and/or Displacement from Foraging or Roosting Area (Onshore)

138. These impacts are associated with the Onshore Scheme only.

139. Disturbance and/or displacement of ornithological species or features from a foraging or roosting area may occur during construction of the Onshore Scheme through presence of plant equipment and machinery. These impacts can arise as a result of long- or short-term disturbance to and/or loss of foraging or roosting areas associated with terrestrial habitats.

140. The majority of bird species demonstrate a low to moderate sensitivity (Goodship and Furness, 2022; Atterbury et al, 2021) to disturbance and/or displacement as a result of construction activities. The Onshore Scheme is located within an area of extensive development and activity, with works of a similar nature to those proposed by the Project completed for the North Sea Link Interconnector Cable, Blyth Demonstrator wind farm and the Northumberland Energy Park (Phases 1) carried out without significant impacts arising from onshore works. The temporary displacement of limited numbers of birds which may use land within and adjacent to the Onshore Scheme is anticipated to result in short-term and temporary changes to species distribution.

141. Between 2012-2014, National Grid Ventures undertook winter and breeding bird surveys to understand the potential impacts of the North Sea Link Interconnection Cable on habitat loss or disturbance between the proposed landfall location and the proposed convertor station. Of the Northumbria Coast SPA and Ramsar qualifying species, the surveys recorded: a peak count of eight turnstone (*Arenaria interpres*) (wintering) in the intertidal habitat north of the Wansbeck Estuary, and two little tern (*Sterna albifrons*) (breeding) on the intertidal habitat at Cambois beach, however they were not nesting and there was no evidence they were breeding at this location (NorthSea Link, 2014). WeBS counts (2022) between 2015 and 2020 for these qualifying species of the Northumbria Marine SPA and Ramsar have no records for little tern, 10 (total) records for Arctic tern, and the WeBS counts for turnstone and purples sandpiper are provided in Table 5-.

142. The findings of the National Grid Ventures studies concluded that any potential foraging habitat loss would be temporary (with the total foraging habitat loss between the proposed landfall and convertor station location predicted at approximately 10-15 m wide (accounting for cable construction activities)) (NorthSea Link, 2014) and that any disturbance to designated bird species during construction activities would not be significant due to the irregular use of the shore by these birds, the short-term and temporary nature of the works, and the level of baseline disturbance from the public. Additionally it is considered that beyond the ZOI of the Onshore Scheme, there is substantial unaffected habitat available for species. Therefore, any temporary habitat loss from the Onshore Scheme is unlikely to adversely affect conservation objectives for these species.

143. Notwithstanding, there is an ongoing programme of ornithology surveys in support of consent applications for the Onshore Scheme. Furthermore, the exact landfall location and methodology has not yet been confirmed. On this basis, it is not currently possible to validate predictions from comparable cable development for all of the land associated with the Onshore Scheme.

144. At this stage and in the absence of outputs from ornithology surveys carried out in support in the Onshore Scheme and the definition of a specific landfall site, it is not possible to fully rule out the potential for LSE as a result of disturbance and/or displacement from foraging or roosting areas. On this basis, disturbance and/or displacement from foraging or roosting areas associated with the Onshore Scheme has been **screened in** for further assessment in relation to the two neighbouring European Sites (**Northumberland Marine SPA and Northumbria Coast SPA/Ramsar**).

6.1.2. Temporary Habitat Loss/Disturbance (Offshore)

145. These impacts are associated with the Marine Scheme only (in both Scottish and English waters).

146. The potential loss or change of foraging habitats associated with prey for marine mammal and ornithological species or features are primarily anticipated during construction activities for the Marine Scheme (i.e., during cable route clearance and site preparation activities and cable burial) and retrospective decommissioning activities. As detailed in Table 6-1, this impact pathways considers abrasion and disturbance of the substrate on the surface of the seabed, and penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion. It is considered that this impact pathway would only occur over the area of cable construction activities only, and therefore would only indirectly impact the prey species of marine mammals and seabirds using that area of the marine environment.

147. Disturbance due to construction works may result in a change of behaviour for seabirds and could displace them from the affected areas. This could lead to a reduction in foraging opportunities or increased energy expenditure, which may result in decreased population productivity or survival rates.

148. Marine mammal prey abundance and distribution may be impacted as a result of this disturbance from construction activities. This may indirectly result in a reduction in foraging opportunities or success in the area.

149. Any loss of habitat or disturbance due to construction activities is a temporary and relatively short-term effect, restricted only to the construction period, and therefore is unlikely to be significant for prey species for ornithological species using the marine area. Additionally it is considered that beyond the ZOI of the Marine Scheme, there is plenty of habitat available for prey species. In relation to marine mammals, the extensive distance between the Marine Scheme and the closest designated sites for marine mammal features as well as the short lived and temporary nature of impacts on prey species mean that there is a highly limited potential for significant effects (particularly when the extensive range of marine mammal species is considered, meaning they exploit much of the north sea).

150. It is therefore concluded that potential pathways for LSE as a result of temporary habitat loss or disturbance, offshore, from the Project **can be screened out** for further assessment in relation to the qualifying features of the **SPAs and SACs Designated for Marine Mammals Species and Features** identified in Table 5-3 which have direct and indirect connectivity with the Project.

6.1.3. Changes to Water Quality

151. These impacts are associated with both the Marine Scheme only (in both Scottish and English waters).

152. Activities related to the Project that have the potential to result in changes to water quality include the resuspension of buried sediment contaminants (such as heavy metals and hydrocarbons) and

increases in suspended sediment concentrations (SSC) and subsequent deposition during construction activities.

153. Accidental pollution associated with construction activities is not considered as an effect pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. All vessels to be used as part of any phase of the Project will adopt a waste management plan in line with the requirements set out as part of the International Convention for the Prevention of Pollution from Ships (MARPOL) and the Shipboard Oil Pollution Emergency Plan (SOPEP[12]).

154. Any resuspension of sediment contaminants which has the potential to alter localised water quality may result in direct impacts to various receptor groups (marine mammals, ornithology, diadromous fish) and indirect impacts to prey species for bird species principally (and, albeit to a highly limited extent as explained above, marine mammals). For seabirds and/or waterbirds present across the Project, this could result in physiological changes to individuals and populations (i.e., through immunosuppression and genotoxicity disruption) (Richard *et al*, 2021).

155. Depending on the nature of the seabed conditions encountered along the route, construction tools can lead to turbid plumes, which can persist for several hours to days depending upon the particle sizes found along the length of the Marine Scheme. Increased sedimentation associated with construction works may indirectly impact prey species through smothering and siltation rate changes, changes in suspended solids and deoxygenation.

156. Designed in measures adopted as part of the Project will incidentally avoid or mitigate against the resuspension of buried contaminants on European Sites and their associated qualifying features, such as the Construction Environmental Management Plan and the Cable Plan. Additionally, any impact would be highly localised and temporary in nature[13]. Based upon an analysis of similar comparable infrastructure projects and a sensitivity against the seabed conditions anticipated to be found along the route, the ZOI is anticipated to be within 2 km (this is expected to be the maximum distance at which increased SSC are likely to have the potential for a significant impact). It is important to note that this is a preliminary figure and it is also based on a precautionary assumption of fine sands and silts along the Marine Scheme route (coarse sand is likely to travel for a greatly reduced distance).

157. As any designed in measures adopted as part of the Project have not been specifically included to mitigate against any potential direct or indirect impacts of changes to water quality on qualifying species, they can be considered as part of the assessment of potential pathways for LSE on European Sites.

158. Therefore, potential pathways for LSE as a result of changes to water quality **can be screened out** in relation to the European Sites identified in Table 5-3.

6.1.4. Indirect Effects (in relation to abundance or availability of prey species)

159. These impacts are associated with both the Marine Scheme only (in both Scottish and English waters).

[12] As explained above, this is an incidental measure not applied to manage potential effects on European Sites and is therefore included in the HRA Screening.

[13] As explained above in section 3.3.4, these are measures which are not designed to specifically manage impacts on European Sites and can therefore be considered as part of the assessment. It is important to recognise that they are presented for completeness, however the conclusions of the assessment do not 'rely' on these incidental measures.

160. The potential pathways for indirect effects to marine mammals and ornithological features primarily relate to the availability of prey species within the marine environment. During the course of the construction process for the Marine Scheme, indirect impacts on marine mammals and seabirds may occur as a result of changes in prey distribution, availability or abundance in the marine environment. The primary sources of changes to and impacts on prey species may include temporary and long-term habitat loss / disturbance; changes to water quality including increases in suspended sediment concentrations and sediment deposition and release of sediment bound contaminant; and long-term habitat loss.

161. Habitats which support prey species for qualifying features of the European Site may be temporarily disturbed within the footprint of construction for the Marine Scheme. Outside of the immediate footprint of construction for the Marine Scheme, increased SSC and potentially suspended contaminant may impact upon prey species although within a highly localised area.

162. Overall, it is considered that any indirect impacts to European Sites and qualifying species and features will be highly localised and temporary, with seabird species demonstrating low sensitivity and high recoverability to the indirect effects of developments within the marine environment. It is also important to recognise that there will be extensive available prey species resource – and supporting habitat – outside of this area (i.e. the entire north sea). It is therefore considered that potential pathways for LSE as a result of indirect wider **can be screened out** for further assessment in relation to the qualifying features of the **SPAs** identified in Table 5-3 which have direct and indirect connectivity with the Project.

6.1.5. Underwater Noise

163. These impacts are associated with the Marine Scheme only (in both Scottish and English waters).

6.1.5.1. MARINE MAMMALS

164. The underwater noise characteristics used to assess any potential pathways for LSE on marine mammal qualifying features of a European Sites have been determined based on the anticipated sources of underwater noise and the propagation of sound within an offshore environment (typical frequencies between 10 hertz (Hz) and 1 megahertz (MHz)).

165. A number of underwater sound sources which have the potential to result in injury to marine mammals are anticipated to arise from activities relating to the Marine Scheme. Auditory injury to marine mammals is defined by levels of temporary threshold shift (TTS) or permanent threshold shift (PTS). Several of these (as outlined in Table 6-2) can be ruled out of the assessment either directly on the basis of their sound acoustic characteristics, or as the survey or construction/installation activity generates such a low sound intensity that they are masked by the ambient noise levels of the North Sea. The only activities associated with the Marine Scheme that are anticipated to generate a sound profile within the threshold of marine mammal hearing are sub-bottom profiling (SBP) and Ultra Short Base Line (USBL)[14] operations undertaken during pre-construction and construction activities (Table 6-2).

[14] USBL, or Ultra Short Base Line, is a method of underwater acoustic positioning which is used to identify and track the operations of subsea equipment and vehicles.

Table 6-2 Characteristics of underwater sound sources generated by the Marine Scheme construction phase

Survey or cable installation activity	Operating frequency	Sound pressure level (dB re 1µP a@1m)	Sound source data reference	Screened into appraisal?
Swathe or multi-beam echo sounder (e.g. Knogsberg EM2040, Reason Seabat 7125)	200-400 kHz	221 235 (peak)	Genesis Oil and Gas Consultants, 2011	X
Side scan sonar (e.g., EdgeTech 4200 Series)	100 / 900 kHz	245dB (peak)	Genesis (2011) and equipment specification sheet	X
Sub-bottom profiling (SBP) (e.g., Innomar SES-2000, Edgetech Chirp & Applied Acoustics 201 boomer)	500Hz – 10kHz	248 (peak)	Equipment specification sheets	✓
USBL (e.g., Kongsberg HiPAP 502)	200-300Hz to 3500-4000Hz	220 (peak)	Equipment specification sheet	✓ (Marine mammals only)
Cable installation (e.g., jet trenching, mechanical trenching)	1-15 kHz	178	(Nedwell, Langworthy, & Howell, 2003); Nedwell et al., (2008); Hale (2018)	X
Rock placement	n/a	~172	Vessel Rollingstone (Orsted, 2019)	X
Trenchless Methods such as HDD (e.g., break-out)	n/a	129.5	Nedwell et al. (2012)	X
Cable lay vessel (~140 m in length operating with dynamic positioning)	0.005-3.2 kHz	180-197	Ross (1993); AT&T (2008)	X
Project support vessels including medium (50 m to 100 m) and small (<50) boats	Low to high frequency	160-180	Genesis (2011); Richardson et al. (1995); OSPAR commission (2009)	X

166. Anticipated injury distances from SBP on harbour porpoises is anticipated to be up to approximately 251 m, based on dual-metric modelling from a comparable third party development. Given the mobile nature of marine mammal species and the direct overlap with harbour porpoise North Sea MU (IAMMWG, 2022), without the appropriate designed in

measures, potential pathways for LSE from underwater noise **cannot be screened out** for the **Southern North Sea SAC**.

