Broadshore Hub

Wind Farm Development Areas

Habitats Regulations Appraisal Screening Report

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Executive Summary

Through the ScotWind and Innovation and Targeted Oil and Gas (INTOG) leasing rounds managed by Crown Estate Scotland (CES), Broadshore Offshore Wind Farm Limited, Sinclair Offshore Wind Farm Limited and Scaraben Offshore Wind Farm Limited (the Applicants) were successfully awarded exclusivity of the areas of seabed shown in **Figure 1.1** in **Appendix 1** to develop the 900 MW[1] Broadshore Offshore Wind Farm Project (the **Broadshore Project**), the 99.5 MW Sinclair Offshore Wind Farm Project (the **Sinclair Project**) and the 99.5 MW Scaraben Offshore Wind Farm Project (the **Scaraben Project**).

For consenting purposes, each of the above projects will comprises a Wind Farm Development Area (WFDA), an Offshore Transmission Development Area (OfTDA) and an Onshore Transmission Development Area (OnTDA). Separate consents will be sought for each Development Area.

Whilst the Broadshore Project, the Sinclair Project and the Scaraben Project are separate and distinct projects in their own right, given their geographic proximity and parallel consenting programme, they are collectively referred to as the **Broadshore Hub** for the purpose of this **Broadshore Hub WFDAs Habitats Regulations Appraisal (HRA) Screening Report**.

The Broadshore Hub will deliver significant supply chain expenditure within Scotland, have the potential to power over one million[2] homes with renewable energy and will help achieve Scotland's net zero targets whilst improving energy security.

Each WFDA will comprise the following infrastructure:

- Wind turbine generators (WTGs), with fixed bottom substructures and/or floating substructures;
- Station keeping systems (SKS) for each floating substructure, including mooring lines and anchors;
- Inter-array cables (IACs), subsea cable hub(s) and associated cable protection; and
- Scour protection for fixed bottom substructures and/or floating substructure anchoring points.

Each WFDA will comprise the following number of WTGs:

- For the Broadshore WFDA, between 32 and 60 WTGs;
- For the Sinclair WFDA, between three and six WTGs; and
- For the Scaraben WFDA, between three and six WTGs.

[1] Project capacities quoted throughout this Broadshore Hub WFDAs HRA Screening Report are approximate.
[2] https://www.broadshorewind.co.uk/.

The Applicants will seek the following consents from MD-LOT for the Broadshore WFDA; the Sinclair WDFA; and the Scaraben WFDA:

- Section 36 (s.36) consent under the Electricity Act 1989; and
- Marine Licence under the Marine and Coastal Access Act 2009 (MCAA) (applicable to Scottish offshore waters between 12 nautical miles (nm) and 200 nm).

This Screening Report accompanies the **Broadshore Hub WFDAs Scoping Report.** This HRA Screening Report informs the HRA process for the Broadshore Hub WFDAs. Specifically, this HRA Screening Report provides supporting information to enable HRA Screening with respect to the likely significant effects (LSEs) associated with the Broadshore Hub WFDAs on European sites and Ramsar sites. Where no potential LSE is predicted on a European site (either alone or in-combination with other projects or plans), the European Site has been screened out and no further assessment will be carried out. Where LSE cannot be ruled out, a more detailed assessment will be carried out in advance of the consent applications and reported within the full RIAA that will be issued alongside the s.36 and Marine Licence applications for the Broadshore Hub WFDAs.

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Glossary of Terminology

Term	Definition
Applicant(s)	Legal entity submitting consent applications for its respective project, being either: • Broadshore Offshore Wind Farm Limited; • Sinclair Offshore Wind Farm Limited; or • Scaraben Offshore Wind Farm Limited.
Benthic/Benthos	Refers to anything associated or occurring on the bottom of a body of water (the seabed).
Biologically Defined Minimum Population Scale	The estimated population size of a species within a defined biogeographic area during a biologically relevant season, as defined by Furness (2015). For many seabird species present in UK waters there are two defined biogeographic areas; UK Western waters and UK North Sea and Channel. However, some species have different defined Biologically Defined Minimum Population Scale (BDMPS) areas, dependent on the distribution and movements of the species population through the year. Furness (2015) defines the BDMPS for non-breeding seasons; the breeding season BDMPS is defined as the breeding population within foraging range from the project, plus non-breeders and immatures.
Breeding season	Furness (2015) defines breeding season as the period from modal return to the colony through to modal departure from the colony at the end of breeding, for birds at UK colonies.
Broadshore Hub	The collective term for the Broadshore Offshore Wind Farm, the Sinclair Offshore Wind Farm and the Scaraben Offshore Wind Farm.
Broadshore Hub Offshore Transmission Development Areas	The collective Offshore Transmission Development Areas of the Broadshore Offshore Wind Farm, the Sinclair Offshore Wind Farm and the Scaraben Offshore Wind Farm.
Broadshore Hub Wind Farm Development Areas	The collective Wind Farm Development Areas of the Broadshore Offshore Wind Farm, the Sinclair Offshore Wind Farm and the Scaraben Offshore Wind Farm.
Broadshore Hub WFDAs Screening Boundary	The boundary within which the Broadshore Hub Wind Farm Development Areas are located for the purpose of the Broadshore Hub WFDAs HRA Screening Report.
Broadshore Offshore Wind Farm	An offshore wind farm capable of exporting around 900 MW of renewable energy to the National Electricity Transmission System. Additional capacity may also be developed for overplanting purposes. The Wind Farm Development Area is located 47 km north of Fraserburgh, and the working assumption is that the Broadshore Offshore Wind Farm will connect to the National Grid Electricity Transmission System in the vicinity of Peterhead. The Broadshore Offshore Wind Farm comprises of the following development areas: • Wind Farm Development Area; • Offshore Transmission Development Area; and • Onshore Transmission Development Area.
Cable protection	Protective measure to minimise the effects of scour and hazards along the inter-array cables and/or offshore export cables (e.g. cable exposure or

Term	Definition
	snagging), as well as for protecting inter-array cables and/or offshore export cables at infrastructure crossing points.
Collision	Contact between moving objects.
Connector	Joint between a dynamic inter-array cable and a static inter-array cable.
Dynamic inter-array cable	The section of inter-array cable between the floating substructure and the connector to the static inter-array cable, which is designed to accommodate the dynamic movement of the floating substructure and minimise movement of the static inter-array cable.
Embedded mitigation measure	Mitigation measures to avoid or reduce environmental effects that are directly incorporated into the design for the Broadshore Hub WFDAs.
Environmental Impact Assessment	The process of evaluating the likely significant environmental effects of a proposed development over and above the existing circumstances (or 'baseline').
Excursion limit	The maximum horizontal movement of a floating substructure from its design coordinates.
Fixed bottom substructure	A substructure, or foundation, that provides support for the wind turbine generator and provides a conduit for inter-array cables.
Floating offshore unit	The combined wind turbine generator and floating substructure.
Floating substructure	A floating structure which provides buoyancy and, in conjunction with the station keeping system, supports a superstructure (e.g. wind turbine generator, offshore substation or similar), and maintaining verticality and movement within acceptable limits.
Innovation and Targeted Oil & Gas	A Crown Estate Scotland leasing round for offshore wind projects, under which the Sinclair Offshore Wind Farm and the Scaraben Offshore Wind Farm were awarded Exclusivity Agreements for their respective Wind Farm Development Areas, under which early-stage development works can progress.
Inter-array cable	Armoured cable containing electrical and fibre optic cores, which link the wind turbines to each other and to the subsea cable hub(s) and/or the offshore substation(s) and include dynamic inter-array cable and static inter-array cable sections.
Interconnector cable	Armoured cable containing electrical and fibre optic cores which link two or more offshore substations.
Landfall	The area from Mean Low Water Springs to a transition bay(s), where the offshore export cable(s) come ashore.
Lowest Astronomical Tide	The lowest level that can be expected to occur under average meteorological conditions and under any combination of astronomical conditions.
Management Units	The MUs provide an indication of the spatial scales at which impacts of plans and projects alone, cumulatively and in-combination, need to be assessed for the marine mammal species in UK waters, with consistency across the UK.
Mean High Water Springs	The average over a year of the heights of two successive high waters during those periods of 24 hours (once every fortnight) when the range of the tide is greatest.

Term	Definition
Mean Low Water Springs	The average over a year of the heights of two successive low waters during those periods of 24 hours (once every fortnight) when the range of the tide is greatest.
Mean Sea Level	The average level of the sea taking account of all tidal effects but excluding surge events.
National Electricity Transmission System	The high-voltage electricity power transmission network serving Great Britain which receives electricity from generators (such as offshore wind farms) and transmits that electricity to anywhere on the National Electricity Transmission System to satisfy demand.
Non-breeding season	Furness (2015) defines non-breeding season as the remaining part of the year that is not a part of breeding season.
Offshore export cable	Armoured cable containing electrical and fibre optic cores between the offshore substation(s) and the transition bay(s).
Offshore export cable corridor	The Marine Licence application boundary within which the offshore export cable route will be located.
Offshore export cable route	The area within the offshore export cable corridor where construction and commissioning of the offshore export cable(s) will be undertaken and will involve (but not limited to) seabed preparation, trenching, installation and burial of offshore export cable(s), and cable protection.
Offshore substation	An offshore platform which houses electrical equipment such as transformers, switchgear, and protection and control systems, enabling the wind farm's renewable electricity to be received via inter-array cables and exported via the offshore export cable(s).
Offshore Transmission Development Area	The application boundary which extending to Mean High Water Springs and within which the following will be consented: offshore export cable(s), offshore substation(s), interconnector cables and cable protection. The Offshore Transmission Development Area refers to both the area and the infrastructure described above. Each Offshore Transmission Development Area is subject to a Section 36 consent and Marine Licence application.
Onshore export cable corridor	The planning application boundary within which the onshore export cable(s) route will be located.
Onshore export cable route	The area within the onshore export cable corridor where construction and commissioning of the onshore export cables will be undertaken, and which may include (but not limited to) the onshore export cables and trench(es); link boxes and associated fencing; temporary haul road; spoil, material and equipment laydown and/or storage; drainage infrastructure; wheel washing facilities; lighting, fencing and security; and environmental mitigation area(s).
Onshore export cables	Electrical and fibre optic cables between the transition bay(s) and the onshore substation(s) which may be laid directly within a trench or laid within cable ducts or protective covers.
Onshore substation	Onshore substation which will be fenced and house electrical equipment (such as transformers, switchgear, and protection and control systems), thereby enabling renewable electricity from the wind farm(s) to be received via the onshore export cables(s) and exported to the National Electricity Transmission System.