167. With consideration given to the mobile nature of grey seals and the intervening 13 km between the Marine Scheme and the Berwickshire and North Northumberland Coast SAC, potential pathways for LSE from underwater noise **cannot be screened out** for the **Berwickshire and North Northumberland Coast SAC.**

168. The precautionary deterrent range from geophysical survey equipment is considered to be 5 km (JNCC, 2020). Therefore due to the intervening distance between the Project and the River Tay and River Tweed SACs, there is no pathway for potential impacts from underwater noise on the qualifying species (otters) of these European Sites. The River Tay SAC and River Tweed SAC are therefore **screened out** of further assessment.

6.1.5.2. DIADROMOUS FISH

169. Diadromous fish species (lamprey and Atlantic salmon) using the area are very likely to move away from noise generated by construction activity, and therefore there is a low likelihood of exposure that could result in injury. Whilst there may be some minor avoidance from noisy activities, it is not considered that the construction will pose a barrier to movement or migration. Once construction has completed, normal activity and behaviour will resume.

170. Furthermore, lamprey do not have a swim bladder and therefore are less susceptible to TTS, and whilst Atlantic salmon have a swim bladder, it is not involved in their hearing.

171. The likelihood of auditory injury or behavioural change from underwater noise on diadromous fish species is considered to be low. Any behavioural change will be a temporary and relatively short-term effect, restricted only to the construction period, and therefore is unlikely to be significant for diadromous fish species using the marine area.

172. It is therefore concluded that potential pathways for LSE as a result of underwater noise from the Project **can be screened out** for further assessment in relation to the qualifying features of the **SACs** designated for diadromous fish identified in Table 5-3 which have direct and indirect connectivity with the Project.

6.1.6. Vessel Disturbance and Nearshore Construction Activity (Offshore)

173. Vessel disturbance is associated with the Marine Scheme in both Scottish and English waters however nearshore construction activity is only associated with the Marine Scheme in English waters.

174. Activities associated with all phases of the Project will result in an increase in vessel presence, which may disturb marine mammals and seabirds, causing changes in behaviour or displacing them from affected areas.

175. The degree of impact of vessel presence and activities on ornithological receptors will vary depending on the species and with proximity to vessels. The majority of bird species demonstrate a low to moderate sensitivity to disturbance and/or displacement as a result of construction activities (Atterbury et al, 2021), with others (divers, grebes and mergansers), particularly red-throated divers and Slavonian grebe (both of which are qualifying species of Outer Firth of Forth and St Andrews Bay Complex SPA) being particularly sensitive (Mendel et al, 2019; Dorsch et al, 2019). The presence of vessels has the potential to result in behavioural changes in seabird species, such as avoidance or displacement from the Project during periods of vessel activities.

176. Much of what is known regarding seabird disturbance and displacement as a result of vessel presence has been developed through the assessment of seabird sensitivity to offshore wind farms. Vessel presence during construction activities will be transient, moving along the offshore export cable corridor. Whilst there are a number of shipping channels and routes throughout the North Sea, and it is therefore not anticipated that activities relating to the Project will result in a significant increase in baseline levels of the marine environment, temporary disturbance and displacement can lead to further impacts such as a reduction in foraging opportunities or increased energy expenditure.

177. Particularly for seabirds using the marine environment within which installation vessels will be present (e.g. the offshore export cable corridor), this could potentially result in a decrease in survival rates or productivity in the population.

178. For marine mammals, there is the potential for vessel presence and movement to cause behavioural changes. Disturbance can also arise from noise which is addressed separately in section 6.1.5 above). It is considered that the slow speeds at which Project vessels will move are unlikely to cause disturbance or injury to mammals. Additionally, best practice for vessel transit (following defined routes and ensuring movement is uniform) will reduce likelihood of disturbance.

179. Therefore, potential pathways for LSE for vessel presence **can be screened out** for further assessment in relation to the qualifying marine mammal features of the **SACs** identified in Table 5-3 which have direct and indirect connectivity with the Project.

180. However potential pathways for LSE for vessel presence **cannot be screened out** for further assessment in relation to the qualifying features of the **SPAs and Ramsar sites** identified in Table 5-3 which have direct and indirect connectivity with the Project.

6.1.7. Vessel Collision Risk

181. These impacts are associated with the Marine Scheme only (in both Scottish and English waters).

182. Increases in vessel activity compared to baseline levels can potentially result in increased marine mammal collisions with vessels. The spatial footprint of this impact pathway is restricted to the boundary of the Marine Scheme, noting that there is a well-understood level of baseline vessel activity from existing shipping routes, localised fisheries activity and recreational sailing (among other activities) shipping activity.

183. The vessel numbers associated with the construction of the Project are not considered to substantially increase vessel traffic relative to existing levels and therefore do not present a significant risk of collision, as set out in section 2 above. Furthermore, as detailed above, Project vessels will abide by best practice transit measures including following defined routes and avoid erratic movement, which will substantially reduce risk of collision.

184. Marine mammals are highly unlikely to be within the immediate vicinity of vessels, instead exhibiting avoidance behaviour (as has been demonstrated in multiple studies and based on comparable infrastructure development experience, marine mammals – such as harbour porpoise – are known to flee from noise generating operations such as vessel operations (Graham et al, 2019)). It is also well understood that their range across the North Sea is extensive meaning the potential for a direct interaction between a porpoise and an installation vessel is negligible. For these reasons, there is no credible pathway for vessel collision risk.

185. Therefore, potential pathways for LSE for vessel collision risk **can be screened out** for further assessment in relation to the qualifying marine mammal features of the **SACs** identified in Table 5-3 which have direct and indirect connectivity with the Project.

6.2. Operation and Maintenance

6.2.1. Electromagnetic Field Emissions (EMFs)

186. These impacts are associated with the Marine Scheme only (in both Scottish and English waters).

187. Submarine and HVDC cables, such as those proposed as part of the Marine Scheme, emit magnetic fields into seabed sediments and the lower water column which can result in sensory injury and disruption to fish species. Sensory disruption can manifest as changes in swimming speed or direction.

188. While it is acknowledged that there is limited but emerging research on EMF impacts on diadromous fish species, and with existing research from Armstrong et al, (2015) suggesting that Atlantic salmon have a relatively low sensitivity to EMF emissions, this species is known to utilise EMFs in their migrations. As a result, the introduction of EMF emissions from submarine HVDC cables has the potential to result in negative impacts to their migrations particularly in nearshore waters (Gibson et al., 2022; Gill et al., 2012).

189. EMF impacts on diadromous fish results in a potential pathway for LSE. Therefore, potential pathways for LSE from EMF emissions on diadromous fish species **cannot be screened** out for the River Tay SAC, River Tweed SAC, Tweed Estuary SAC, River Teith SAC, and the River South Esk SAC, as identified in Table 5-3.

6.2.2. Long-term Habitat Loss

6.2.2.1. ORNITHOLOGY (ONSHORE)

190. These impacts are associated with both the Marine Scheme (in both Scottish and English waters) and Onshore Scheme.

191. Direct habitat loss may occur during operation and maintenance from the physical presence of the onshore infrastructure (i.e., the onshore converter station), noting that this would not be habitat designated within a European Site and therefore no direct habitat loss of an SPA will occur as a result of the Project. Due to the nature of the Marine Scheme (e.g., a subsea cable), there will be no long term habitat loss associated with the Marine Scheme that has the potential to result in LSEs in relation to the qualifying features of the SPAs.

192. Considering the small footprint of the Onshore Scheme (i.e., the onshore converter station) in parallel with the extent of onshore habitat available for foraging and roosting for qualifying features of the SPAs, it is not considered that habitat loss as a result of the Project will have effects on SPA bird populations from the physical presence of onshore infrastructure during the operation and maintenance phase of the Project. Survey records suggest that relatively low numbers of the migratory terrestrial populations use the Cambois beach area and therefore any effects are unlikely to be seen on a population level. It is also important to recognise that the indicative location of the converter station is significantly distanced from the land most likely to be used by seabirds designated as part of neighbouring European Sites.

193. It is therefore considered that potential pathways for LSE as a result of direct habitat loss **can be screened out** for further assessment in relation to the qualifying features of the **SPAs** identified in Table 5-3 which have direct and indirect connectivity with the Project

6.2.2.2. DIADROMOUS FISH (OFFSHORE)

194. These impacts are associated with the Marine Scheme only (in both Scottish and English waters).

195. There is the potential for long-term habitat loss to occur under the cable protection required along the offshore export cable for the duration of the operation and maintenance phase. This will be restricted to the footprint of the offshore export cable corridor of which there is no direct overlap with any of the SACs and therefore no potential for direct impacts to supporting habitats for diadromous fish species. Whilst there will be no direct loss of SAC habitat, there is the potential for migratory fish that are present in the waters around the offshore export cable route to be affected, indirectly, by long-term habitat loss which may affect feeding ground availability. The offshore export cable will be buried as far as possible, and therefore the only habitat loss will arise from areas of cable protection which is anticipated to be extremely limited. Additionally, it is considered that in the context of the wider North Sea, these areas are not significant and will not result in significant impacts due to the availability of alternative seabed habitat.

196. Indirect impacts on feeding grounds and habitats outwith the European Sites would be extremely localised and are not considered to result in long-term effects on availability of food. Therefore, it is considered that potential pathways for LSE as a result of direct habitat loss **can be screened out** of further assessment in relation to the qualifying features of the River Tay SAC, River Tweed SAC, Tweed Estuary SAC, River Teith SAC, and the River South Esk SAC

6.2.3. Disturbance and Displacement

197. These impacts are associated with the Marine Scheme (in both Scottish and English waters) and Onshore Scheme.

198. The presence of maintenance vessels / equipment and activities during operation and maintenance may have the potential to disturb marine mammals and seabirds, and displace them from foraging (or roosting, with regards to birds onshore) over the long term operational period of the Project. Disturbance and displacement may ultimately lead to a reduction in foraging opportunities, increased competition and increased energy expenditure.

199. For ornithology and mammal species, this effect may impact animals using the Project area, however given the anticipated level of maintenance likely to be required, and the temporary nature of these maintenance activities, it is unlikely to result in a significant effect for ornithological and marine species using the onshore and marine areas.

200. During operation, the offshore export cable is a static asset buried underneath or on the seabed. Onshore, it is not considered that disturbance (from plant machinery and equipment) will result in a significant increase from baseline levels of works in the current environment.

201. It is therefore concluded that potential pathways for LSE as a result of disturbance and displacement from Project maintenance works **can be screened out** for further assessment in relation to the qualifying features of the **SPAs and SACs** identified in Table 5-3 which have direct and indirect connectivity with the Project.

6.2.4. Vessel Collision Risk

202. These impacts are associated with the Marine Scheme only (in both Scottish and English waters).

203. Vessel collision risk is considered above in section 6.1.7; the conclusions provided there are valid for this phase but are not repeated for brevity.

204. The increase of vessel numbers associated with the operation and maintenance of the Project will be considerably lower than the construction phase (which does not result in any potential for significant effect). The likelihood of collisions with Project vessels and marine mammals identified as qualifying features of the SACs is therefore considered to be low, with no foreseeable potential for vessel activity to result in LSE from vessel collisions.

205. Therefore, potential pathways for LSE for vessel collision risk **can be screened out** for further assessment in relation to the qualifying marine mammal features of the **SACs** identified in Table 5-3 which have direct and indirect connectivity with the Project.

6.3. Decommissioning Phase

206. Impacts during the decommissioning phase are considered to be similar and potentially less than those outlined for construction phase impacts in section 5.1 above.

6.4. Summary of Initial Screening of European Sites

Table 6-3 to

207. Table 6-5 below summarise the result of Step 2, and outline the European Sites taken forward for LSE assessment, including the relevant qualifying species and impact pathway to be assessed.

Table 6-3 Summary of initial screening for LSE on Diadromous Fish

European Site	Qualifying Features and/or Species	Potential Impact	Project Phase[15]	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
River Tay SAC	• Atlantic salmon (*Salmo salar*) • River lamprey (*Lamptera fluvi*atilis) • Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*)	EMF	O&M	✓	✓	x
River Tweed SAC	• Atlantic salmon (*Salmo salar*) • River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*)	EMF	O&M	✓	✓	x
Tweed Estuary SAC	• River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*)	EMF	O&M	✓	✓	x
River Teith SAC	• Atlantic salmon (*Salmo salar*) • River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*)	EMF	O&M	✓	✓	x
River South Esk SAC	• Atlantic salmon (*Salmo salar*)	EMF	O&M	✓	✓	x

[15] Construction (C), Operation and Maintenance (O&M), Decommissioning (D)

European Site	Qualifying Features and/or Species	Potential Impact	Project Phase[15]	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	• Freshwater pearl mussel (*Maragaritifera margaritifera*)					

Table 6-4 Summary of initial screening for LSE on Marine Mammals

European Site	Qualifying Features and/or Species	Potential Impact	Project Phase[11]	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
Berwickshire and North Northumberland Coast SAC	Grey Seal (*Halichoerus grypus*)	Underwater Noise	C / D	✓	✓	x
Southern North Sea SAC	Harbour porpoise (*Phocoena phocoena*)	Underwater Noise	C / D	✓	✓	x

Table 6-5 Summary of initial screening for LSE on Ornithological Qualifying Species

European Site	Qualifying Features and/or Species	Potential Impact	Project Phase [11]	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
Northumberland Marine SPA	• Guillemot (*Uria aalge*) (Breeding) • Common tern (*Sterna hirundo*) (Breeding) • Little tern (*Sterna albifrons*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Arctic tern (*Sterna paradisaea*) (Breeding) • Puffin (*Fratercula arctica*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding) • Seabird assemblage (breeding) including the components: - Cormorant (*Phalacrocoracidae*) - Shag (*Gulosus aristotelis*) - Black-headed gull (*Chroicocephalus ridibundus*) - Kittiwake (*Rissa tridactyla*)	Vessel disturbance and nearshore construction (and decommissioning) activity; disturbance and/ or displacement from foraging or roosting area related to the Onshore Scheme	C / D	✓	✓	✓
Northumbria Coast SPA/Ramsar	• Little tern (*Sterna albifrons*) (Breeding) • Turnstone (*Arenaria interpres*) (Non-breeding) • Purple sandpiper (Calidris maritima) (Non-breeding) • Arctic tern (*Sterna paradisaea*) (Breeding)	Vessel disturbance and nearshore construction (and decommissioning) activity; disturbance and/or displacement from foraging or roosting area related to the Onshore Scheme	C / D	✓	✓	✓
Outer Firth of Forth and St	• Common tern (*Sterna hirundo*) (Breeding) • Arctic tern (*Sterna paradisea*) (Breeding)	Vessel disturbance and nearshore construction	C / D	✓	✓	x

European Site	Qualifying Features and/or Species	Potential Impact	Project Phase [11]	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
Andrews Bay Complex SPA	• Red-throated diver (*Gavia stellata*) (Non-breeding) • Slavonian grebe (*Podiceps auritus*) (Non-breeding) • Common eider (*Somateria mollissima*) (Non-breeding) • Northern gannet (*Morus bassanus*) (Breeding) • Little gull (*Hydrocoloeus minutus*) (Non-breeding) • Waterfowl assemblage (non-breeding) including the components: - Long-tailed duck (*Clangula hyemalis*) - Common scoter (*Melanitta nigra*) - Velvet scoter (*Melanitta fusca*) - Common goldeneye (*Bucephala clangula*) - Red- breasted merganser (*Mergus serrator*) • Seabird assemblage (breeding) including the components: - Atlantic puffin (*Fratercula arctica*) - Kittiwake (*Rissa tridactyla*) - Manx shearwater (*Puffinus puffinus*) - Guillemot (*Uria aalge*) - Herring gull (*Larus argentatus*) • Seabird assemblage (non-breeding) including the components: - Black-headed gull (*Chroicocephalus ridibundus*) - Common gull (*Larus canus*) - Herring gull (*Larus argentatus*) - Guillemot (*Uria aalge*) - Shag (*Gulosus aristotelis*)	(and decommissioning) activity				

European Site	Qualifying Features and/or Species	Potential Impact	Project Phase [11]	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	- Kittiwake (*Rissa tridactyla*) Razorbill (*Alca torda*)					
Coquet Island SPA	• Common tern (*Sterna hirundo*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding) • Arctic tern (*Sterna paradisaea*) (Breeding) • Seabird assemblage (Breeding) including the components: - Atlantic puffin (*Fratercula arctica*) - Kittiwake (*Rissa tridactyla*) - Black- headed gull (*Chroicocephalus ridibundus*) - Fulmar (*Fulmarus glacialis*) - Herring gull (*Larus argentatus*) - Lesser black-backed gull (*Larus fuscus)*	Vessel disturbance and nearshore construction (and decommissioning) activity	C / D	✓	✓	x
Farne Islands SPA	• Guillemot (*Uria aalge*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding) • Common tern (*Sterna hirundo*) (Breeding) • Arctic tern (*Sterna paradisaea*) (Breeding) • Seabird assemblage (Breeding) including the components: - Kittiwake (*Rissa tridactyla*) - Shag (*Gulosus aristotelis*)	Vessel disturbance and nearshore construction (and decommissioning) activity	C / D	✓	✓	x

European Site	Qualifying Features and/or Species	Potential Impact	Project Phase [11]	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	- Cormorant (*Phalacrocoracidae*) Atlantic puffin (*Fratercula arctica*) - Black- headed gull (*Chroicocephalus ridibundus*) - Fulmar (*Fulmarus glacialis*) - Great black-backed gull (*Larus marinus)* - Lesser black-backed gull (*Larus fuscus)* - Herring gull (*Larus argentatus*) - Razorbill (*Alca torda*)					
Lindisfarne SPA/Ramsar	• Bar-tailed godwit (*Limosa lapponica*) (Non-breeding) • Common scoter (*Melanitta nigra*) (Non-breeding) • Dunlin (*Calidris alpina*) (Non-breeding) • Eider (*Somateria mollissima*) (Non-breeding) • Golden plover (*Pluvialis apricaria*) (Non-breeding) • Grey plover (*Pluvialis squatarola*) (Non-breeding) • Greylag goose (*Anser anser*) (Non-breeding) • Light-bellied brent goose (*Branta bernicla hrota*) (Non-breeding) • Little tern (*Sterna albifrons*) (Non-breeding) • Long-tailed duck (*Clangula hyemalis*) (Non-breeding) • Red-breasted merganser (*Mergus serrator*) (Non-breeding) • Redshank (*Tringa tetanus*) (Non-breeding) • Ringed plover (*haradriusCharadrius hiaticula*) (Non-breeding)	Vessel disturbance and nearshore construction (and decommissioning) activity	C / D	✓	✓	x

European Site	Qualifying Features and/or Species	Potential Impact	Project Phase [11]	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	• Roseate tern (*Sterna dougallii*) (Non-breeding) • Sanderling (*Calidris alba*) (Non-breeding) • Shelduck (*Tadorna tadorna*) (Non-breeding) • Waterbird assemblage (Non-breeding) • Whooper swan (*Cygnus cygnus*) (Non-breeding) • Wigeon (*Mareca uratus*) (Non-breeding)					
St Abb's Head to Fast Castle SPA	• Seabird assemblage (Breeding) including the components: - Guillemot (*Uria aalge*) - Razorbill (*Alca torda*) - Herring gull (*Larus argentatus*) - Shag (*Gulosus aristotelis*) - Kittiwake (*Rissa tridactyla*)	Vessel disturbance and nearshore construction (and decommissioning) activity	C / D	✓	✓	x
Teesmouth and Cleveland Coast SPA	• Little tern (*Sterna albifrons*) (Breeding) • Common tern (*Sterna hirundo*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Redshank (*Tringa tetanustotanus) (Non-breeding)* • Waterbird assemblage (Non-breeding)	Vessel disturbance and nearshore construction (and decommissioning) activity	C / D	✓	✓	x
Forth Islands SPA	• Gannet *(Morus bassanus)* (Breeding) • Puffin (*Fratercula arctica*) (Breeding) • Lesser black-backed gull (*Larus fuscus*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding)	Vessel disturbance and nearshore construction (and decommissioning) activity	C / D	✓	✓	x

European Site	Qualifying Features and/or Species	Potential Impact	Project Phase [11]	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	• Common tern (*Sterna hirundo*) (Breeding) • Arctic tern (*Sterna paradisea*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Shag (*Gulosus aristotelis*) (Breeding) • Seabird assemblage (Breeding) including the components: - Guillemot (*Uria aalge*) - Razorbill (*Alca torda*) - Kittiwake (*Rissa tridactyla*) - Herring gull (*Larus argentatus*) - Cormorant (*Phalacrocoracidae*)					
Fowlsheugh SPA	• Seabird assemblage (Breeding) including the components: - Razorbill (*Alca torda*) - Fulmar (*Fulmarus glacialis*) - Herring gull (*Larus argentatus*) - Kittiwake (*Rissa tridactyla*) - Guillemot (*Uria aalge*)	Vessel disturbance and nearshore construction (and decommissioning) activity	C / D	✓	✓	x
Buchan Ness to Collieston Coast SPA	• Seabird assemblage (Breeding) including all the components: - Fulmar (*Fulmarus glacialis*) - Herring gull (*Larus argentatus*) - Shag (*Gulosus aristotelis*) - Kittiwake (*Rissa tridactyla*)	Vessel disturbance and nearshore construction (and decommissioning) activity	C / D	✓	✓	x

European Site	Qualifying Features and/or Species	Potential Impact	Project Phase [11]	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	- Guillemot (*Uria aalge*)					
Flamborough and Filey Coast SPA	• Kittiwake (*Rissa tridactyla*) (Breeding) • Gannet (*Morus bassanus*) (Breeding) • Razorbill (*Alca torda*) (Breeding) • Guillemot (*Uria aalge*) (Breeding) • Seabird assemblage (Breeding) including the components: - Fulmar (*Fulmarus glacialis*) - Atlantic puffin (*Fratercula arctica*) - Herring gull (*Larus argentatus*) - Shag (*Gulosus aristotelis*) - Cormorant (*Phalacrocoracidae*)	Vessel disturbance and nearshore construction (and decommissioning) activity	C / D	✓	✓	x

7. Step 3: Assessment of Likely Significant Effect (Project Alone)

208. The initial screening process documented in section 5 above has generated a list of European Sites and qualifying interest features which require further consideration. This section of the LSE screening process therefore documents the determination of LSE for those European sites which have been identified for further consideration through section 4.

209. The assessment of LSE below is presented as a series of matrices setting out whether no LSE can be concluded for the relevant features of the European sites identified in section 5 above. The matrix approach which has been adopted by the Applicant is based upon the approach set out within The Planning Inspectorate's Advice Note 10 on HRA (2022). As described above, the Project is not an NSIP however the matrix-based approach is considered to be a robust and well-structured solution to the assessment of LSE and has therefore been followed by the Applicant.

210. The assessment of LSE provides a clear audit trail for agreement with the statutory consultees on the scope of the HRA and the features and impacts to be taken forward into the appropriate assessment for each site.

211. The tables below provide the assessment of LSE matrix for the Project.

Table 7-1 Assessment of LSE (Diadromous Fish)

European Site	Approximate Distance and Direction to European Site (km)	Qualifying Features and/or Species[16]	Impact: EMF	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
River Tay SAC	61 km (NW) from Scottish Marine Scheme 109 km (NW) from English Marine Scheme 173 km (N) from Onshore Scheme	• Atlantic salmon (*Salmo salar*) • River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*) • Otter (*Lutra lutra*) • Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*	The presence of offshore export cables, such as those required for the Marine Scheme, have the potential to emit localised magnetic fields. Magnetic fields have been observed to reduce swimming speed in European eel *Anguilla anguilla* in some circumstances (Orpwood, Fryer, Rycroft, & Armstrong, 2015). Magnetic fields may interfere with the navigation of migratory fish, particularly in shallow nearshore waters (Gill and Bartlett, 2010). Studies have been carried out demonstrating a behavioural response from crustaceans when exposed to magnetic fields; Scott et al (2021) conclude that increased physiological stress will occur if *C. pagurus is* exposed to an Electro-Magnetic Field (EMF) of 500 µT or above (noting that data was obtained at 1000 µT, 2.8 mT and 40 mT confirming this trend).	Screened In for migratory species in relation to EMF	Screened In for migratory species in relation to EMF	EMF – not applicable to Onshore Scheme

[16] As detailed in section 5 above, there are no pathways between the Project and Annex I habitats / designated habitats as part of relevant European Sites. Qualifying features of European Sites are therefore presented for completeness but for the avoidance of doubt, they do not require further onward appraisal to determine the potential for LSE for the reasons cited in section 4 of this HRA Screening.