Term	Definition
Onshore Transmission Development Area	The planning application boundary extending from Mean Low Water Springs and within which the following will be consented: landfall, onshore export cables, onshore substation(s), temporary construction compounds, and environmental mitigation areas. The Onshore Transmission Development Area refers to both the area and the infrastructure described above. Each Onshore Transmission Development Area is subject to a planning application through Planning Permission in Principle.
Operational life	The operational life is the expected length of time from final commissioning of the Wind Farm Development Area until the cessation of commercial operations.
Overplanting	The installation of additional capacity over and above that which the wind farm can export to the National Electricity Transmission System, to allow additional renewable energy to be generated and exported during times of lower wind speed or during wind turbine generator maintenance than would otherwise have been the case.
Pre-construction works	Pre-construction works are activities undertaken prior to formal commencement of construction. Examples include survey works such as geotechnical and geophysical surveys and seabed preparation activities.
Safety Zone	An area of water around or adjacent to a floating offshore unit which is to be constructed, extended, operated or decommissioned, from which certain or all classes of vessels are excluded and within which activities can be regulated for the purpose of securing safety of the floating offshore unit or vessels in that vicinity, and individuals on both the floating offshore unit and vessel, in line with Section 95 of the Energy Act 2004.
Scaraben Offshore Wind Farm	An offshore wind farm capable of exporting around 99.5 MW of renewable energy to the National Electricity Transmission System. Additional capacity may also be developed for overplanting purposes. The Wind Farm Development Area is located 58 km north of Fraserburgh and the working assumption is that the Scaraben Project will connect to the to the National Electricity Transmission System in the vicinity of Peterhead. The Scaraben Project comprises of the following development areas: • Wind Farm Development Area; • Offshore Transmission Development Area; and • Onshore Transmission Development Area.
ScotWind	A Crown Estate Scotland leasing round for offshore wind projects in which the process enabled developers to apply for seabed rights to plan and build wind farms in Scottish waters.
Scour protection	Protective material positioned around anchors and foundations to avoid sediment being eroded as a result of the flow of water.
Sinclair Offshore Wind Farm	An offshore wind farm capable of exporting around 99.5 MW of renewable energy to the National Electricity Transmission System. Additional capacity may also be developed for overplanting purposes. The Wind Farm Development Area is located 61 km north of Fraserburgh and the working assumption is that the Sinclair Project will connect to the National Electricity Transmission System in the vicinity of Peterhead. The Sinclair Project comprises of the following development areas: • Wind Farm Development Area; • Offshore Transmission Development Area; and • Onshore Transmission Development Area.

Term	Definition
Static inter-array cable	The section of inter-array cable between the connector from the dynamic inter-array cable to the subsea cable hub(s) and/or the offshore substation(s).
Station keeping system	The system (including mooring lines and anchors) used to hold a floating substructure within its excursion limit and maintain the intended orientation of the floating substructure.
Subsea cable hub	A subsea device which allows the connection of multiple inter-array cables.
Temporary construction compound	Area within the Onshore Transmission Development Area used temporarily to support the construction and commissioning, which may include (but not limited to) office, welfare and workshop facilities; vehicle parking; spoil, material and equipment laydown and/or storage; drainage infrastructure; wheel washing facilities; and lighting, fencing and security.
Transition bay	An underground structure at the landfall accessed by manhole or other means which accommodates the jointing of the offshore export cable(s) and the onshore export cables. A fence may be installed around the access manhole for protection.
Weather	Atmospheric conditions prevailing at specific moments in time or over short time periods, defined by climate variables such as temperature and precipitation.
Wet storage	The temporary storage for floating substructures and/or floating offshore units prior to their transportation to the relevant Wind Farm Development Area.
Wind Farm Development Area	The application boundary within which the following will be consented: wind turbine generators, floating and/or fixed bottom substructures and station keeping systems; inter-array cables; subsea cable hubs and associated cable protection; and scour protection. The Wind Farm Development Area refers to both the area and the infrastructure described above. Each Wind Farm Development Area is subject to a separate Section 36 consent and Marine Licence application.
Wind turbine generator	A wind turbine generator which converts wind energy into electrical energy. Each wind turbine generator is a complex system composed of a high number of components. Generally, the main components include the rotor assembly (composed of three blades and a hub); the nacelle (containing a generator, shaft and gearbox, power electronic converter and transformer); and the tower (containing lifting equipment and the switchgear).

Glossary of Acronyms

Term	Definition
AA	Appropriate assessment
AC	Alternating current
AHTS	Anchor handling tug supply
AHV	Anchor handling vessels
BDMPS	Biologically Defined Minimum Population Scales

Term	Definition
BEIS	Department for Business, Energy and Industrial Strategy (now the Department for Energy Security and Net Zero)
BTO	British Trust for Ornithology
CBRA	Cable Burial Risk Assessment
CEA	Cumulative Effects Assessment
CES	Crown Estate Scotland
CIS	Celtic and Irish Sea
cSAC	Candidate Special Area of Conservation
CTV	Crew transfer vessel
DEA	Drag embedment anchors
DECC	Department of Energy and Climate Change (now the Department for Energy Security and Net Zero)
DEFRA	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero *(formally BEIS)*
ECU	Energy Consents Unit
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EMF	Electromagnetic field
EPS	European Protected Species
ESO	Electricity System Operator *(formally National Grid ESO)*
EU	European Union
FBSS	Fixed bottom substructure
FC	Financial close
FCS	Favourable Conservation Status
FOU	Floating offshore unit
FPSO	Floating Production Storage and Offloading
FSS	Floating substructure
GNS	Greater North Sea
HGV	Heavy goods vehicle

Term	Definition
HLV	Heavy lift vessel
HRA	Habitats Regulations Appraisal
HVDC	High-voltage direct current
IAC	Inter-array cable
IAMMWG	Inter-Agency Marine Mammal Working Group
INTOG	Innovation and Targeted Oil & Gas
IPF	Initial Plan Framework
IROPI	Imperative reasons of overriding public interest
JNCC	Joint Nature Conservation Committee
JUV	Jack-up vessel
km	Kilometres
LAT	Low Astronomical Tide
LSE	Likely significant effect
MCAA	Marine and Coastal Access Act
MD-LOT	Marine Directorate - Licensing Operations Team
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
ML	Marine Licence
MLWS	Mean Low Water Springs
MMMP	Marine Mammal Mitigation Protocol
MMO	Marine Management Organisation
MPA	Marine Protected Area
MSL	Mean sea level
MSS	Marine Scotland Science
MW	Megawatt
NCMPA	Nature Conservation Marine Protected Areas
nm	Nautical mile
NS	North Sea

Term	Definition
O&M	Operation and maintenance
OFSS	Offshore substation
OfTDA	Offshore Transmission Development Area
OnTDA	Onshore Transmission Development Area
OWF	Offshore wind farm
Photo-ID	Photograph-identification
PLGR	Pre-lay Grapnel Run
pSAC	Possible/proposed Special Area of Conservation
pSPA	Potential/proposed Special Protection Area
PTS	Permanent Threshold Shift
RIAA	Report to Inform Appropriate Assessment
ROV	Remotely operated vehicle
s.36	Section 36
SAC	Special Area of Conservation
SCI	Site of Community Importance
SCOS	Special Committee on Seals
SD	Standard deviation
SEER	U.S. Offshore Wind Synthesis of Environmental Effects Research
SEPLA	Suction embedded plate anchor
SKS	Station keeping system
SMP	Sectoral Marine Plan
SMP-INTOG	Sectoral Marine Plan for Innovation and Targeted Oil and Gas
SMP-OWE	Sectoral Marine Plan for Offshore Wind Energy
SMRU	Sea Mammals Research Unit
SNH	Scottish Natural Heritage
SOV	Service operation vessel
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest

Term	Definition
T&I	Transport and installation
TLP	Tension leg platform
UK	United Kingdom
USV	Unmanned surface vessel
UXO	Unexploded ordnance
VLA	Vertical load anchor
WFDA	Wind Farm Development Area
WS	West Scotland
WTG	Wind turbine generator
WWT	Wildfowl and Wetlands Trust
ZoI	Zone of influence

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1 Introduction

1. This Broadshore Hub Wind Farm Development Areas (WFDAs) Habitats Regulations Appraisal (HRA) Screening Report provides information to enable the screening for the Broadshore Hub WFDAs associated with the Broadshore Offshore Wind Farm, the Sinclair Offshore Wind Farm and the Scaraben Offshore Wind Farm, with respect to their potential to have likely significant effects (LSE) on sites in the 'UK National Site Network' as required by the Habitats Regulations. This report accompanies the **Broadshore Hub WFDAs Scoping Report** (BlueFloat | Renantis Partnership, 2024).

2. This Broadshore Hub WFDAs HRA Screening Report has been prepared by Royal HaskoningDHV.

1.1 The Broadshore Hub Overview

3. In January 2022, as part of the ScotWind leasing round, Broadshore Offshore Wind Farm Limited was successfully awarded exclusivity of the area of seabed shown in **Figure 1.1** in **Appendix 1** to develop the 900 MW[3] Broadshore Offshore Wind Farm Project (the **Broadshore Project**).

4. In May 2023, under the innovation arm of INTOG leasing round, Sinclair Offshore Wind Farm Limited and Scaraben Offshore Wind Farm Limited was also successfully awarded exclusivity of the area of seabed shown in **Figure 1.1** in **Appendix 1** to develop the 99.5 MW Sinclair Offshore Wind Farm Project (the **Sinclair Project**) and the 99.5 MW Scaraben Offshore Wind Farm Project (the **Scaraben Project**) respectively.

5. For consenting purposes, each of the above projects comprises a WFDA, an Offshore Transmission Development Area (OfTDA) and an Onshore Transmission Development Area (OnTDA). Separate consents will be sought for each Development Area.

6. Whilst the Broadshore Project, the Sinclair Project and the Scaraben Project are separate and distinct projects in their own right, given their geographic proximity and parallel consenting programme they are collectively referred to as the **Broadshore Hub** for the purpose of this Broadshore Hub WFDAs HRA Screening Report.

7. This Broadshore Hub WFDAs HRA Screening Report accompanies the Scoping Report which requests a formal Scoping Opinion submitted to the Marine Directorate - Licensing Operations Team (MD-LOT), acting on behalf of the Scottish Ministers, relating to the:

- Broadshore WFDA;
- Sinclair WFDA; and the
- Scaraben WFDA.

[3] Project capacities quoted throughout this Broadshore Hub WFDAs HRA Screening Report are approximate.

8. The above WFDAs are located approximately 47 km, 58 km and 61 km north of Fraserburgh, off the Aberdeenshire coast, respectively as shown in as show in **Figure 1.1** in **Appendix 1.1**.

9. Consents for the Broadshore Project, the Sinclair Project and the Scaraben Project will be sought in due course by the following (collectively, the **Applicants**):

- Broadshore Offshore Wind Farm Limited (the **Broadshore Applicant**);
- Sinclair Offshore Wind Farm Limited (the **Sinclair Applicant**); and
- Scaraben Offshore Wind Farm Limited (the **Scaraben Applicant**).

10. Whilst the grid connection location(s) of the Broadshore Project, the Sinclair Project and the Scaraben Project are yet to be confirmed, the Applicants' working assumption is that all projects will connect to the National Electricity Transmission System in the vicinity of Peterhead. Confirmation of the grid connection location(s) is expected in early 2024.

11. The Broadshore Hub will deliver significant supply chain expenditure within Scotland, have the potential to power over one million homes[4] with renewable energy and will help achieve Scotland's net zero targets whilst improving energy security.