European Site	Approximate Distance and Direction to European Site (km)	Qualifying Features and/or Species[16]	Impact: EMF	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
			Based on the nature of the Marine Scheme and the anticipated rating of the offshore export cables, the levels of EMF emitted by the Marine Scheme will be orders of magnitude lower than those used to elicit behavioural responses in the studies described above. Notwithstanding, based on existing stakeholder feedback and on a highly precautionary basis, EMF will be considered in more detail by the Applicant. This will be focused on migratory species such as the River lamprey, sea lamprey and Atlantic salmon which are all sea-going species at some stage in their lifecycle (they are mobile and migratory species which may pass over the Marine Scheme). Brook lamprey is a freshwater species, and not sea-going so will not be considered further. Similarly, there is no pathway for Otter or designated habitats. **In relation to EMF, the potential for LSE cannot be ruled out for migratory species of the European Site and it will therefore be assessed by the Applicant within the RIAA for the Marine Scheme for both Scottish and English waters.**			

European Site	Approximate Distance and Direction to European Site (km)	Qualifying Features and/or Species[16]	Impact: EMF	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
River Tweed SAC	48 km (SW) from Scottish Marine Scheme 40 km (W) from English Marine Scheme 40 km (N) from Onshore Scheme	• Atlantic salmon (*Salmo salar*) • River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*) • Otter (*Lutra lutra*) • Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation	Further to the discussion of this topic above, based on existing stakeholder feedback and on a highly precautionary basis, EMF will be considered in more detail by the Applicant. This will be focused on migratory species such as the River lamprey, sea lamprey and Atlantic salmon which are all sea-going species at some stage in their lifecycle (they are mobile and migratory species which may pass over the Marine Scheme). Brook lamprey is a freshwater species, and not sea-going so will not be considered further. Similarly, there is no pathway for Otter or designated habitats. **In relation to EMF, the potential for LSE cannot be ruled out for migratory species of the European Site and it will therefore be assessed by the Applicant within the RIAA for the Marine Scheme for both Scottish and English waters.**	Screened In for migratory species in relation to EMF	Screened In for migratory species in relation to EMF	EMF – not applicable to Onshore Scheme
River Teith SAC	127 km (W) from Scottish Marine Scheme	• Atlantic salmon (*Salmo salar*) • River lamprey (*Lamptera fluviatilis*)	Further to the discussion of this topic above, based on existing stakeholder feedback and on a highly precautionary basis, EMF will be considered in more detail by the Applicant.	Screened In for migratory species in relation to EMF	Screened In for migratory species in relation to EMF	EMF – not applicable to Onshore Scheme

European Site	Approximate Distance and Direction to European Site (km)	Qualifying Features and/or Species[16]	Impact: EMF	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	157 km (NW) from English Marine Scheme 185 km (N) from Onshore Scheme	• Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*)	This will be focused on migratory species such as the River lamprey, sea lamprey and Atlantic salmon which are all sea-going species at some stage in their lifecycle (they are mobile and migratory species which may pass over the Marine Scheme). Brook lamprey is a freshwater species, and not sea-going so will not be considered further. **In relation to EMF, the potential for LSE cannot be ruled out for migratory species of the European Site and it will therefore be assessed by the Applicant within the RIAA for the Marine Scheme for both Scottish and English waters.**			
River South Esk SAC	50 km (NW) from Scottish Marine Scheme 101 km (NW) from English Marine Scheme 183 km (N) from Onshore Scheme	• Atlantic salmon (*Salmo salar*) • Freshwater pearl mussel (*Maragaritifera margaritifera*)	Further to the discussion of this topic above, based on existing stakeholder feedback and on a highly precautionary basis, EMF will be considered in more detail by the Applicant. This will be focused on Atlantic salmon which are sea-going species at some stage in their lifecycle (they are mobile and migratory species which may pass over the Marine Scheme). Freshwater pearl mussel is dependent on salmon	Screened In for migratory species in relation to EMF	Screened In for migratory species in relation to EMF	EMF – not applicable to Onshore Scheme

European Site	Approximate Distance and Direction to European Site (km)	Qualifying Features and/or Species[16]	Impact: EMF	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
			migration for part of its lifecycle and this will be considered collectively alongside Atlantic salmon. **In relation to EMF, the potential for LSE cannot be ruled out for migratory species of the European Site and it will therefore be assessed by the Applicant within the RIAA for the Marine Scheme for both Scottish and English waters. This will include consideration of freshwater pearl mussel.**			
Tweed Estuary SAC	46 km (W) from Scottish Marine Scheme 48 km (W) from English Marine Scheme 73 km (N) from Onshore Scheme	• Estuaries • Mudflats and sandflats not covered by seawater at low tide • Sea lamprey (*Petromyzon marinus)* • River lamprey (*Lampetra fluviatilis)*	Further to the discussion of this topic above, based on existing stakeholder feedback and on a highly precautionary basis, EMF will be considered in more detail by the Applicant. This will be focused on the two migratory species which may pass over the Marine Scheme (there is no pathway for designated habitats). **In relation to EMF, the potential for LSE cannot be ruled out for migratory species of the European Site and it will therefore be assessed by the Applicant within the RIAA for the Marine Scheme for both Scottish and English waters.**	Screened In for migratory species in relation to EMF	Screened In for migratory species in relation to EMF	EMF – not applicable to Onshore Scheme

Table 7-2 Assessment of LSE (Marine Mammals)

European Site	Approximate Distance and Direction to European Site (km)	Qualifying Features and/or Species	Impact: Underwater Noise	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
Berwickshire and North Northumberland Coast SAC	35 km (S) from Scottish Marine Scheme 18 km (W) from English Marine Scheme 26 km (N) from Onshore Scheme	• Reefs • Mudflats and sandflats not covered by seawater at low tide • Large shallow inlets and bays • Submerged or partially submerged sea caves • Grey seal (*Halichoerus grypus*)	As detailed within section 5.1 there is no pathway between the Marine Scheme and Annex I habitats; they are presented for completeness as features of the European Site but have not been assessed further. A number of underwater sound sources which have the potential to result in injury to marine mammals are anticipated to arise from activities relating to the Marine Scheme. These are considered to be as follows: • Pre-installation geophysical survey (specifically expected to relate to underwater sound generated by MBES, SSS and USBL sources); • Cable lay installation; • Placement / installation of cable protection where required; • Nearshore landfall operations; and • Vessel movements including cable lay vessels with dynamic positioning (DP). The majority of the sound sources described above are unlikely to lead to any likely significant effect by virtue of their low intensity or due to them having such a low sound source intensity that they can effectively be masked by sound from other elements of the Marine Scheme.	Screened In for Grey seal	Screened In for Grey seal	Offshore pre-installation surveys – not applicable to Onshore Scheme

European Site	Approximate Distance and Direction to European Site (km)	Qualifying Features and/or Species	Impact: Underwater Noise	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
			However, in relation to pre-installation surveys (and particularly USBL and SBP) the potential for LSE cannot be ruled out for the Grey seal *Halichoerus grypus* and it will therefore be assessed by the Applicant within the RIAA for the Marine Scheme for both Scottish and English waters.			
Southern North Sea SAC	144 km (SE) from Scottish Marine Scheme 104 km (SE) from English Marine Scheme 140 km (SE) from Onshore Scheme	• Harbour porpoise (*Phocoena phocoena*)	A number of underwater sound sources which have the potential to result in injury to marine mammals are anticipated to arise from activities relating to the Marine Scheme. These are described above for the Berwickshire and North Northumberland Coast SAC. The majority of the sound sources described above are unlikely to lead to any likely significant effect by virtue of their low intensity or due to them having such a low sound source intensity that they can effectively be masked by sound from other elements of the Marine Scheme. Disturbance to harbour porpoise arising from a range of anthropogenic activity is well documented. Considering the wealth of impact assessments and field studies carried out for wind farm installations (including pre-installation surveys), harbour porpoise have been shown to demonstrate strong behavioural reactions to underwater sound. Further information associated with	Screened In for Harbour porpoise	Screened In for Harbour porpoise	Offshore pre-installation surveys – not applicable to Onshore Scheme

European Site	Approximate Distance and Direction to European Site (km)	Qualifying Features and/or Species	Impact: Underwater Noise	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
			this specific feature can be found within the Scoping Report for the Marine Scheme (SSER, 2022a) and the HRA Screening Report (SSER, 2021) carried out by the Applicant in support of the BBWF Section 36 consent application (SSER, 2022d). **In relation to pre-installation surveys (and particularly USBL and SBP) the potential for LSE cannot be ruled out for the Harbour porpoise (*Phocoena auratus)* and it will therefore be assessed by the Applicant within the RIAA for the Marine Scheme for both Scottish and English waters.**			

Table 7-3 Assessment of LSE (Ornithology)

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
Designated Sites located in Scotland						
Outer Firth of Forth and St Andrews Bay Complex SPA	2 km (W) from the Scottish Marine Scheme 22 km (W) from the English Marine Scheme 92 km (N) from the Onshore Scheme	• Common tern (*Sterna hirundo*) (Breeding) • Arctic tern (*Sterna paradisea*) (Breeding) • Red-throated diver (*Gavia stellata*) (Non-breeding) • Slavonian grebe (*Podiceps auritus*) (Non-breeding) • Common eider (*Somateria mollissima*) (Non-breeding) • Northern gannet (*Morus bassanus*) (Breeding) • Little gull (*Hydrocoloeus minutus*) (Non-breeding) • Waterfowl assemblage (non-breeding) including the components: - Long-tailed duck (*Clangula hyemalis*)	Migratory waterbird species would not be significantly affected when passing through (or over) the Project on migration owing to the highly limited suite of construction activities required. The presence of vessels associated with the Marine Scheme have the potential to introduce visual disturbance to seabird species. The sensitivity of seabirds to visual disturbance varies between species and with proximity to vessels. The slow-moving nature of vessels that will be present within the marine environment during construction of the offshore export cables will result in periods of disturbance from vessel lighting (noting this is anticipated to be a 24 hour year-round operation to minimise the overall completion of works). The presence of vessels and construction works may disturb seabirds from offshore foraging or	Screened In for all features for vessel disturbance	Screened In for all features for vessel disturbance	Vessel disturbance – not applicable to Onshore Scheme
				Screened Out for all features for nearshore construction activity	Screened Out for all features for nearshore construction activity	Screened out for all features for nearshore construction activity

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
		- Common scoter (*Melanitta nigra*) - Velvet scoter (*Melanitta fusca*) - Common goldeneye (*Bucephala clangula*) - Red- breasted merganser (*Mergus serrator*) • Seabird assemblage (breeding) including the components: - Atlantic puffin (*Fratercula arctica*) - Kittiwake (*Rissa tridactyla*) - Manx shearwater (*Puffinus puffinus*) - Guillemot (*Uria aalge*) - Herring gull (*Larus argentatus*) • Seabird assemblage (non-breeding) including the components:	roosting areas in the short-term, causing changes in behaviour or displacing them from the affected areas. Temporary disturbance/displacement may lead to a reduction in foraging opportunities or increased energy expenditure, resulting in decreased survival rates or productivity in the population. This is anticipated to apply to seabirds which use the area encompassed by the Marine Scheme plus a precautionary buffer of 5 km (recognising the potential increased sensitivity of some species, as explained above). The nearshore landfall activities required to bring the offshore export cables to shore are approximately 90 km to the south of this European Site at the closest point and there is therefore no potential for direct disruption of these designated species. **In relation to vessel disturbance, the potential for LSE cannot be ruled out for all features of the European Site and it will therefore be**			

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
		- Black-headed gull (*Chroicocephalus ridibundus*) - Common gull (*Larus canus*) - Herring gull (*Larus argentatus*) - Guillemot (*Uria aalge*) - Shag (*Gulosus aristotelis*) - Kittiwake (*Rissa tridactyla*) - Razorbill (*Alca torda*)	**assessed by the Applicant within the RIAA for both Scottish and English waters.**			
St Abb's Head to Fast Castle SPA	37 km (SW) from Scottish Marine Scheme 46 km (W) from English Marine Scheme 90 km (N) from	• Seabird assemblage (Breeding) including the components: - Guillemot (*Uria aalge*) - Razorbill (*Alca torda*) - Herring gull (*Larus argentatus*) - Shag (*Gulosus aristotelis*) - Kittiwake (*Rissa tridactyla*)	Features of this SPA would not be significantly affected if passing through (or over) the Project owing to the highly limited suite of construction activities required. As described above, the maximum ZOI associated with vessel disturbance is 5 km (an initial precautionary estimate for the purposes of the screening assessment of LSE); the SPA is outside of this. Notwithstanding, seabirds can (and will) use waters outside of the SPA and this may include the area	Screened Out for all features for vessel disturbance and nearshore construction activity	Screened Out for all features for vessel disturbance and nearshore construction activity	Screened Out for all features for nearshore construction activity

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Onshore Scheme		encompassed by the Marine Scheme. This may include species such as fulmar, which have a particularly large foraging range. Seabirds using waters outside of the SPA will do so on a spatially and temporarily varied basis (i.e., the area encompassed by the Marine Scheme does not represent a specifically valuable resource for seabirds). The nearshore landfall activities required to bring the offshore export cables to shore are approximately 87 km to the south of this European Site at the closest point and there is therefore no potential for direct disruption of these designated species. **In relation to vessel disturbance and nearshore construction activities, there is no potential for LSE for all features of the European Site and it will therefore not be assessed by the Applicant within the RIAA.**			
Forth Islands SPA	38 km (W) from Scottish	• Gannet *(Morus bassanus)* (Breeding)	Migratory waterbird species would not be significantly affected when passing through (or over)	Screened Out for all	Screened Out for all	Screened Out for all

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Marine Scheme 70 km (W) from English Marine Scheme 121 km (N) from Onshore Scheme	• Puffin (*Fratercula arctica*) (Breeding) • Lesser black-backed gull (*Larus fuscus*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding) • Common tern (*Sterna hirundo*) (Breeding) • Arctic tern (*Sterna paradisea*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Shag (*Gulosus aristotelis*) (Breeding) • Seabird assemblage (Breeding) including the components: - Guillemot (*Uria aalge*) - Razorbill (*Alca torda*) - Kittiwake (*Rissa tridactyla*) - Herring gull (*Larus argentatus*) - Cormorant (*Phalacrocoracidae*)	the Project on migration owing to the highly limited suite of construction activities required. As described above, the maximum ZOI associated with vessel disturbance is 5 km (an initial precautionary estimate for the purposes of the assessment of LSE); the SPA is outside of this. Notwithstanding, seabirds can (and will) use waters outside of the SPA and this may include the area encompassed by Marine Scheme. Seabirds using waters outside of the SPA will do so on a spatially and temporarily varied basis (i.e., the area encompassed by the Marine Scheme does not represent a specifically valuable resource for seabirds). The nearshore landfall activities required to bring the offshore export cables to shore are approximately 130 km to the south of this European Site at the closest point and there is therefore no potential for direct disruption of these designated species. **In relation to vessel disturbance and nearshore construction activities, there is no potential for**	features for vessel disturbance and nearshore construction activity	features for vessel disturbance and nearshore construction activity	features for vessel disturbance and nearshore construction activity

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
			LSE for all features of the European Site and it will therefore not be assessed by the Applicant within the RIAA.			
Fowlsheugh SPA	54 km (N) from Scottish Marine Scheme 99 km (N) from English Marine Scheme 197 km (N) from Onshore Scheme	• Seabird assemblage (Breeding) including the components: - Razorbill (*Alca torda*) - Fulmar (*Fulmarus glacialis*) - Herring gull (*Larus argentatus*) - Kittiwake (*Rissa tridactyla*) - Guillemot (*Uria aalge*)	Features of this SPA would not be significantly affected if passing through (or over) the Project owing to the highly limited suite of construction activities required. As described above, the maximum ZOI associated with vessel disturbance is 5 km (an initial precautionary estimate for the purposes of the assessment of LSE); the SPA is outside of this. Notwithstanding, seabirds can (and will) use waters outside of the SPA and this may include the area encompassed by Marine Scheme. This may include species such as fulmar, which have a particularly large foraging range. Seabirds using waters outside of the SPA will do so on a spatially and temporarily varied basis (i.e., the area encompassed by the Marine Scheme does not represent a specifically valuable resource for seabirds).	Screened Out for all features for vessel disturbance and nearshore construction activity	Screened Out for all features for vessel disturbance and nearshore construction activity	Screened Out for all features for vessel disturbance and nearshore construction activity

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
			The nearshore landfall activities required to bring the offshore export cables to shore are approximately 193 km to the south of this European Site at the closest point and there is therefore no potential for direct disruption of these designated species. **In relation to vessel disturbance and nearshore construction activities, there is no potential for LSE for all features of the European Site and it will therefore not be assessed by the Applicant within the RIAA.**			
Buchan Ness to Collieston Coast SPA	96 km (N) from Scottish Marine Scheme 136 km (N) from English Marine Scheme 243 km (N) from	• Seabird assemblage (Breeding) including all the components: - Fulmar (*Fulmarus glacialis*) - Herring gull (*Larus argentatus*) - Shag (*Gulosus aristotelis*) - Kittiwake (*Rissa tridactyla*) - Guillemot (*Uria aalge*)	Features of this SPA would not be significantly affected if passing through (or over) the Project owing to the highly limited suite of construction activities required. As described above, the maximum ZOI associated with vessel disturbance is 5 km (an initial precautionary estimate for the purposes of the assessment of LSE); the SPA is outside of this. Notwithstanding, seabirds can (and will) use waters outside of the SPA and this may include the area	Screened Out for all features for vessel disturbance and nearshore construction activity.	Screened Out for all features for vessel disturbance and nearshore construction activity	Screened Out for all features for nearshore construction activity

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Onshore Scheme		encompassed by Marine Scheme. This may include species such as fulmar, which have a particularly large foraging range. Seabirds using waters outside of the SPA will do so on a spatially and temporarily varied basis (i.e., the area encompassed by the Marine Scheme does not represent a specifically valuable resource for seabirds). The nearshore landfall activities required to bring the offshore export cables to shore are approximately 240 km to the south of this European Site at the closest point and there is therefore no potential for direct disruption of these designated species. **In relation to vessel disturbance and nearshore construction activities, there is no potential for LSE for all features of the European Site and it will therefore not be assessed by the Applicant within the RIAA.**			
Designated Sites located in England						

Northumbria Coast SPA/ Ramsar	48 km (S) from Scottish Marine Scheme 0 km (direct overlap) with English Marine Scheme 0 km (direct overlap) with Onshore Scheme	• Guillemot (*Uria aalge*) (Breeding) • Common tern (*Sterna hirundo*) (Breeding) • Little tern (*Sterna albifrons*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Arctic tern (*Sterna paradisaea*) (Breeding) • Puffin (*Fratercula arctica*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding) • Seabird assemblage (breeding) including the components: - Cormorant (*Phalacrocoracidae*) - Shag (*Gulosus aristotelis*) - Black-headed gull (*Chroicocephalus ridibundus*) - Kittiwake (*Rissa tridactyla*)	The Northumbria Coast SPA / Ramsar protects the coastal waters along the Northumberland coast which support a number of important seabird populations. The presence of vessels associated with the Marine Scheme have the potential to introduce visual disturbance to seabird species. The sensitivity of seabirds to visual disturbance varies between species and with proximity to vessels. The slow-moving nature of vessels that will be present within the marine environment during construction of the offshore export cables will result in periods of disturbance from vessel lighting (noting this is anticipated to be a 24 h year-round operation to minimise the overall completion of works). Temporary disturbance/displacement may lead to a reduction in foraging opportunities or increased energy expenditure, resulting in decreased survival rates or productivity in the population. The nearshore landfall activities required to bring the offshore export cables to shore may lead to disruption of seabirds. Activities required in support of the construction of the Onshore Scheme may lead to disturbance and/or displacement from foraging or roosting land; this may include the onshore export cables which are adjacent to the Cambois coastline, and other construction-phase activity.	Screened In for all features for vessel disturbance	Screened In for all features for vessel disturbance and nearshore construction activity	Screened In for all features for nearshore construction activity

		In relation to vessel disturbance, nearshore construction activity and disturbance and/or displacement from foraging or roosting land, the potential for LSE cannot be ruled out for all features of the European Site and it will therefore be assessed by the Applicant within the RIAA.	

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
Northumberland Marine SPA	38 km (S) from Scottish Marine Scheme 0 km (direct overlap) with English Marine Scheme 0 km (direct overlap) with Onshore Scheme	• Little tern (*Sterna albifrons*) (Breeding) • Turnstone (*Arenaria interpres*) (Non-breeding) • Purple sandpiper (*Calidris maritima*) (Non-breeding) • Arctic tern (*Sterna paradisaea*) (Breeding)	The Northumberland Marine SPA protects the coastal waters along the Northumberland coast which support important breeding seabird colonies. The presence of vessels associated with the Marine Scheme have the potential to introduce visual disturbance to seabird species. The sensitivity of seabirds to visual disturbance varies between species and with proximity to vessels. The slow-moving nature of vessels that will be present within the marine environment during construction of the offshore export cables will result in periods of disturbance from vessel lighting (noting this is anticipated to be a 24 h year-round operation to minimise the overall completion of works). Temporary disturbance/displacement may lead to a reduction in foraging opportunities or increased energy expenditure, resulting in decreased survival rates or productivity in the population. The nearshore landfall activities required to bring the offshore export cables to shore may lead to disruption of seabirds (noting this is anticipated to	Screened In for all features for vessel disturbance	Screened In for all features for vessel disturbance and nearshore construction activity	Screened In for all features for nearshore construction activity

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
			be a 24 h operation to minimise the overall completion of works). **In relation to vessel disturbance and nearshore construction activity, the potential for LSE cannot be ruled out for all features of the European Site and it will therefore be assessed by the Applicant within the RIAA.**			
Lindisfarne SPA / Ramsar	46 km (SW) from Scottish Marine Scheme 42 km (W) from English Marine Scheme 52 km (N) from Onshore Scheme	• Bar-tailed godwit (*Limosa lapponica*) (Non-breeding) • Common scoter (*Melanitta nigra*) (Non-breeding) • Dunlin (*Calidris alpina*) (Non-breeding) • Eider (*Somateria mollissima*) (Non-breeding) • Golden plover (*Pluvialis apricaria*) (Non-breeding) • Grey plover (*Pluvialis squatarola*) (Non-breeding) • Greylag goose (*Anser anser*) (Non-breeding)	The Lindisfarne SPA / Ramsar protects the coastal waters adjacent to the north Northumberland coast / Holy Island. The presence of vessels associated with the Marine Scheme have the potential to introduce visual disturbance to seabird species. The sensitivity of seabirds to visual disturbance varies between species and with proximity to vessels. The slow-moving nature of vessels that will be present within the marine environment during construction of the offshore export cables will result in periods of disturbance from vessel lighting (noting	Screened Out for all features for vessel disturbance	Screened Out for all features for vessel disturbance and nearshore construction activity	Screened Out for all features for nearshore construction activity

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
		• Light-bellied brent goose (*Branta bernicla hrota*) (Non-breeding) • Little tern (*Sterna albifrons*) (Non-breeding) • Long-tailed duck (*Clangula hyemalis*) (Non-breeding) • Red-breasted merganser (*Mergus serrator*) (Non-breeding) • Redshank (*Tringa tetanus*) (Non-breeding) • Ringed plover (*haradriusCharadrius hiaticula*) (Non-breeding) • Roseate tern (*Sterna dougallii*) (Non-breeding) • Sanderling (*Calidris alba*) (Non-breeding) • Shelduck (*Tadorna tadorna*) (Non-breeding) • Waterbird assemblage (Non-breeding) • Whooper swan (*Cygnus cygnus*) (Non-breeding)	this is anticipated to be a 24 h year-round operation to minimise the overall completion of works). Temporary disturbance/displacement may lead to a reduction in foraging opportunities or increased energy expenditure, resulting in decreased survival rates or productivity in the population. With relation to the roseate tern and the little tern, the Marine Scheme is considered beyond the maximum breeding season foraging distance for these species, as described above. For all other waterbirds for which the SPA is designated, they are not considered to forage out to sea at such a distance where there would be interactivity with the Marine Scheme. The nearshore landfall activities required to bring the offshore export cables to shore are approximately 53 km to the south of this European Site at the closest point and there is therefore no potential for direct disruption of these designated species. **In relation to vessel disturbance and nearshore construction activities, there is no potential for**			