1.2 Development Areas

12. In addition to the WFDAs as discussed in **Section 1.1** above, the Broadshore Project, Sinclair Project and Scaraben Project will also comprise the OfTDA and the OnTDA to allow for the generation of electricity from the wind turbine generators (WTGs) and its transmission to the National Electricity Transmission System. The three development areas are summarised below and are shown schematically in **Plate 1.1** and the key infrastructure associated with each development area is presented in **Table 1.1** below.

- **WFDA**: Individually referred to as the **Broadshore WFDA**, the **Sinclair WFDA** and the **Scaraben WFDA**, and collectively referred to as the **Broadshore Hub WFDAs**;
- **OfTDA**: Individually referred to as the **Broadshore OfTDA**, the **Sinclair OfTDA** and the **Scaraben OfTDA**, and collectively referred to as the **Broadshore Hub OfTDAs**; and
- **OnTDA**: Individually referred to as the **Broadshore OnTDA**, the **Sinclair OnTDA** and the **Scaraben OnTDA**, and collectively referred to as the **Broadshore Hub OnTDAs**.

13. Key infrastructure associated with each Development Area is presented in **Table 1.1** below.

[4] https://www.broadshorewind.co.uk/

Table 1.1: Key Infrastructure within Each Development Area

Development Area	Key Infrastructure
Broadshore Hub WFDAs	Area as shown in **Figure 1.1** in **Appendix 1** within which the following will be consented: WTGs and associated substructures and station keeping systems (SKS) if applicable; inter-array cables (IACs), subsea cable hubs and associated cable protection; and scour protection.
Broadshore Hub OfTDAs	Area extending seaward from Mean High Water Springs (MHWS) and overlapping with the WFDAs within which the following will be consented: offshore substation(s), interconnector cables, offshore export cable(s) and associated cable protection.
Broadshore Hub OnTDAs	Area extending landward from Mean Low Water Springs (MLWS) within which the following will be consented: landfall(s), onshore export cable(s), onshore substation(s), and temporary construction compounds.

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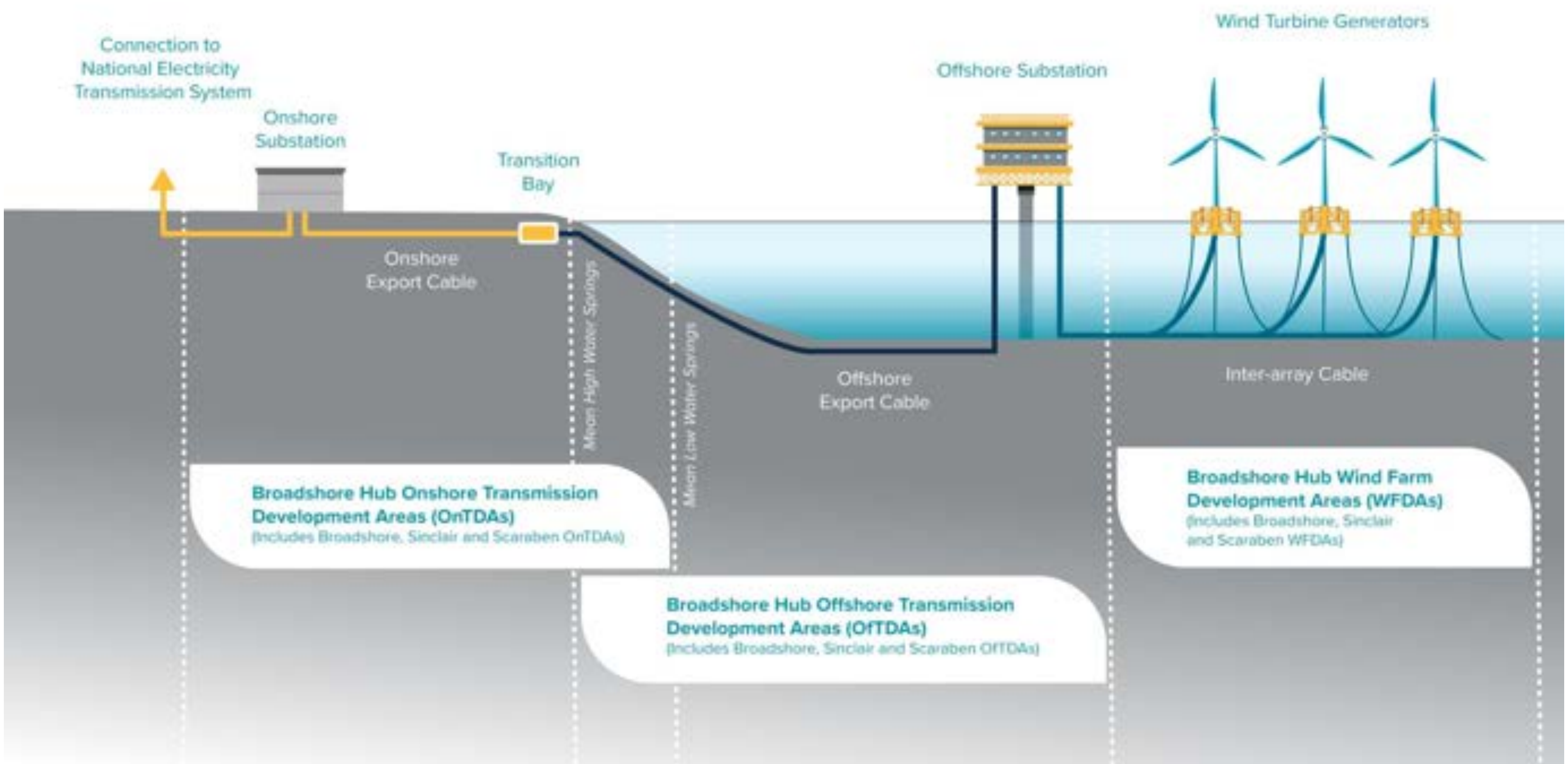
Plate 1.1: Overview of the Broadshore Hub Development Areas



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14. This Broadshore Hub WFDAs HRA Screening Report relates to the Broadshore Hub WFDAs only, the boundary of which is shown in **Figure 1.1** in **Appendix 1** and which includes the Broadshore WFDA, the Sinclair WFDA and the Scaraben WFDA infrastructure as detailed in **Table 1.1**. Stage 3 of the HRA Process (See **Section 2.2** for details) in undertaken in this Broadshore Hub WFDAs HRA Screening Report and the Applicants seek comment and feedback from relevant consultees on whether they agree with the proposed approach. The subsequent Broadshore Hub WFDAs Report to Inform Appropriate Assessment (RIAA) will be valid for three separate project applications, as agreed with MD-LOT in the Scoping Workshop, held September 2023.

15. Two additional HRA Screening Reports will be prepared separately to this Broadshore Hub WFDAs HRA Screening Report to seek comment and feedback from consultees on:

- Broadshore Hub OfTDAs HRA Screening Report, which will be submitted for offshore transmission activities and infrastructure within the Broadshore Hub OfTDAs as detailed in **Table 1.1**; and
- Broadshore Hub OnTDAs HRA Screening Report, which will be submitted separately to Aberdeenshire Council to screen for landfall(s) and onshore infrastructure works within the Broadshore Hub OnTDAs as detailed in **Table 1.1**.

16. These documents will be produced once grid connection location(s) are confirmed for the Sinclair Project and the Scaraben Project and sufficient project definition has been achieved.

1.3 Consents Strategy

17. The Applicants will seek the following consents from MD-LOT for the Broadshore WFDA; the Sinclair WDFA; and the Scaraben WFDA:

- Section 36 (s.36) consent under the Electricity Act 1989; and
- Marine Licence under the Marine and Coastal Access Act 2009 (MCAA) (applicable to Scottish offshore waters between 12 nautical miles (nm) and 200 nm).

18. A single Environmental Impact Assessment (EIA) process will be undertaken that will support each individual consent application. Each consent application will be accompanied by the Broadshore Hub WFDAs EIA Report and a RIAA which will present an assessment of likely significant effects on the environment for the following scenarios:

- **Overall Broadshore Hub WFDAs**: An assessment that will consider the construction, operation and maintenance, and decommissioning of the Broadshore Hub WFDAs infrastructure, and assess on a Broadshore Hub basis the likely significant effects should all three WFDAs be built out.
- **WFDA specific**: An assessment that will consider the construction, operation and maintenance, and decommissioning of WFDAs infrastructure, and assess on a WFDA

specific basis the likely significant effects of each individual WFDA should one be built in isolation.

19. This approach will ensure a complete impact assessment is undertaken of the overall Broadshore Hub WFDAs if they are delivered at the same time; or for each individual WFDA if they are delivered in isolation.

20. Separate consent applications will be submitted for the Broadshore Hub OfTDAs and the Broadshore Hub OnTDAs. In order to present a full project assessment of the Broadshore Hub, in-combination effects of the Broadshore Hub WFDAs, the Broadshore Hub OfTDAs and the Broadshore Hub OnTDAs will be considered together within each respective RIAA, before being considered alongside other projects and plans in the wider area.

21. Further details on the methodology for the RIAA is discussed in **Sections 2.2** and **2.3** below.

1.4 Broadshore Hub Wind Farm Development Areas Overview

22. As discussed above, the Broadshore Hub is formed of the Broadshore Project, Scaraben Project and Sinclair Project. These projects are described below.

1.4.1 Broadshore Project

23. The Broadshore WFDA (shown in **Figure 1.1** in **Appendix 1**) is located approximately 47 km north of Fraserburgh and covers an area of 134 km^2. The Broadshore WFDA will have a seabed lease for up to 60 years and an anticipated operational life of between 25 years and 50 years.

24. The Broadshore WFDA will comprise between 32 and 60 WTGs (depending on the size of the WTGs) fixed bottom and/or floating substructures, and will be capable of exporting approximately 900 MW of renewable energy to the National Electricity Transmission System.

25. The Broadshore Hub WFDAs RIAA will be based on the number of WTGs and their physical size, which will be dependent on the technology available on the market at the time of construction. A number of floating substructure, fixed bottom substructure and SKS options are being considered. IACs will connect the WTGs to the offshore substation(s) and interconnector cables will connect the offshore substation(s). Electricity will be transmitted to shore via offshore export cables (with cable protection at certain locations depending on ground conditions and cable burial depth) which will run from the offshore substation(s) to landfall(s), where the export cables will transition from offshore to onshore export cables. From there the onshore export cables will connect to the National Electricity Transmission System through a new 400kV Scottish and Southern Electricity Networks (SSEN) Transmission substation(s) in the vicinity of Peterhead (anticipated to be confirmed in early 2024).

26. The RIAA will be based on the number of WTGs and their physical size, which will be dependent on the technology available on the market at the time of construction.

1.4.2 Sinclair Project

27. The Sinclair WFDA (shown in **Figure 1.1** in **Appendix 1**) is located approximately 61 km north of Fraserburgh and covers an area of 25 km^2. A change to the Sinclair WFDA is under consideration but not yet confirmed. The original and proposed revised Sinclair WFDA boundaries are shown in **Figure 1.2** in **Appendix 1**. Whilst both boundaries fall within the Broadshore Hub WFDAs Screening Boundary[5], only the final agreed Sinclair WFDA will be assessed within the Broadshore Hub WFDAs EIA Report and RIAA. The Sinclair WFDA will have a seabed lease for a period of up to 25 years and an anticipated operational life of between 25 years and 50 years.