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
		• Wigeon (*Mareca uratus*) (Non-breeding)	**LSE for all features of the European Site and it will therefore not be assessed by the Applicant within the RIAA.**			
Coquet Island SPA	79 km (S) from the Scottish Marine Scheme 16 km (NW) from the English Marine Scheme 20 km (N) from the Onshore Scheme	• Common tern (*Sterna hirundo*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding) • Arctic tern (*Sterna paradisaea*) (Breeding) • Seabird assemblage (Breeding) including the components: - Atlantic puffin (*Fratercula arctica*) - Kittiwake (*Rissa tridactyla*) - Black- headed gull (*Chroicocephalus ridibundus*) - Fulmar (*Fulmarus glacialis*) - Herring gull (*Larus argentatus*)	The presence of vessels associated with the Marine Scheme have the potential to introduce visual disturbance to seabird species. The sensitivity of seabirds to visual disturbance varies between species and with proximity to vessels. The slow-moving nature of vessels that will be present within the marine environment during construction of the offshore export cables will result in periods of disturbance from vessel lighting (noting this is anticipated to be a 24 h year-round operation to minimise the overall completion of works). Temporary disturbance/displacement may lead to a reduction in foraging opportunities or increased energy expenditure, resulting in decreased survival rates or productivity in the population. Mobile bird species present during the breeding season, likely foraging, preening or loafing in marine waters around the Marine Scheme.	Screened In for all features for vessel disturbance Screened out for all features for nearshore construction activity	Screened In for all features for vessel disturbance Screened out for all features for nearshore construction activity	Vessel disturbance – not applicable to Onshore Scheme Screened out for all features for nearshore construction activity

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
		- Lesser black-backed gull (*Larus fuscus)*	The nearshore landfall activities required to bring the offshore export cables to shore are approximately 19 km to the south of this European Site at the closest point and there is therefore no potential for direct disruption of these designated species. **In relation to vessel disturbance, the potential for LSE cannot be ruled out for all features of the European Site and it will therefore be assessed by the Applicant within the RIAA for the Marine Scheme for both Scottish and English waters.**			
Farne Islands SPA	46 km (S) from the Scottish Marine Scheme 35 km (W) from the English	• Guillemot (*Uria aalge*) (Breeding) • Sandwich tern (*Sterna sandvicensis*) (Breeding) • Roseate tern (*Sterna dougallii*) (Breeding) • Common tern (*Sterna hirundo*) (Breeding) • Arctic tern (*Sterna paradisaea*) (Breeding)	The presence of vessels associated with the Marine Scheme have the potential to introduce visual disturbance to seabird species. The sensitivity of seabirds to visual disturbance varies between species and with proximity to vessels. The slow-moving nature of vessels that will be present within the marine environment during construction of the offshore export cables will result in periods of disturbance from vessel lighting (noting	Screened In for all features for vessel disturbance	Screened In for all features for vessel disturbance	Vessel disturbance – not applicable to Onshore Scheme
				Nearshore construction activity – not	Screened out for all features for	Screened out for all features for

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Marine Scheme 52 km (N) from the Onshore Scheme	• Seabird assemblage (Breeding) including the components: - Kittiwake (*Rissa tridactyla*) - Shag (*Gulosus aristotelis*) - Cormorant (*Phalacrocoracidae*) Atlantic puffin (*Fratercula arctica*) - Black- headed gull (*Chroicocephalus ridibundus*) - Fulmar (*Fulmarus glacialis*) - Great black-backed gull (*Larus marinus)* - Lesser black-backed gull (*Larus fuscus)* - Herring gull (*Larus argentatus*) - Razorbill (*Alca torda*)	this is anticipated to be a 24 h year-round operation to minimise the overall completion of works). Temporary disturbance/displacement may lead to a reduction in foraging opportunities or increased energy expenditure, resulting in decreased survival rates or productivity in the population. Mobile bird species may be present during the breeding season, likely foraging, preening or loafing in marine waters around the Marine Scheme. The nearshore landfall activities required to bring the offshore export cables to shore are approximately 50 km to the south of this European Site at the closest point and there is therefore no potential for direct disruption of these designated species. **In relation to vessel disturbance, the potential for LSE cannot be ruled out for all features of the European Site and it will therefore be assessed by the Applicant within the RIAA for the Marine Scheme for both Scottish and English waters.**	applicable to Scottish Marine Scheme	nearshore construction activity	nearshore construction activity

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
Flamborough and Filey Coast SPA	211 km (S) from Scottish Marine Scheme 122 km (S) from English Marine Scheme 125 km (S) from Onshore Scheme	• Kittiwake (*Rissa tridactyla*) (Breeding) • Gannet (*Morus bassanus*) (Breeding) • Razorbill (*Alca torda*) (Breeding) • Guillemot (*Uria aalge*) (Breeding) • Seabird assemblage (Breeding) including the components: - Fulmar (*Fulmarus glacialis*) - Atlantic puffin (*Fratercula arctica*) - Herring gull (*Larus argentatus*) - Shag (*Gulosus aristotelis*) - Cormorant (*Phalacrocoracidae*)	Features of this SPA would not be significantly affected if passing through (or over) the Project owing to the highly limited suite of construction activities required. As described above, the maximum ZOI associated with vessel disturbance is 5 km (an initial precautionary estimate for the purposes of the assessment of LSE); the SPA is outside of this. Notwithstanding, seabirds can (and will) use waters outside of the SPA and this may include the area encompassed by Marine Scheme. This may include species such as the features of this European Site, which have a particularly large foraging range. Seabirds using waters outside of the SPA will do so on a spatially and temporarily varied basis (i.e., the area encompassed by the Marine Scheme does not represent a specifically valuable resource for seabirds). The nearshore landfall activities required to bring the offshore export cables to shore are approximately 125 km to the north of this European Site at the closest point and there is therefore no	Screened Out for all features for vessel disturbance	Screened Out for all features for vessel disturbance and nearshore construction activity	Screened out for all features for nearshore construction activity

European Site	Approximate Distance and Direction to European Site (km)As	Qualifying Features and/or Species	Impact: Vessel Disturbance and Nearshore Construction Activity	Screening Outcome		
				Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
			potential for direct disruption of these designated species. **In relation to vessel disturbance and nearshore construction activities, there is no potential for LSE for all features of the European Site and it will therefore not be assessed by the Applicant within the RIAA.**			

8. Step 4: Projects Requiring Consideration for In-Combination Effects

212. This section outlines the approach to the in-combination assessment of other projects or plans within the marine environment and provides a screening of projects or plans to be considered as part of Stage Two: Report to Inform Appropriate Assessment. This section is applicable to both the Marine Scheme and the Onshore Scheme.

8.1. Approach

213. It is a requirement under the Habitats Regulations, that the potential impacts of a project are not only considered alone but are assessed in-combination with other plans and projects.

The LSE test requires consideration of the Project alone and/ or in-combination with other plans and projects. Therefore, it is not necessary at the LSE stage to consider sites/features for which an LSE 'alone' has already been identified, as in-combination effects on these sites/features (e.g. those screened in within Table 7-1, Table 7-2 and

214. Table 7-3) will be considered at the Appropriate Assessment stage.

215. The European Sites (identified in section 7 above) that have been taken forward for Stage 2 will be assessed for in-combination effects within the RIAA. Those European Sites which have been screened out in Step 3 for assessment of likely significant effects from the Project alone require an assessment to identify the potential of LSE from in-combination effects. Table 8-2 below presents this assessment.

216. Rather than assessing potential for LSE for all pathways identified within section 5 (as has been carried out for the Project alone assessment), the assessment for the potential for LSE from in-combination effects presented here focusses on pathways that are reasonably possible from the identified in-combination projects. In practice, this has included *reviewing* all potential pathways considered earlier (as set out in section 5) to understand which pathways could give rise to an in-combination LSE. Importantly, what is presented within this section of the in-combination LSE assessment is proportionate to the scale and nature of the Project (meaning a document which is focused, thereby reducing regulatory burden). The process has drawn on best practice and industry guidance and has required professional judgment to be exercised; this is discussed in paragraph 217 below.

217. The pathways taken forward for in-combination LSE assessment have been identified based on professional judgement of comparable infrastructure development experience; in accordance with the HRA Principles (UK Government, 2021), the assessment has considered all possible effects associated with the Project, reaching judgments based on the facts of the Onshore Scheme, Marine Scheme and existing baseline environment whilst using the best available objective and scientific information to make robust judgments. Whilst appreciating that the Project is not an NSIP as detailed in section 3.4.1, the Applicant is cognisant of the well-established HRA guidance available for development under the Planning Act 2008 and this has also been used to inform the assessment of potential pathways (The Planning Inspectorate, 2022); this has included thorough pre-application engagement with SNCBs prior to submission of this assessment. This is to present a proportionate assessment of LSE based on the nature, location and scale of the Project to identify those receptors and European Sites which have the potential to experience in-combination effects.

8.1.1. In-Combination Projects

218. The in-combination assessment should consider plans or projects that are 'reasonably foreseeable'[17] in their potential for in-combination impacts. Including:

- Existing projects which are under construction and installation or completed construction and installation;
- Projects which have received approval but are awaiting construction and installation; and

219. Proposals which are awaiting consent but who have information available within the public domain.

220. Other activities and industries which should be considered as part of the in-combination assessment include:

- Marine renewable developments (wind, wave or tidal);

[17] 'Reasonably foreseeable' is a term interpreted within in-combination assessments (or cumulative effects assessments, within EIA) to include other projects that are 'committed' and which are reasonably likely to come forward, in line with relevant industry guidance (The Planning Inspectorate, 2019) (Highways England, 2020).

- Coastal projects and developments (including but not limited to ports and harbours);
- Marine aggregate extraction, dredging and disposal activities;
- Offshore oil and gas activities;
- Carbon capture and sequestration; and
- Offshore subsea cables and pipelines.

221. A staged approach to the in-combination assessment will be adopted in order to identify which plans, projects or activities should be considered as part of the HRA. This staged approach will follow the same process as the cumulative effects assessment within the ES:

- **Step 1:** from a 'long list' of projects collated, the ZOI for each will be established based on the assessed receptor. The ZOI will indicate the maximum search radius for other projects, plans or activities which are to be screened out for further assessment. This is an initial screening which will be completed using information that is publicly available by 30 April 2023, as agreed with consultees.
- **Step 2:** by considering the potential impact pathways of a plan or project (i.e., as a result of a temporal or physical overlap of effects), this 'long list' will be reduced to a 'short list'. Additional information will be gathered for each plan or project on the 'short list' which will detail the activities, timescale and nature of the plan or project. This information will determine the significance of the potential cumulative impact with the Project on a receptor.

222. The projects summarised in Table 8-1 have been identified for consideration as part of the in-combination assessment for the Project. These have been based on an initial search to identify projects which have the potential to trigger in-combination.

223. Based on the potential pathways, projects have been identified for having potential to trigger in-combination LSE where they are considered to have either a direct physical overlap with the Project, or a temporal overlap (e.g., where there is an overlap within the anticipated construction timeframes, that could trigger a potential in-combination LSE).

224. The temporal overlap is based on the construction period for the Project occurring from Q4 2027 to Q4 2031.

Table 8-1 Long-list of projects to be considered as part of the in-combination assessment for the Project

Plan or Project	Status	Physical overlap?	Temporal overlap of construction period?[18]	Receptor group which may have the potential to experience in-combination effects	Scoped in?
BBWF[19]	In planning	Yes, direct overlap with the Marine Scheme	Yes, construction anticipated to be 2025 to 2032	Diadromous fish, marine mammals and ornithology	Yes
Scotland to England Green Link (SEGL) 1	In planning	Yes, direct overlap with the Marine Scheme	Yes, construction anticipated to be 2024 to 2027	Diadromous fish, marine mammals and ornithology	Yes
Eastern Link 3 (EL3)	Pre-planning	Limited information in public domain but potential for direct overlap	Potentially, earliest in service date noted as 2031	Diadromous fish, marine mammals and ornithology	Yes
Eastern Link 4 (EL4)	Pre-planning	Limited information in public domain but potential for direct overlap	Potentially, earliest in service date noted as 2031	Diadromous fish, marine mammals and ornithology	Yes

[18] Based on publicly available information.

[19] Both the proposed onshore infrastructure for the BBWF landwards of MLWS and the proposed offshore infrastructure seawards of MHWS will be assessed separately as two projects.

Plan or Project	Status	Physical overlap?	Temporal overlap of construction period?[18]	Receptor group which may have the potential to experience in-combination effects	Scoped in?
North Sea Link Interconnector Cable	Operational	Yes, direct overlap with Onshore and Marine Schemes	No, operational.	Diadromous fish	Yes
Blyth Demonstrator Offshore Wind Farm	Operational	Yes, direct overlap with Marine Scheme)	No, operational	Diadromous fish	Yes
Blyth Offshore Wind Decommissioning Project	Operational	Yes, direct overlap with Marine Scheme	No, operational	Diadromous fish	Yes
Newbiggin Bay Beach Management Area (MLA/2011/00012)	Operational / completed	No, approximately 1 km from Onshore and Marine Schemes	No, operational	N/A	No
Northumberland Energy Park (Phases 1-3)	Phase 1 and Phase 2 completed / operational, Phase 3 consented	Yes, direct overlap with Onshore Scheme	No for Phase 1 and Phase 2 Unknown for Phase 3 (no information on potentially updated construction periods following consent award have been identified from publicly available information)	Ornithology	Yes

Plan or Project	Status	Physical overlap?	Temporal overlap of construction period?[18]	Receptor group which may have the potential to experience in-combination effects	Scoped in?
Tyne / Tyne Industrial / Howden Area (Disposal Areas)	Completed	No, approximately 1 km from Onshore Scheme	No	N/A	No
Eastern Green Link (EGL) 2	In planning	No, approximately 3 km from Marine Scheme	Yes, construction anticipated to be 2025 to 2029	Diadromous fish, marine mammals and ornithology	Yes
NO-UK Fibre Optic Cable System	Operational	No, approximately 5 km from Marine Scheme	No	Diadromous fish	No
Blyth Demonstrator Offshore Wind Farm 2	Installation planned for 2023	Likely, potential for direct overlap with Marine Scheme)	No	Ornithology	Yes
Single wind turbine (tip height up to circa 300 m and rotor diameter of up to 200 m)	Unknown	Likely, potential for direct overlap with Onshore Scheme	Yes	Ornithology	Yes
22/01725/FUL I Battery Storage Site, West Sleekburn	Unknown	Likely, potential for direct overlap with Onshore Scheme	Yes	Ornithology	Yes

Table 8-2 Assessment of potential in-combination LSE for European Sites where no LSE from Project alone has been identified

European Site	Qualifying Features and/or Species	Impact	Screening of potential in-combination LSE	Screening Outcome[20]
River Tay SAC	• Atlantic salmon (*Salmo salar*) • River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*)	Removal of habitat	For the operational lifetime of the Marine Scheme, there will be long-term habitat loss where burial of the offshore export cables cannot be achieved. Burial is the preferred method of installation however cable protection may be required where this cannot be achieved. The actual footprint of the offshore export cables and associated protection (where required) will be minimal against the context of the wider North Sea and extensive prey species habitat availability elsewhere. This impact will be spatially restricted to within the footprint of the Marine Scheme and it is not considered that the removal of this footprint will result in a significant removal of habitat for these species in-combination with the other projects and plans outlined in Table 8-1. Based on the scoped in projects and plans outlined in Table 8-1, it is not considered that the introduction of the Project will result in a potential in-combination LSE for the qualifying features of the River Tay SAC. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to removal of habitat, species availability, in-combination with other plans and projects

[20] Screening outcome is applicable to both the Marine Scheme (in Scottish and English waters) and the Onshore Scheme.

European Site	Qualifying Features and/or Species	Impact	Screening of potential in-combination LSE	Screening Outcome[20]
River Tweed SAC	• Atlantic salmon (*Salmo salar*) • River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*)	Removal of habitat	A detailed discussion of this topic is provided in the row above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to removal of habitat, species availability, in-combination with other plans and projects
Tweed Estuary SAC	• Sea lamprey (*Petromyzon marinus)* • River lamprey (*Lampetra fluviatilis)*	Removal of habitat	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to removal of habitat, species availability, in-combination with other plans and projects
River Teith SAC	• Atlantic salmon (*Salmo salar*) • River lamprey (*Lamptera fluviatilis*) • Sea lamprey (*Petromyzon marinus*) • Brook lamprey (*Lampetra planeri*)	Removal of habitat	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to removal of habitat, species availability, in-combination with other plans and projects

European Site	Qualifying Features and/or Species	Impact	Screening of potential in-combination LSE	Screening Outcome[20]
River South Esk SAC	• Atlantic salmon (*Salmo salar*) • Freshwater pearl mussel (*Maragaritifera margaritifera*)	Removal of habitat	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to removal of habitat, species availability, in-combination with other plans and projects
Outer Firth of Forth and St Andrews Bay Complex SPA	• Kittiwake (*Rissa tridactyla*) • Guillemot (*Uria aalge*) • Common tern (*Sterna hirundo*) • Shag (*Gulosus aristotelis*) • Herring gull (*Larus argentatus*) • Artic tern (*Sterna paradisea*) • European shag (*Phalacrocorax aristotelis*) • Red-throated diver (*Gavia stellata*) • Slavonian grebe (*Podiceps auritus*) • Common eider (*Somateria mollissima*) • Long-tailed duck (*Clangula hyemalis*) • Common scoter (*Melanitta nigra*) • Non-breeding waterfowl assemblage • Northern gannet (*Morus bassanus*) • Atlantic puffin (*Fratercula arctica*)	Changes to prey species availability	Changes to prey availability is an indirect impact as a result of: • Temporary habitat loss / disturbance; • Increases in suspended sediment concentrations (SSC) and sediment deposition; • Release of sediment bound contaminant; and • Long-term habitat loss. During construction of the Project, there will be long-term habitat loss (where cable burial cannot be achieved, and across the footprint of the Onshore Scheme) and short-term, temporary disturbance due to the construction of the Project. In-combination, the habitat disturbance and loss will be minimal against the context of the wider North Sea and onshore habitat. This impact will be spatially restricted to within the footprint of the Project, and it is not considered that the removal of this footprint will result in a significant removal of temporary or long-term habitat for these species in-combination with the other projects and plans outlined in Table 8-1. Increases in SSC and release of sediment bound contaminant in the marine environment as a result of the Project alone are not considered	Screened Out for all species in relation to changes in prey species availability, in-combination with other plans and projects

European Site	Qualifying Features and/or Species	Impact	Screening of potential in-combination LSE	Screening Outcome[20]
	• Manx shearwater (*Puffinus puffinus*) • Razorbill (*Alca torda*) • Little gull (*Hydrocoloeus minutus*) • Black-headed gull (*Chroicocephalus ridibundus*) • Common gull (*Larus canus*) • Velvet scoter (*Melanitta fusca*) • Common goldeneye (*Bucephala clangula*) • Red-breasted merganser (*Mergus serrator*) • Seabird assemblage		to result in a potential pathway for LSE. There are five identified projects which have the potential to result in in-combination effects due to their potential for temporary overlap during construction; BBWF, SEGL1, EGL2 and potentially EL3 and EL4. Considering the temporary and localised nature of this impact, and the embedded mitigation proposed as part of BBWF, SEGL1 and EGL2 to mitigate these impacts (SSER, 2022d; National Grid and Scottish Power Transmission 2022; National Grid and Scottish and Southern Energy Networks, 2022), and the appraisal of this impact as 'not significant' within BBWF EIA (SSER, 2022d) and 'negligible' within the SEGL1 and EGL2 Environmental Appraisal Reports (EARs) it is not considered that there will be significant increases in SSC and sediment deposition in-combination. It is anticipated that the forthcoming applications for EL3 and EL4 will implement similar, appropriate embedded mitigation to reduce the impact of this effect. Based on the scoped in projects and plans outlined in Table 8-1, it is not considered that the introduction of the Project will result in a potential in-combination LSE for the qualifying features of the European Site. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	
St Abb's Head to Fast Castle SPA	• Guillemot (*Uria aalge*) • Razorbill (*Alca torda*) • Herring gull (*Larus argentatus*)	• Vessel disturbance	The presence of vessels associated with the Marine Scheme have the potential to introduce visual disturbance to seabird species. Vessel movements and operational plant machinery during operation and	Screened Out for all species in relation to vessel disturbance, in-

European Site	Qualifying Features and/or Species	Impact	Screening of potential in-combination LSE	Screening Outcome[20]
	• Shag (*Phalacrocorax aristotelis*) • Kittiwake (*Rissa tridactyla*)		maintenance are extremely low and are not considered to result in a significant LSE when considered with in-combination projects or plans. The sensitivity of seabirds to visual disturbance varies between species and with proximity to vessels. The slow-moving nature of vessels that will be present within the marine environment during construction of the offshore export cables will result in periods of disturbance from vessel lighting. There are five identified projects which have the potential to result in in-combination effects due to their potential for temporary overlap during construction. Additionally, as described in section 5.3, the maximum ZOI associated with vessel disturbance is 5 km (an initial precautionary estimate for the purposes of the assessment of LSE); the SPA is outside of this for all identified in-combination projects and plans. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	combination with other plans and projects
		• Changes to prey species availability	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to changes in prey species availability, in-combination with other plans and projects

European Site	Qualifying Features and/or Species	Impact	Screening of potential in-combination LSE	Screening Outcome[20]
Forth Islands SPA	• Guillemot (*Uria aalge*) • Gannet *(Morus bassanus)* • Razorbill (*Alca torda*) • Puffin (*Fratercula arctica*) • Herring gull (*Larus argentatus*) • Lesser black-backed gull (*Larus fuscus*) • Kittiwake (*Rissa tridactyla*) • Roseate tern (*Sterna dougallii*) • Common tern (*Sterna hirundo*) • Arctic tern (*Sterna paradisea*) • Sandwich tern (*Sterna sandvicensis*) • Shag (*Gulosus aristotelis*) • Cormorant (*Phalacrocoracidae*)	• Vessel disturbance	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to vessel disturbance, in-combination with other plans and projects
		• Changes to prey species availability	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to changes in prey species availability, in-combination with other plans and projects
Fowlsheugh SPA	• Razorbill (*Alca torda*) • Fulmar (*Fulmarus glacialis*) • Herring gull (*Larus argentatus*) • Kittiwake (*Rissa tridactyla*) • Guillemot (*Uria aalge*)	• Vessel disturbance	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to vessel disturbance, in-combination with other plans and projects

European Site	Qualifying Features and/or Species	Impact	Screening of potential in-combination LSE	Screening Outcome[20]
		• Changes to prey species availability	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to changes in prey species availability, in-combination with other plans and projects
Buchan Ness to Collieston Coast SPA	• Fulmar (*Fulmarus glacialis*) • Herring gull (*Larus argentatus*) • Shag (*Gulosus aristotelis*) • Kittiwake (*Rissa tridactyla*) • Guillemot (*Uria aalge*) • Seabird assemblage	• Vessel disturbance • Changes to prey species availability	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to vessel disturbance, in-combination with other plans and projects
			A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to changes in prey species availability, in-combination with other plans and projects

European Site	Qualifying Features and/or Species	Impact	Screening of potential in-combination LSE	Screening Outcome[20]
Northumbria Coast SPA/ Ramsar	• Little tern (*Sterna albifrons*) • Turnstone (*Arenaria interpres*) • Purple sandpiper (*Calidris maritima*) • Arctic tern (*Sterna paradisaea*)	• Changes to prey species availability	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to changes in prey species availability, in-combination with other plans and projects
Northumberland Marine SPA	• Guillemot (*Uria aalge*) • Common tern (*Sterna hirundo*) • Little tern (*Sterna albifrons*) • Sandwich tern (*Sterna sandvicensis*) • Arctic tern (*Sterna paradisaea*) • Puffin (*Fratercula arctica*) • Roseate tern (*Sterna dougallii*)	• Changes to prey species availability	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to changes in prey species availability, in-combination with other plans and projects