28. The design envelope is the same as the Broadshore WFDA. The key difference is that the Sinclair WFDA will comprise between three and six WTGs (depending on the size of the WTGs) on fixed bottom and/or floating substructures, and will be capable of exporting approximately 99.5 MW of renewable energy to the National Electricity Transmission System.

1.4.3 Scaraben Project

29. The Scaraben WFDA (shown in **Figure 1.1** in **Appendix 1**) is located approximately 58 km north of Fraserburgh and covers an area of 33 km^2. The Scaraben WFDA will have a seabed lease for a period of up to 25 years and an anticipated operational life of between 25 years and 50 years.

30. The design envelope is the same as the Broadshore WFDA. The key difference is that the Scaraben WFDA will comprise between three and six WTGs (depending on the size of the WTGs) on fixed bottom and/or floating substructures and will be capable of exporting approximately 99.5 MW of renewable energy to the National Electricity Transmission System.

1.5 Purpose of this Habitat Regulations Assessment Screening Report

31. This Broadshore Hub WFDAs HRA Screening Report informs the HRA process for the Broadshore Hub WFDAs. Specifically, this Broadshore Hub WFDAs HRA Screening Report provides supporting information to enable HRA Screening with respect to the LSEs associated with the Broadshore Hub WFDAs on European sites. Where no potential LSE is predicted on a European site (either alone or in-combination with other projects or plans), the European Site has been screened out and no further assessment will be carried out. Where LSE cannot be ruled out, a more detailed assessment will be carried out in advance of the consent applications and reported within the full RIAA that will be submitted as part of the s.36 and Marine Licence applications for the Broadshore Hub WFDAs.

32. Only the potential effects from the Broadshore Hub WFDAs during pre-construction, construction, operation and maintenance, and decommissioning phases are considered within this Broadshore Hub WFDAs HRA Screening Report. The HRA screening associated with

[5] The red line boundary which encompasses the Broadshore WFDA, the Sinclair WFDA and the Scaraben WFDA.

infrastructure and activities for the Broadshore Hub OfTDAs and Broadshore Hub OnTDAs will be considered separately in the Broadshore Hub OfTDAs and OnTDAs HRA Screening Reports. Any onshore designated sites where there is potential connectivity to the Broadshore Hub WFDAs have been considered in this Broadshore Hub WFDAs HRA Screening Report. Where any offshore designated site has potential connectivity with the Broadshore Hub OnTDAs, this will be considered in the Broadshore Hub OnTDAs HRA Screening Report associated with the onshore planning applications. Each RIAA will reflect the information available at that time on the other development areas in the Broadshore Hub (with the final RIAA submitted being most up to date).

33. The assessment within this Broadshore Hub WFDAs HRA Screening Report is based on the existing understanding of the baseline environment and the Broadshore Hub WFDAs activities. Further assessments, surveys, stakeholder engagement and offshore project design amendments may change this assessment. Any such changes will be considered within the RIAA.

34. This Broadshore Hub WFDAs HRA Screening Report covers designated sites for Annex I habitats, Annex I birds and Annex II species and will be provided to the relevant stakeholders to seek agreement on the European sites that should be considered further. This is the first stage in the development of information to support the HRA (all steps in the HRA process and associated reporting requirements are described in **Section 2** below).

2 Habitat Regulations Appraisal Process

2.1 Legislative Context

2.1.1 The Habitats Regulations

35. In 1992, the European Union (EU) Directive 92/43/EEC, known as the 'Habitats Directive', was adopted to enable EU member states to meet obligations set out under the Bern Convention (1979). The purpose of the Habitats Directive is to maintain or restore natural habitats and wild species listed in Annex I and II of the Habitats Directive at Favourable Conservation Status (FCS). Protection to meet FCS is given through designation of European Sites (Special Areas of Conservation (SAC)). In addition, the EU Directive 2009/147/EC, known as the 'Birds Directive', was implemented to provide a framework for conservation and management of wild birds in Europe. Annex I of the Birds Directive provides a list of rare, vulnerable and migratory species, which are protected through the designation of Special Protected Areas (SPAs).

36. These directives are transposed into Scottish law by:

- The Conservation (Natural Habitats &c.) Regulations 1994;
- Conservation of Habitats and Species Regulations 2017 (2017 No. 1012) which apply to Section 36 (s.36) applications within Scottish offshore waters (12 nautical miles (nm) to 200 nm)); and
- Conservation of Offshore Marine Habitats and Species Regulations 2017 (2017 No. 1013) which apply to Marine Licences within the Scottish Offshore region.

37. The Conservation of Offshore Marine Habitats and Species Regulations 2017 is the relevant pieces of secondary legislation which, prior to the UK's departure from the European Union, transposed the offshore marine aspects of the Habitats Directive and elements of the Birds Directive into the domestic law (see **Section 2.1.1.1** below for further details). Together, with changes enacted by the Conservation of Habitats and Species Amendment (EU Exit) Regulations 2019 (the 'EU Exit Regulations'), this regulation is referred to as the 'Habitats Regulations'. The Habitat Regulations require a Habitats Regulations Appraisal (HRA) to be undertaken, where a project is likely to have significant effects on a designated site (SPAs, SACs, proposed or candidate SPAs and SACs or Ramsar Sites), either individually or in-combination with other plans or projects, in consideration of the site's conservation objectives.

38. The UK is no longer a member of the EU. However, the Habitats Directive continues to provide legislative guidance for HRA in the UK through the EU Exit Regulations. This legislation sets out the changes that apply now that the UK has left the European Union, confirming that:

- All protected sites and species retain the same level of protection; and

- Among other things, the requirement for HRA to be undertaken continues to apply.

39. Unless the UK government implements additional legislative changes which may affect the HRA process, the obligations, process and terminology of the Habitats Regulations will, for the purposes of this Broadshore Hub Wind Farm Development Area (WFDAs) HRA Screening Report, remain as set out in existing legislation and regulations. The role of the European Commission is now undertaken by Scottish Ministers.

2.1.1.1 European Sites (Post EU Exit)

40. The Europe-wide network of nature conservation sites that are the subject of the HRA process was established under the Habitats Directive. European sites (SACs and SPAs) located within an EU Member State are combined to create a Europe-wide network of designated sites (the Natura 2000 network) and may be referred to as Natura 2000 Sites.

41. European sites located within the UK no longer belong to the Natura 2000 network but instead combine to form the UK's "National Site Network". The National Site Network comprises of European sites in the UK that existed on 31 December 2020 (or proposed to the European Commission before that date) and any new sites designated under the Habitats Regulations under an amended designation process. Post EU-exit, the European Commission no longer has involvement in the final stages of the derogation procedure for those sites which are part of the UK National Site Network. Hereafter, sites within the UK and the EU are both referred to within this Broadshore Hub WFDAs HRA Screening Report as 'European sites'.

42. Ramsar sites are not included within the National Site Network but are still included within this Broadshore Hub WFDAs HRA Screening Report as they remain protected in the same way as SACs and SPAs – please refer to **Section 2.1.2** for further details.

43. National Site Network management objectives are established in the EU Exit Regulations and are referred to as the network objectives. The objectives in relation to the National Site Network are to:

- Maintain or, where appropriate, restore habitats and species listed in Annexes I and II of the Habitats Directive to a FCS; and
- Contribute to ensuring, in their area of distribution, the survival and reproduction of wild birds and securing compliance with the overarching aims of the Wild Birds directive.

2.1.2 The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention)

44. The Ramsar Convention (United Nations, 1971) was adopted in 1971 and ratified by the UK in 1976, provides an international mechanism for protecting sites of global importance and is thus of key conservation significance, covering all aspects of wetland conservation. The Convention has three key uses:

- The designation of wetlands of international importance as Ramsar Sites;

- The promotion of the wise use of all wetlands in the territory of each country; and
- International co-operation with other countries to further the wise use of wetlands and their resources.

45. The criteria for assessing a site for designation as a Ramsar site include whether or not the wetland supports 20,000 water birds and/or supports 1% of the individuals in a population of one species or subspecies of water bird.

46. UK Government policy affords the same protection to Ramsar sites as SPAs and SACs. The UK has generally chosen to underpin the designation of its Ramsar sites through prior notification of these areas as Sites of Special Scientific Interest (SSSI).

2.1.3 Sectoral Marine Plan for Offshore Wind Energy

47. As part of the Scottish Government's commitment to long-term decarbonisation of the energy sector, the Scottish Government produced a Sectoral Marine Plan for Offshore Wind Energy (SMP-OWE) (Scottish Government, 2020), which was adopted in October 2020 and built upon the 2013 Draft Sectoral Marine Plan for Offshore Renewable Energy in Scottish Waters. The SMP-OWE aimed to identify sustainable Plan Options for the future development of commercial-scale offshore wind energy in Scotland, including deep water wind technologies, and covers both Scottish inshore (Scottish territorial waters or within 12 nm from shore) and offshore waters (extending from 12 nm out to the Exclusive Economic Zone (EEZ) limit).

48. The SMP-OWE identified 15 Plan Options across four regions for offshore wind development in Scotland. The plan identifies which areas of seabed can be made available for leasing by the Crown Estate Scotland (CES).

49. The SMP-OWE was developed in-combination with a strategic (plan level) HRA process, in order to assess the SMP-OWE's potential effects on international protected nature conservation sites. The strategic HRA process was undertaken as a sequence of discrete stages in accordance with established guidance for conducting plan-level HRA that was produced by Scottish Natural Heritage (SNH, now NatureScot) in 2015:

- Phase 1 – Pre-Screening Report;
- Phase 2 – Review of Proposed Assessment Methodology; and
- Phase 3 – Screening and RIAA.

50. The Pre-Screening report identified an initial list of 652 European/Ramsar sites, and their qualifying interest habitats and species, for which there could be a likely significant effect (LSE) (or where the possibility of an LSE could not be excluded). A 100 km buffer around the Plan Options was used to identify these European sites to represent the maximum foraging distance of bird species. Following the main screening process, a total of 468 European sites were identified, this consisted of the following:

- 267 SACs (including possible/proposed SACs (pSACs), candidate SACs (cSACs) and SCIs);
- 150 SPAs (including potential/proposed SPAs (pSPAs)); and
- 51 Ramsar sites (Scottish Government, 2019).

51. Of these 468 sites, 107 were non-UK sites screened in due to the presence of mobile features (e.g. cetaceans and/or birds) with ranges that regularly exceeded 100 km.

52. Overall, it was concluded that the SMP-OWE may avoid adverse effects on the integrity of Natura 2000 features either alone or in-combination with other plans and projects, provided that the project-level HRAs are conducted, an iterative plan review is undertaken, and:

- The classification of Plan Options E3 and NE2 to NE6 as being 'subject to high levels of ornithological constraint'. It was proposed, therefore, that development will be unable to progress at these Plan Options until such time that enough evidence on the environmental capacity for seabirds exists to reduce the risk to an acceptable level. This will involve the resolution of knowledge gaps through potential strategic monitoring; and
- The completion of regional-level survey work to address knowledge gaps regarding potential impacts of development within Plan Options E1 and E2.