European Site	Qualifying Features and/or Species	Impact	Screening of potential in-combination LSE	Screening Outcome[20]
Lindisfarne SPA / Ramsar	• Whooper swan *(Cygnus cygnus)* • Greylag goose (*Anser answer)* • Light-bellied brent goose (*Branta bernicla hrota)* • Common shelduck (*Tadorna tadorna)* • Eurasian wigeon *(Anas Penelope)* • Common eider (*Somateria mollissima)* • Long-tailed duck (*Clangula hyemalis)* • Black (common) scoter (*Melanitta nigra)* • Red-breasted merganser (M*ergus serrator)*	• Vessel disturbance	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to vessel disturbance, in-combination with other plans and projects

European Site	Qualifying Features and/or Species	Impact	Screening of potential in-combination LSE	Screening Outcome[20]
	• Ringed plover (*Charadrius hiaticula)* • European golden plover (*Pluvialis apricaria)* • Grey plover (*Pluvialis squatarola)* • Sanderling (*Calidris alba)* • Dunlin Calidris (*alpina alpina)* • Bar-tailed godwit (*Limosa lapponica)* • Common redshank *(Tringa tetanus)* • Roseate tern (*Sterna dougalli)i* • Little tern (*Sterna albifrons)*	• Changes to prey species availability	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to changes in prey species availability, in-combination with other plans and projects
Coquet Island SPA	• Common tern (*Sterna hirundo*) • Sandwich tern (*Sterna sandvicensis*) • Roseate tern (*Sterna dougallii*) • Arctic tern (*Sterna paradisaea*)	• Changes to prey species availability	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to changes in prey species availability, in-combination with other plans and projects

European Site	Qualifying Features and/or Species	Impact	Screening of potential in-combination LSE	Screening Outcome[20]
Farne Islands SPA	• Guillemot (*Uria aalge*) • Sandwich tern (*Sterna sandvicensis*) • Roseate tern (*Sterna dougallii*) • Common tern (*Sterna hirundo*) • Arctic tern (*Sterna paradisaea*)	• Changes to prey species availability	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to changes in prey species availability, in-combination with other plans and projects
Flamborough and Filey Coast SPA	• Kittiwake (*Rissa tridactyla*) • Gannet (*Morus bassanus*) • Razorbill (*Alca torda*) • Guillemot (*Uria aalge*)	• Vessel disturbance	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to vessel disturbance, in-combination with other plans and projects
		• Changes to prey species availability	A detailed discussion of this topic is provided above and it is equally applicable to this European Site; it is not repeated here for brevity. **For these reasons, there is no potential for in-combination LSE on all features of the European Site in terms of habitat removal and it will therefore not be assessed by the Applicant within the RIAA.**	Screened Out for all species in relation to changes in prey species availability, in-combination with other plans and projects

9. Conclusions of the Stage 1: HRA Screening

225. This HRA Screening Report has been provided to the relevant Competent Authorities for review. The Applicant requests feedback to confirm that the identified European Sites and qualifying features are relevant to the Project and the sites identified for further assessment are acceptable. Once agreed, Stage Two of the HRA assessment will be completed in tandem with the ESs for the Marine and Onshore Schemes.

226. Table 9-1 provides a summary of the European Sites, qualifying features and potential impacts for which a potential for LSE has been identified as a result of the Project alone or in-combination with other plans or projects. The table exclusively lists only those features which have been screened in as having a potential for LSE identified.

227. One potential pathways for LSE has been identified between the Onshore Scheme and European Sites; that is disturbance and/or displacement from foraging or roosting land, for those SPAs with direct overlap with the Onshore Scheme (Northumbria Coast SPA and Ramsar, and Northumberland Marine SPA). All other potential pathways have been identified with the Marine Scheme only.

228. These sites and features will be taken forward for consideration in the RIAA.

Table 9-1 Summary of the European Sites, qualifying features and/or species and potential impacts for LSE

European Site	Relevant Qualifying Features and/or Species	Phase of Project	Potential Impact	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
River Tay SAC	Atlantic salmon (*Salmo salar*)	Operation and maintenance	EMF	✓	✓	x
	River lamprey (*Lamptera fluviatilis*)	Operation and maintenance	EMF	✓	✓	x
	Sea lamprey (*Petromyzon marinus*)	Operation and maintenance	EMF	✓	✓	x
River Tweed SAC	Atlantic salmon (*Salmo salar*)	Operation and maintenance	EMF	✓	✓	x
	River lamprey (*Lamptera fluviatilis*)	Operation and maintenance	EMF	✓	✓	x
	Sea lamprey (*Petromyzon marinus*)	Operation and maintenance	EMF	✓	✓	x
Tweed Estuary SAC	River lamprey (*Lamptera fluviatilis*)	Operation and maintenance	EMF	✓	✓	x
	Sea lamprey (*Petromyzon marinus*)	Operation and maintenance	EMF	✓	✓	x

European Site	Relevant Qualifying Features and/or Species	Phase of Project	Potential Impact	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
River Teith SAC	Atlantic salmon (*Salmo salar*)	Operation and maintenance	EMF	✓	✓	x
	River lamprey (*Lamptera fluviatilis*)	Operation and maintenance	EMF	✓	✓	x
	Sea lamprey (*Petromyzon marinus*)	Operation and maintenance	EMF	✓	✓	x
River South Esk SAC	Atlantic salmon (*Salmo salar*)	Operation and maintenance	EMF	✓	✓	x
	Freshwater pearl mussel (*Maragaritifera margaritifera*)	Operation and maintenance	EMF	✓	✓	x
Berwickshire and North Northumberland Coast SAC	Grey seal (*Halichoerus grypus*)	Construction and decommissioning	Underwater noise	✓	✓	x
Southern North Sea SAC	Harbour porpoise (*Phocoena phocoena*)	Construction and decommissioning	Underwater noise	✓	✓	x
Outer Firth of Forth and St Andrews Bay Complex SPA	Common tern (*Sterna hirundo*) (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Arctic tern (*Sterna paradisea*) (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x

European Site	Relevant Qualifying Features and/or Species	Phase of Project	Potential Impact	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Red-throated diver (*Gavia stellata*) (Non-breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Slavonian grebe (*Podiceps auritus*) (Non-breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Common eider (*Somateria mollissima*) (Non-breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Northern gannet (*Morus bassanus*) (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Little gull (*Hydrocoloeus minutus*) (Non-breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Waterfowl assemblage (non-breeding) including the components: - Long-tailed duck (*Clangula hyemalis*) - Common scoter (*Melanitta nigra*) - Velvet scoter (*Melanitta fusca*) - Common goldeneye (*Bucephala clangula*)	Construction and decommissioning	Vessel Disturbance	✓	✓	x

European Site	Relevant Qualifying Features and/or Species	Phase of Project	Potential Impact	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	- Red- breasted merganser (*Mergus serrator*)					
	Seabird assemblage (breeding) including the components: - Atlantic puffin (*Fratercula arctica*) - Kittiwake (*Rissa tridactyla*) - Manx shearwater (*Puffinus puffinus*) - Guillemot (*Uria aalge*) - Herring gull (*Larus argentatus*)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Seabird assemblage (non-breeding) including the components: - Black-headed gull (*Chroicocephalus ridibundus*) - Common gull (*Larus canus*) - Herring gull (*Larus argentatus*)	Construction and decommissioning	Vessel Disturbance	✓	✓	x

European Site	Relevant Qualifying Features and/or Species	Phase of Project	Potential Impact	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	- Guillemot (*Uria aalge*) - Shag (*Gulosus aristotelis*) - Kittiwake (*Rissa tridactyla*) - Razorbill (*Alca torda*)					
Northumbria Coast SPA/ Ramsar	Little tern (*Sterna albifrons*) (Breeding)	Construction and decommissioning	Vessel Disturbance, Nearshore Construction (and Decommissioning) Activity	✓	✓	X
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
	Turnstone (*Arenaria interpres*) (Non-breeding)	Construction and decommissioning	Vessel Disturbance, Nearshore Construction (and Decommissioning) Activity	✓	✓	X
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
			Vessel Disturbance, Nearshore Construction	✓	✓	X

European Site	Relevant Qualifying Features and/or Species	Phase of Project	Potential Impact	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Purple sandpiper (*Calidris maritima*) (Non-breeding)	Construction and decommissioning	(and Decommissioning) Activity			
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
	Arctic tern (*Sterna paradisaea*) (Breeding)	Construction and decommissioning	Vessel Disturbance, Nearshore Construction (and Decommissioning) Activity	✓	✓	X
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
Northumberland Marine SPA	Guillemot (*Uria aalge*) (Breeding)	Construction and decommissioning	Vessel Disturbance, Nearshore Construction (and Decommissioning) Activity	✓	✓	X
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
			Vessel Disturbance, Nearshore Construction	✓	✓	X

European Site	Relevant Qualifying Features and/or Species	Phase of Project	Potential Impact	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Common tern (*Sterna hirundo)* (Breeding)	Construction and decommissioning	(and Decommissioning) Activity			
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
	Little tern (*Sterna albifrons)* (Breeding)	Construction and decommissioning	Vessel Disturbance, Nearshore Construction (and Decommissioning) Activity	✓	✓	X
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
	Sandwich tern (*Sterna sandvicensis*) (Breeding)	Construction and decommissioning	Vessel Disturbance, Nearshore Construction (and Decommissioning) Activity	✓	✓	X
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
			Vessel Disturbance, Nearshore Construction	✓	✓	X

European Site	Relevant Qualifying Features and/or Species	Phase of Project	Potential Impact	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Arctic tern (*Sterna paradisaea*) (Breeding)	Construction and decommissioning	(and Decommissioning) Activity			
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
	Puffin (*Fratercula arctica*) (Breeding)	Construction and decommissioning	Vessel Disturbance, Nearshore Construction (and Decommissioning) Activity	✓	✓	X
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
	Roseate tern (*Sterna dougallii*) (Breeding)	Construction and decommissioning	Vessel Disturbance, Nearshore Construction (and Decommissioning) Activity	✓	✓	X
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
			Vessel Disturbance, Nearshore Construction	✓	✓	X

European Site	Relevant Qualifying Features and/or Species	Phase of Project	Potential Impact	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Seabird assemblage (breeding) including the components: - Cormorant (*Phalacrocoracidae*) - Shag (*Gulosus aristotelis*) - Black-headed gull (*Chroicocephalus ridibundus*) - Kittiwake (*Rissa tridactyla*)	Construction and decommissioning	(and Decommissioning) Activity			
			Disturbance and/or displacement from foraging or roosting land	X	X	✓
Coquet Island SPA	Common tern (*Sterna hirundo)* (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Sandwich tern (*Sterna sandvicensis*) (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Roseate tern (*Sterna dougallii*) (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Arctic tern (*Sterna paradisaea*) (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Seabird assemblage (Breeding) including the components:	Construction and decommissioning	Vessel Disturbance	✓	✓	x

European Site	Relevant Qualifying Features and/or Species	Phase of Project	Potential Impact	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	- Atlantic puffin (*Fratercula arctica*) - Kittiwake (*Rissa tridactyla*) - Black- headed gull (*Chroicocephalus ridibundus*) - Fulmar (*Fulmarus glacialis*) - Herring gull (*Larus argentatus*) - Lesser black-backed gull (*Larus fuscus)*					
Farne Islands SPA	Guillemot (*Uria aalge*) (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Sandwich tern (*Sterna sandvicensis*) (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Roseate tern (*Sterna dougallii*) (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Common tern (*Sterna hirundo)* (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x

European Site	Relevant Qualifying Features and/or Species	Phase of Project	Potential Impact	Scottish Marine Scheme	English Marine Scheme	Onshore Scheme
	Arctic tern (*Sterna paradisaea*) (Breeding)	Construction and decommissioning	Vessel Disturbance	✓	✓	x
	Seabird assemblage (Breeding) including the components: - Kittiwake (*Rissa tridactyla*) - Shag (*Gulosus aristotelis*) - Cormorant (*Phalacrocoracidae*) Atlantic puffin (*Fratercula arctica*) - Black- headed gull (*Chroicocephalus ridibundus*) - Fulmar (*Fulmarus glacialis*) - Great black-backed gull (*Larus marinus)* - Lesser black-backed gull (*Larus fuscus)* - Herring gull (*Larus argentatus*) - Razorbill (*Alca torda*)	Construction and decommissioning	Vessel Disturbance	✓	✓	x

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