53. The Broadshore Project, was offered an option agreement for the Broadshore WFDA under the ScotWind leasing round in 2022, and is located in Plan Option NE6. It is therefore subject to 'high levels of ornithological constraint'.

54. This Broadshore Hub WFDAs HRA Screening Report builds on the conclusions of the plan level HRA in light of developments on the nature, scale, and location of the Broadshore Hub WFDAs. It should be noted that at the time of writing, the Scottish Government is revising the SMP-OWE and plan-level HRA in 2023/2024 and will publish the consultations and amendments to the SMP-OWE in due course. The updated SMP-OWE is expected to be published in 2024.

2.1.4 Sectoral Marine Plan for Innovation and Targeted Oil and Gas Decarbonisation

55. To further support the Scottish Government's long-term decarbonisation commitments, the Scottish Government is developing a Sectoral Marine Plan for Innovation and Targeted Oil and Gas (INTOG) (SMP-INTOG), with an Initial Plan Framework (IPF) adopted in February 2022 (Scottish Government 2022), building upon the 2020 SMP-OWE in Scottish Waters (Scottish Government, 2020).

56. The Sinclair Project and Scaraben Project (part of the Broadshore Hub), were offered exclusivity agreements under the INTOG leasing round in 2023.

57. Accompanying the Draft SMP-INTOG, a plan level HRA will assess Draft Plan Options for significant effects on Natura 2000 sites. The HRA findings may lead to alterations of the SMP-INTOG if it is concluded that a development may result in a significant effect on a Natura 2000

site and that appropriate mitigation measures cannot be determined. An outcome of the HRA may include the reduction of Plan Options.

58. The final SMP for INTOG is anticipated to be published in 2024 alongside the updated SMP-OWE.

2.2 The Habitat Regulations Assessment Process

2.2.1 Overview

59. HRA is a precautionary, rigorous and legally binding procedure to protect Scotland's European sites. HRA considers the potential for LSE to arise as a result of a plan or project, which may affect the integrity of the national site network and their associated qualifying features, and can involve up to nine stages (NatureScot, 2023).

2.2.2 Stage 1 – What is the Plan or Project?

60. This stage requires the Applicants to provide the competent authority with sufficient information about the three projects to carry out an HRA. Details on the Broadshore Hub WFDAs and the three projects are presented in **Chapter 3: Project Description** of this Broadshore Hub WFDAs HRA Screening Report.

2.2.3 Stage 2: Is the Plan or Project Directly Connected with or Necessary to Site Management for Nature Conservation?

61. This test is to identify and remove from further assessment those proposals which are clearly necessary to, or of no value to, or inevitable as part of, management of the site for its qualifying interest. All qualifying interests should be considered. The Broadshore Hub is not directly connected with or necessary to site management of any European sites.

2.2.4 Stage 3: Is the Plan or Project (Either Alone or In-combination with Other Plans or Projects) Likely to Have a Significant Effect on a European Site?

62. This is essentially a screening stage to determine whether or not appropriate assessment is required. European sites are screened for LSE (either alone or in-combination with other plans or projects). It is important to consider any connectivity between the proposal and each of the qualifying interests, i.e. are there processes or pathways by with the proposal may influence the site's interest directly or indirectly? If there is doubt or a lot of detail is required, LSE should be concluded and Stage 4 should be undertaken. The effects of the three projects should be considered 'in-combination' with the effects of other projects and plans on the same European site.

63. Upon determination that there is no potential for LSE to occur to qualifying features of a site, that site is proposed to be screened out.

64. Under the Habitats Regulations, a HRA must be carried out on all plans and projects that have LSEs on European sites. The designations considered within this Broadshore Hub WFDAs HRA Screening Report are:

- SPAs (some of which are also Ramsar sites);
- pSPAs - SPAs that are approved by the UK Government but are still in the process of being classified;
- SACs;
- pSACs - A site which has been identified and approved to go out to formal consultation;
- cSACs - Following consultation on the pSAC, the site is submitted to the European Commission for designation and at this stage it is called a cSAC;
- Site of Community Importance (SCI) - Once the European Commission approves the site it becomes a SCI, before the UK government then designates it as a SAC (please note that any remaining cSACs and SCIs within the UK are sites that were adopted by the European Commission before the end of the Transition Period following the UK's exit from the EU); and
- Ramsar sites (protecting wetland areas and extend only to 'areas of marine water the depth of which at low tide does not exceed six metres').

65. Stage 3 Screening is undertaken in this Broadshore Hub WFDAs HRA Screening Report, and the Applicants are seeking comment and feedback from relevant consultees on whether they agree with the proposed approach. A separate HRA will be undertaken for the Broadshore WFDA, the Sinclair WFDA and the Scaraben WFDA, and will also consider the Broadshore Hub cumulatively.

2.2.4.1 Mitigation

66. In terms of the consideration of mitigation measures at the HRA Screening stage, the European Court of Justice issued a judgement in the People Over Wind and Sweetman case (Case C323/17) in April 2018, clarifying the stage in a HRA process when mitigation measures can be taken into account when assessing impacts on a European site. The ruling stated that "*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*". However, this does not mean that essential or intrinsic elements of the project design which could reduce or eliminate potential impacts on European sites when screening for LSE are to be ignored (see NatureScot, 2019). Examples of the intrinsic elements of a proposal which would not be considered a 'measure' and could be taken into account in a screening would usually be related to design, location, layout or standard conditions. These 'embedded mitigation measures' are not specifically designed to avoid or reduce effects on a European site but do so incidentally.

67. As such, embedded mitigation measures are taken into account in this Broadshore Hub WFDAs HRA Screening Report but mitigation measures which are specifically implemented to reduce or avoid effects on a European site are not. The embedded mitigation measures taken into account include standard industry practice and post-consent management plans for accidental

release of hazardous substances, such as the Environmental Management Plan, that would be in place regardless of the possible effects on European sites.

68. If there is an element of doubt about potential effects on qualifying features then the conclusion of "LSE" will be made, with progression to Appropriate Assessment (AA).

2.2.5 Stage 4: Undertake an Appropriate Assessment of the Implications for the Site in View of its Conservation Objectives

69. Where a plan or project is considered to have a likely significant effect on the qualifying interest(s) of a European site an AA is required. The AA determines whether the project alone or in-combination has the potential to adversely affect the integrity of the European site in view of its individual conservation objectives.

70. A single RIAA will be prepared by the Applicants taking consideration of the feedback received from the relevant consultees, and further consultation as required. The RIAA will be submitted alongside the consent applications for each of the three Broadshore Hub WFDAs Projects. The competent authority carries out the AA with advice from NatureScot. The Competent Authority then forms its own conclusions based on the RIAA. In this instance, the Competent Authority is Marine Directorate – Licensing Operations Team (MD-LOT).

2.2.6 Stage 5: Can it be Ascertained that the Proposal will Not Adversely Affect the Integrity of the Site?

71. For the projects to be consented, the AA must ascertain that they will not adversely affect the integrity of a European site. Conclusions must be based on there being no reasonable scientific doubt as to the absence of adverse effects. The integrity of the site only applies to the qualifying interests and is directly linked to the conservation objectives for the site.

72. Stages 6 to 9 are only considered in exceptional circumstances where it cannot be ascertained that the plan or project will not adversely affect the integrity of a European site.

2.2.7 Stage 6: Are there Alternative Solutions?

73. Stage 6 examines alternative ways of achieving the objectives of the project that would avoid adverse impacts on the integrity of the European site, should avoidance or mitigation measures be unable to prevent adverse effects. If it cannot be ascertained beyond reasonable scientific doubt that the proposal will not adversely affect the integrity of a European site, it can only proceed if there are no alternative solutions and there are imperative reasons of overriding public interest (see stages 8 and 9). This requirement is set out in regulation 29 of the offshore Habitats Regulations. Guidance (NatureScot, 2022) suggests alternative solutions could include alternative locations or routes; different scales or designs of development; alternative processes; or other different, practicable approaches which would have a lesser impact.

2.2.8 Stage 7: Would a Priority Habitat or Species be Adversely Affected?

74. There are no priority species (as defined in the Habitats Directive) in Scotland's SACs and the Birds Directive does not refer to 'priority' species. Priority habitats that are qualifying interests of SACs in Scotland are provided on NatureScot's website. These habitats are given a greater level of protection under regulation 29 of the offshore Habitats Regulations. Consideration needs to be taken as to whether priority habitat in Scotland (or other relevant part of the UK) would be adversely affected.

2.2.9 Stages 8 and 9: Are there Imperative Reasons of Overriding Public Interest?

75. Where it cannot be ascertained that a plan or project will not adversely affect the integrity of a European site, and there are no alternative solutions, a plan or project can only proceed if there are imperative reasons of overriding public interest (IROPI) for doing so (regulation 29 of the offshore Habitats Regulations). Where a priority habitat could be affected imperative reasons of overriding public interest are limited to those reasons outlined in regulation 29. These must relate to human health, public safety, beneficial consequences of primary importance to the environment, or any other imperative reason of overriding public interest subject to the opinion of the Scottish Ministers. Where a plan or project is to proceed for imperative reasons of overriding public interest Scottish Ministers have a duty to secure any compensatory measures necessary to ensure the overall coherence of the UK site network is protected (regulation 36 of the Habitats Regulations).

76. Without prejudice to the potential findings of the RIAA or the conclusions of the Competent Authority's AA, the Applicants will progress the development of information to support HRA derogation during the pre-submission phase, in consultation with relevant stakeholders.

2.3 Screening Methodology

2.3.1 Approach to Identifying Sites and Features

77. To facilitate the identification of the European sites and features to be considered in the HRA screening for the Broadshore Hub WFDAs, an initial pre-screening of European sites and effects has been undertaken as part of the screening assessment. This is considered an appropriate approach due to the scale of the Broadshore Hub WFDAs and the extensive ranges of European site features which may be affected (marine mammals and birds).

78. The criteria adopted for the initial identification of European sites are outlined in **Table 2.1**. This approach takes account of the location of the European sites (including Ramsar sites) in relation to the Broadshore Hub WFDAs, the anticipated Zone of Influence (ZoI) of potential effects associated with the Broadshore Hub WFDAs, and the ecology and distribution of qualifying interest features.

79. For pre-screening criterion 1, initial consideration is given to whether there is a physical boundary overlap between the Broadshore Hub WFDAs and any European sites; with all overlapping sites screened in to be taken forward for determination of LSE.

80. Pre-screening criterion 2 identifies any European sites, not already screened in using criterion 1, where there is an overlap between the Broadshore Hub WFDAs and the range of any qualifying mobile species of the European site. All sites where the Broadshore Hub WFDAs overlaps with the range of one (or more) features of a European site, are taken forward for determination of LSE.

81. Criterion 3 identifies any European sites, not already screened in by criteria 1 or 2, where the predicted ZoI of the Broadshore Hub WFDAs overlaps with a European site and/or qualifying interests of the site. For receptors associated with ornithology, consideration is also given to factors that inform the probable extent to which the different qualifying features will occur in the Broadshore Hub WFDAs.

Table 2.1: Criteria for Initial Identification of European Sites

Criterion	Definition for Identification of Relevant European Sites
1	The Broadshore Hub WFDAs overlap with one or more European or Ramsar site
2	European or Ramsar sites with qualifying mobile features/species (e.g. Annex I birds, Annex II marine mammals, migratory fish or shellfish) whose range (e.g. foraging, migratory, overwintering, breeding or natural habitat range) overlaps with the Broadshore Hub WFDAs.
3	European or Ramsar sites and/or qualifying interest features located within the potential ZoI of effects associated with the Broadshore Hub WFDAs (e.g. habitat loss or disturbance, noise and collision risk).

82. Development effects of the Broadshore Hub WFDAs will vary in their magnitude and significance, resulting from numerous factors including technology, processes used and the location and timing of activities. Concerning designated habitats and species populations, these effects can be direct (e.g. habitat loss associated with infrastructure installation) or indirect (e.g. via changes in water quality).

83. Screening is based on a conceptual 'source-pathway-receptor' approach:

- Source:
  - The origin of a potential effect (noting that a single source may have numerous pathways and receptors).
  - Example: inter-array cable (IAC) installation.
- Pathway:
  - The means by which the effect of the activity could impact a receptor.
  - Example: noise from IAC installation such as machinery.
- Receptor:

- The element of the receiving environment that is impacted.
- Example: bird species within range of the noise disturbance.

84. The source-pathway-receptor approach identifies potential effects resulting from the proposed construction, operation and maintenance, and decommissioning of the Broadshore Hub WFDAs' infrastructure. Where there is no pathway, or the pathway has sufficient distance for dissipation of the effect to a negligible level before reaching the receptor, there may be justification for the screening out of that particular receptor (i.e. feature) for the site in question.

85. Overall LSE for each European or Ramsar site cannot be screened out if a source-pathway-receptor relationship and potential LSE have been screened in for any one qualifying feature. However, each qualifying feature of that European or Ramsar site will be subsequently considered separately, and the screening process may rule out LSE for some individual features at this stage.

86. Where there is insufficient information available at this stage to screen out a European or Ramsar site or feature, the European or Ramsar site is screened in for further consideration. If, on receipt of that information, it is then possible to screen out a European or Ramsar site, or feature this will be documented as part of the Stage 2 assessment and the screening outcomes updated accordingly.

2.3.2 Consideration of In-combination Effects

87. The Habitats Regulations require that the potential effects of a project on designated sites are considered both alone and in-combination with other plans or projects. Onshore plans or projects that may be considered include (but are not limited to):

- Residential developments;
- Onshore wind farms and solar arrays;
- Planned construction of onshore cables and pipelines;
- Agricultural projects;
- Transport developments;
- Oil and gas projects and operation; and
- Carbon capture projects.

88. Offshore plans or projects that may be considered include (but are not limited to):

- Other offshore wind farms and renewables developments;
- Planned construction of sub-sea cables and pipelines;
- Aquaculture projects;
- Aggregate extraction and dredging;
- Licenced disposal sites;

- Shipping and navigation;
- Port/harbour developments;
- Oil and gas projects and operation, including seismic surveys;
- Unexploded ordnance (UXO) clearance; and
- Carbon capture developments.

89. The assessment will present relevant in-combination effects of projects using the approach as detailed in Scottish National Heritage's HRA Guidance for Plan-making Bodies in Scotland (Scottish National Heritage, 2015). This approach provides a list of criteria for types of other plans and projects that may be used to indicate the certainty that can be applied to each 'other existing development and/or approved development':

a) the incomplete parts of projects that have been started but which are not yet completed;
b) projects given consent but not yet started;
c) projects that are subject to applications for consent;
d) projects that are subject to outstanding appeal procedures;
e) any known unregulated projects that are not subject to any consent;
f) ongoing projects subject to regulatory reviews, such as discharge consents or waste management licenses;
g) development that has recently been completed but where any residual effects may not form part of the environmental baseline;
h) policies and proposals that are not yet fully implemented in plans that are still in force; and
i) draft plans that are being brought forward by other public bodies and agencies.

90. As per the Cumulative Effects Assessment (CEA) in the **Broadshore Hub WFDAs Scoping Report** (BlueFloat | Renantis Partnership, 2024), the in-combination assessment will be considered in two stages:

- **Stage 1:** In-combination effects of the whole Broadshore Hub (i.e., the Broadshore Hub WFDAs, the Broadshore Hub Offshore Transmission Development Areas (OfTDAs) and the Broadshore Hub Onshore Transmission Development Areas (OnTDAs)).
- **Stage 2**: In-combination effects of the whole Broadshore Hub (i.e., the Broadshore Hub WFDAs, the Broadshore Hub OfTDAs and the Broadshore Hub OnTDAs), alongside other plans or projects which fall into the criteria listed above.

91. All other relevant plans or projects that are publicly available six months prior to submission of the Broadshore Hub WFDAs' application will be considered in the in-combination assessment.

2.4 Consultation

92. A Scoping Workshop was held with MD-LOT and NatureScot on 13th September 2023 to discuss and agree the approach to the EIA and HRA processes for the Broadshore Hub WFDAs. A summary of the details of the consultation undertaken at the Scoping Workshop to inform this HRA is presented in **Table 2.2**.

Table 2.2: Summary of Consultation to Date on Stage 1: HRA Screening for the Broadshore Hub WFDAs

Consultee	Date/ Document	Consultation Response	How and Where Addressed
MD-LOT/ NatureScot	13th September 2023, Scoping Workshop	NatureScot's current view agrees that detailed assessment for migratory fish is not needed in the HRA for the Broadshore Hub WFDAs, but should be considered for the OfTDAs HRA. There is a study that is currently underway – State of the Science ScotMER project "diadromous fish in the marine environment" – the content of this, when available, may change their position, but currently NatureScot expect that it will confirm this position. The study report is likely to be available in first half of 2024.	See **Section 5** for further details. The Applicants agree with this position, and also agree with NatureScot and MD-LOT that impacts of the Broadshore Hub WFDAs on diadromous fish can be screened out of the HRA. Annex II fish and shellfish species are therefore screened out of further assessment in this Broadshore Hub WFDAs HRA Screening Report.
		NatureScot advised that no species should be screened out of the EIA and HRA based on a single year of data. The Applicants queried whether it would be acceptable to screen out species based on the first year of survey data and state that this is 'subject to a second year of survey'. This would ensure that if the patterns/findings in the second year of survey are (as expected) consistent with the first year, then the text and assessment within the EIA and HRA are valid and can be promptly finalised. This minimises the risk of extensive revisions being required as a result of the second year data. NatureScot indicated this will be considered further to ensure consistency with their previous advice to other projects but ideally species should be taken forward for consideration on a precautionary basis, with the results of the second year to determine how far forward the species is taken in the EIA and HRA assessment.	Species that are scarce or absent in the first year of baseline survey data have been screened out only where the available evidence on wider distribution and ecology supports this. Please see **Section 7.1**.
		NatureScot advised that the updated Sectoral Marine Plan for Offshore Wind will be released between the Broadshore Hub WFDAs HRA Screening Report submission and the EIA/HRA submission,	Noted.

Consultee	Date/ Document	Consultation Response	How and Where Addressed
		and will work with the Applicants to help minimise the amount of extra work required when the second year of survey data is available.	
MD-LOT	13th September 2023, Scoping Workshop	MD-LOT will consider the cut-off time period for projects to be included in the in-combination assessment consistently across all projects, and once confirmed, will update the Applicants.	Noted.
NatureScot	13th September 2023, Scoping Workshop	The Broadshore WFDAs HRA Screening Report will need to be very clear on the impacts for each of the WFDAs on their own, as well as all combinations of sites. There would be in-combination risks if individually any one of the three projects reaches a conclusion of significant effects on bird colonies.	Noted.

3 Project Description: Wind Farm Development Areas

3.1 Introduction

93. This chapter provides an overview of the Broadshore Hub Wind Farm Development Areas (WFDAs) and describes the main infrastructure to be included within the Broadshore Hub WFDAs Section 36 (s.36) and Marine Licence applications. It also provides an overview of the main activities that will be undertaken during construction, operation and maintenance, and decommissioning of the Broadshore Hub WFDAs' infrastructure under the s.36 consents and Marine Licences.

94. As discussed in **Chapter 1: Introduction,** separate Screening Reports and consent applications will be submitted for the Broadshore Hub Offshore Transmission Development Areas (OfTDAs) and the Broadshore Hub Onshore Transmission Development Areas (OnTDAs) in due course. Whilst there is a geographic overlap between the boundaries of the Broadshore Hub WFDAs and the Broadshore Hub OfTDA, infrastructure within the Broadshore Hub OfTDAs is outside of the scope of this Broadshore Hub WFDAs Habitats Regulations Appraisal (HRA) Screening Report and subsequent consent applications. To ensure a comprehensive assessment is undertaken in the RIAA, the Broadshore Hub WFDAs in-combination assessment will consider the Broadshore Hub OfTDA and Broadshore Hub OnTDA (see **Section 2.3.2** for details).

3.2 Design Envelope Approach

95. A parameter-based design envelope approach will be utilised to set parameters for the Broadshore Hub WFDAs Report to Inform Appropriate Assessment (RIAA) and establish the extent to which the Broadshore Hub WFDAs could impact on European sites. The design envelope will set out a minimum and maximum design scenario for each design parameter. These parameters will be further refined once more detailed engineering studies have been undertaken (which includes site-specific data).

96. The design envelope will include all relevant technical, spatial and temporal elements of the Broadshore Hub WFDAs, and the proposed methodology to be employed for construction, operation and maintenance, and decommissioning.

97. Each receptor in the technical chapters within the Broadshore Hub WFDAs RIAA will consider the design envelope and determine, then assess, the reasonable worst-case scenario for that specific chapter. Further details of the use of a design envelope are provided in **Chapter 4: Approach to Scoping and EIA** of the **Broadshore Hub WFDAs Scoping Report** (BlueFloat | Renantis Partnership, 2024). This is considered a standard approach and is widely accepted

by stakeholders and regulators, and is necessary to ensure the necessary design flexibility at this stage of project development.

98. The information presented in this chapter outlines the options and flexibility required by the Applicants and the range of potential design, location and activity parameters upon which the screening of impacts is based. The final detailed design would lie within the parameters of the design envelope, enabling detailed design work to be undertaken post-consent whilst retaining the validity of the Broadshore Hub WFDAs RIAA.

99. The need for flexibility in the consent is a key aspect of any large development but is particularly significant for offshore wind projects such as the Broadshore Hub WFDAs where technology is evolving. The design envelope must therefore provide sufficient flexibility to enable the Applicants and their contractors to use the most up to date, efficient and economical technology and techniques in the construction, operation and maintenance, and decommissioning of the Broadshore Hub WFDAs infrastructure, without affecting the surrounding environment further than the worst-case scenarios assessed in the Broadshore Hub WFDAs RIAA.

100. The design envelope has already been refined in the preparation of this HRA Screening Report. For instance, spar type floating substructures have been removed from the design envelope as their draught requirements are not compatible with Scottish ports and the Broadshore Hub WFDAs metocean characteristics. The refinement of the design envelope will continue throughout the EIA process and will be described in the RIAA.

101. Guidance has been prepared by Marine Scotland and the Energy Consents Unit on using the design envelope approach for applications under s.36 of the Electricity Act 1989 where flexibility is required in applications (Scottish Government, 2022a). This guidance will be referred to in refining the design envelope to inform the Broadshore Hub WFDAs RIAA.

3.3 Project Infrastructure

3.3.1 Broadshore Hub Wind Farm Development Areas

102. The Broadshore Hub WFDAs is located approximately 47 km north of Fraserburgh, as shown in **Figure 1.1** in **Appendix 1**. The Broadshore Hub WFDAs will comprise of:

- Wind turbine generators (WTGs) with fixed bottom and/or floating substructures (**Section 3.3.2**);
- Station keeping systems (SKS) for each floating substructure, including mooring lines and anchoring systems (**Section 3.5**);
- Inter-array cables (IACs), subsea cable hub(s) and any associated cable protection or ancillary elements (**Section 3.7**); and
- Scour protection for fixed bottom substructures and/or floating substructure anchoring points (**Section 3.8**).

103. Where appropriate, differences in the design envelope for the individual Broadshore WFDA, Sinclair WFDA and Scaraben WFDA will be highlighted.

104. Key site parameters for the Broadshore WFDA, the Sinclair WFDA and the Scaraben WFDA are presented in **Table 3.1.**

Table 3.1: Broadshore Hub Wind Farm Development Areas Parameters

Parameter/Unit	WFDA		
	Broadshore WFDA	Sinclair WFDA	Scaraben WFDA
Distance from shore (km)	47	61	58
Area (km^2)	134	25	33
Water depth (m from Mean Sea Level)	-55 to -100	-90 to -110	-90 to -110
Crown Estate Scotland Lease Period (years)	Up to 60	Up to 25	Up to 25
Operational life (years)	25 to 50	25 to 50	25 to 50

3.3.2 Wind Turbine Generators

105. The WTGs convert wind energy into electrical energy. Each WTG is a complex system composed of a high number of components. The main components are:

- Rotor assembly, composed of three blades and a hub;
- Nacelle, containing the generator, shaft and gearbox (if applicable), power electronic converter and transformer; and
- Tower containing lifting equipment and, if applicable, the switchgear.

106. Technology develops rapidly and the available sizes of turbines are expected to increase over the coming years. The WTG parameters are reflective both of today's technology and up to what the Applicants consider could be achievable by 2035. The final WTG model(s) that will be used for the Broadshore Hub will be selected post-consent.

107. The RIAA will consider several WTG parameters ensuring the worst-case is assessed for each receptor. The WTG design envelope for the Broadshore Hub WFDAs is outlined in **Table 3.2** and an infographic of key features is presented in **Plate 3.1**.

Plate 3.1: Key Features of a Typical Floating Offshore Unit

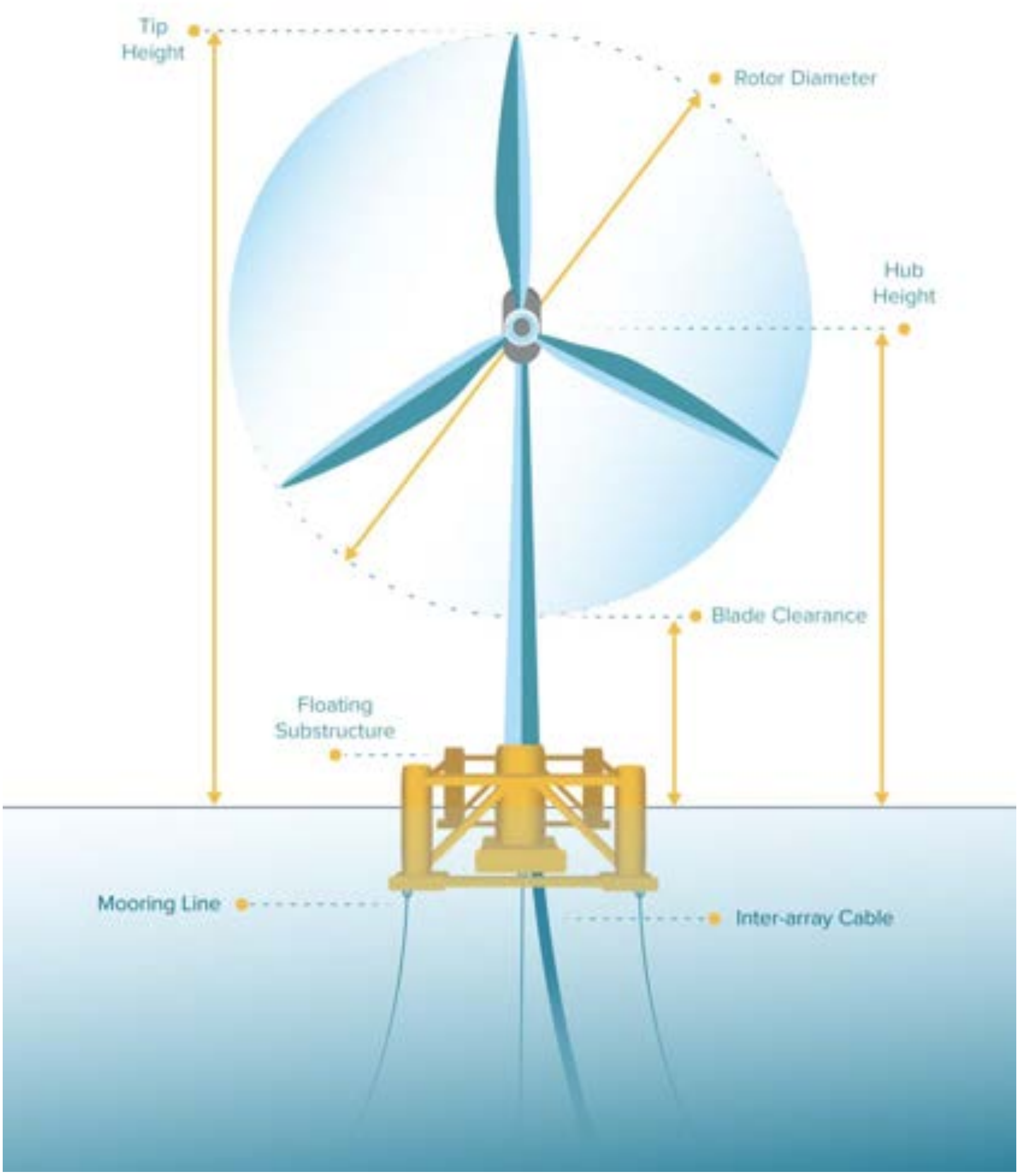

Table 3.2: Wind Turbine Generator Design Envelope

Parameter	Minimum	Maximum
WTG capacity (MW) [1]	15	28
Number of WTGs – Broadshore WFDA [1], [2]	32	60
Number of WTGs – Sinclair WFDA [1], [2]	3	6
Number of WTGs – Scaraben WFDA [1], [2]	3	6
WTG rotor diameter (m)	236	330
Minimum blade tip clearance above Mean High Water Springs (MHWS) (m) [3]	22	N/A
Maximum blade tip height (m) Lowest Astronomical Tide; (LAT)	N/A	400 m
Minimum WTG spacing (m, approximate)	1,000 (all directions)	N/A
Safety Zone radius required around WTG (pre-commissioning) (m, approximate) [4]	50	50
Safety Zone radius required around WTG (active construction) (m, approximate) [4]	500	500
Safety Zone radius required around WTG (major maintenance) (m, approximate) [4]	500	500

[1] The minimum capacity corresponds to the maximum number of WTGs and vice versa.

[2] Additional WTGs may also be developed within the each WFDA for overplanting purposes.

[3] As per Marine Guidance Note (MGN) 654. The minimum air gap for the Broadshore Hub WFDAs will be informed by technical studies and will be defined in the Broadshore Hub EIA Report.

[4] The Broadshore Hub WFDAs EIA Report and RIAA will include an assessment of the proposed approach to Safety Zones at the point of application. The total number of Safety Zones to be established at the same time has not been yet defined.

3.4 Wind Turbine Generator Substructures

108. The Broadshore Hub WFDAs will use WTGs installed upon fixed bottom substructures (FBSSs) and/or floating substructures (FSSs). The final selection of substructure and associated SKS (discussed in **Section 3.5**) will depend on factors including but not limited to seabed conditions, water depth, wave, wind and tidal conditions, economics and procurement approach. As site conditions vary across the Broadshore Hub WFDAs it is possible that more than one substructure or SKS type is used. A summary matrix of substructures and SKS options are provided in **Section 3.6**. Together, the WTG and FSS are referred to as 'floating offshore unit' (FOU).

109. The Broadshore Hub WFDAs RIAA will consider different substructure and associated SKS based on the most up to date worst-case design parameters, **Sections 3.4.1** and **3.4.2** below discuss FSS and FBSS options in turn.

3.4.1 Floating Substructures

110. FSSs require an appropriate SKS, comprising of mooring lines and anchors which will attach the FSSs to the seabed and keep them in position. SKSs options are detailed in **Section 3.5**.

111. **Table 3.3** outlines the key parameters required for screening in relation to FSSs. The parameters presented are considered worst-case and will be further refined as more detailed engineering studies are undertaken. **Plate 3.2** provides typical schematics of each FSS under consideration.

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Plate 3.2: Floating Substructure Options

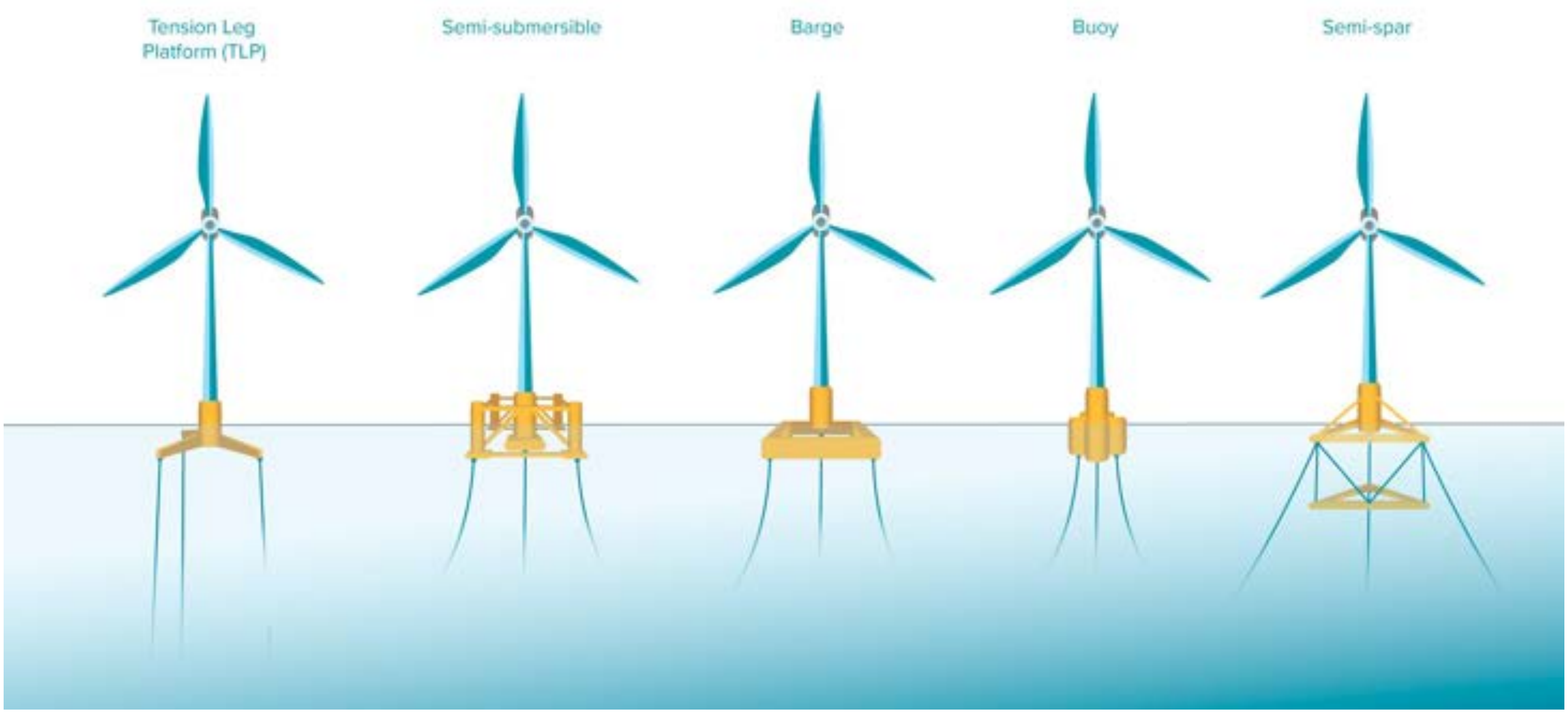

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Table 3.3: Wind Turbine Generator Floating Substructure Design Envelope – Tension Leg Platform, Semi-submersible, Barge, Buoy, and Semi-spar

Parameter (per FSS)	Minimum	Maximum
Footprint at sea surface (m x m)	60 x 60	140 x 140
Height of FSS (m)	15	60
Excursion limit of substructure[1] (m)	N/A	140
[1] Extent to which the floating substructure may offset from the design coordinates due to external conditions (e.g. wind and metocean)		

3.4.1.1 Tension Leg Platform

112. A tension leg platform (TLP) is a highly buoyant semi-submerged structure, which maintains its position and stability through the opposite forces of excess buoyancy in the FSS and the highly tensioned tendons anchored to the seabed.

113. It is anticipated that the WTG installation on a TLP would take place at an assembly port but there are some FSS concepts which may not offer sufficient stability for an integrated FOU transportation operation to a WFDA. However, if WTG integration onto the FSS was expected to be performed at the Broadshore Hub WFDAs, this operation would require installation equipment and methodologies (e.g., a floating crane installing a WTG on a FSS within the Broadshore Hub WFDAs) which are yet to be fully developed and deployed for commercial scale floating wind projects. In addition, major component replacement during the operational and maintenance phase would be more challenging for this technology if the FOU required a tow back to port for repair. A TLP may however lend itself to floating maintenance operations given the concept's good stability characteristics.

3.4.1.2 Semi-submersible Platform

114. Semi-submersible platforms are buoyancy-stabilised structures which float semi-submerged and maintain position via a SKS. These structures usually consist of a set of three or more columns connected via bracings or pontoons with heave plates, however designs may vary. Semi-submersible technology can use a wide range of SKS technology. FOU integration is likely to take place in port and installation at the Broadshore Hub WFDAs is typically achieved using tugs and anchor handling vessels (AHVs).

3.4.1.3 Barge

115. Barge technology offers low draught but a very large water-plane area, which provides the distributed buoyancy by which the platform achieves stability.

116. Generally, barge substructures comprise of a single hull, made from either concrete or steel, but variations of barge FSSs exist such as twin hulled barge concepts. Barges tend to be more susceptible to wave loading than other technology types due to the large water-plane areas.

117. Like semi-submersible technology, barges can use a variety of SKS technology and are capable of FOU integration at quayside.

3.4.1.4 Buoy (Modified Spar-buoy)

118. This form of FSS is less developed in the market, although it has some unique benefits. These FSSs are a modified form of a traditional spar that have a much shallower draught and much larger water plane area than their traditional counterparts. They behave like semi-submersibles during T&I (transport and installation) activities, operations, and FOU integration but they achieve stability, via a low centre of gravity and high centre of buoyancy, over a wider footprint than a traditional spar.

119. Unlike spars which typically require large draughts (both at the quayside and in operation), buoys tend to have draughts comparable to semi-submersibles, which improves port access and other challenges associated with deep draughts. In addition, it also allows for WTG integration at an assembly port and the transport of a fully integrated FOU to the Broadshore Hub WFDAs.

3.4.1.5 Semi-spar Platform

120. This is a subset of traditional spar form of FSS also known as a hybrid spar. They are typically split into two structures, one highly buoyant structure supporting the WTG, and another structure/mass suspended below the support structure which acts to lower the centre of gravity. Coupled together they act like a traditional spar.

121. Semi-spars offer the advantages of tradition spars in terms of stability and reduced water plane areas compared to the market, but also the benefits other FSS forms provide such as quayside FOU integration and integrated T&I operations.

122. However, the use of a counterweight does provide challenges and complications regarding installation, tow to shore maintenance activities and decommissioning, as lowering and raising of the suspended structure/mass is a difficult marine operation to undertake.

3.4.2 Fixed Bottom Substructures

123. The construction methodology of FBSSs requires the installation of the FBSS in the seabed prior to the fixing WTGs on the FBSS.

124. The following sections outline the different types of FBSS that could be selected for the Broadshore Hub WFDAs. **Table 3.4** outlines the parameters for FBSSs, while **Plate 3.3** shows a diagram of each FBSS under consideration.

Plate 3.3: Fixed Bottom Substructure Options

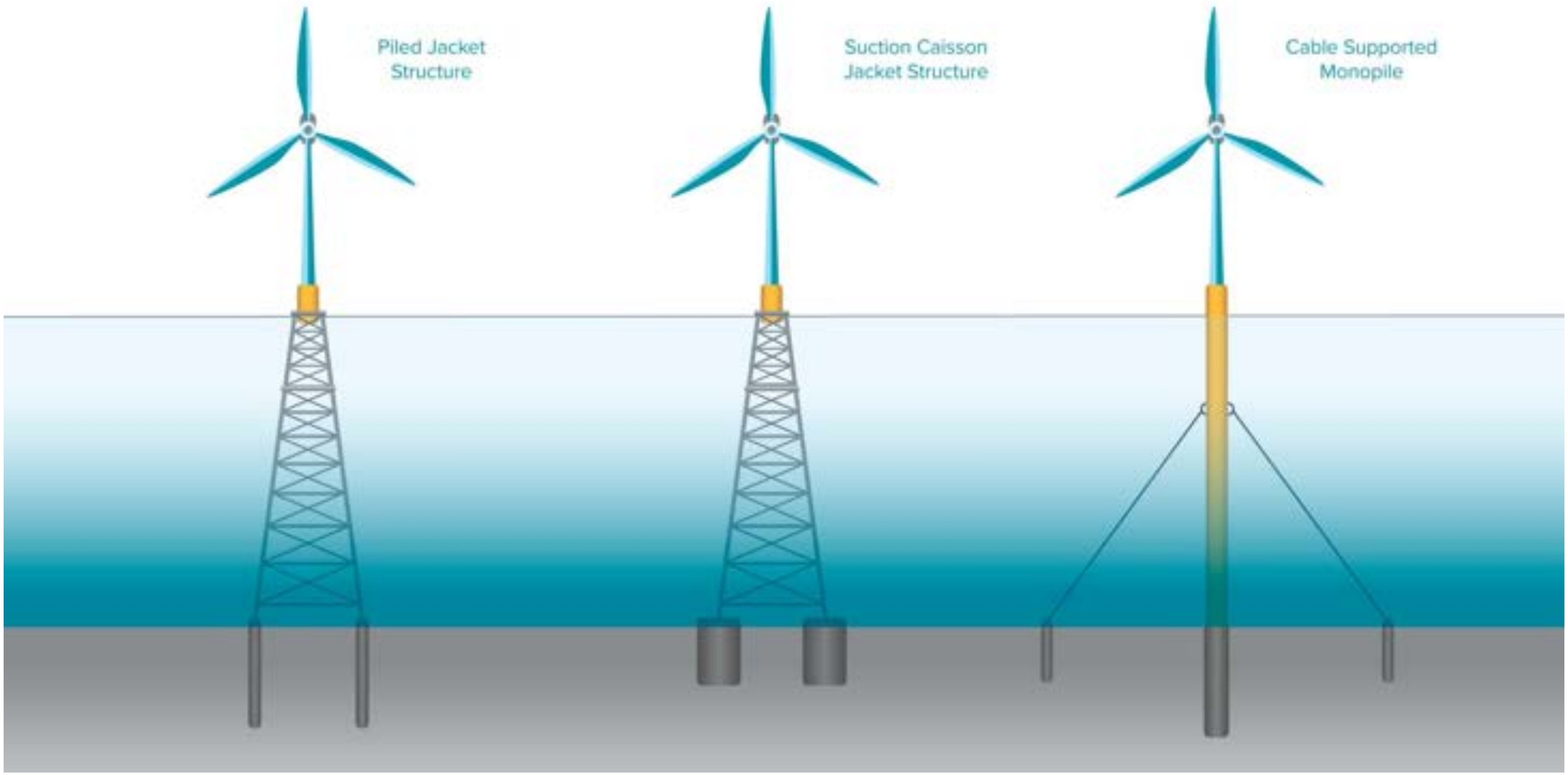

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Table 3.4: Wind Turbine Generator Fixed Bottom Substructure Design Envelope

Parameter	Minimum	Maximum
Maximum FBSS footprint (m x m) per WTG	-	60 x 60
Piled Jacket Structure		
Number of legs per jacket structure	3	4
Maximum footprint (m) per jacket structure	-	50 x 50
Number of pin piles per jacket structure	-	8
FBSS piled jacket – pin pile diameter (m) per jacket structure	-	4
FBSS piled jacket – pile blow energy (kJ) per jacket structure	-	4,000
Suction Caisson Jackets		
Number of legs	3	4
Maximum footprint (m)	-	60 x 60
Cable Supported Monopiles		
FBSS monopile – monopile diameter (m)	10	16
FBSS monopile – monopile blow e(kJ)	To be determined, subject to further design	

3.4.2.1 Piled Jacket Structure

125. Piled jacket structures are formed of a steel lattice construction, which comprises of steel members and welded joints. There is no separate transition piece with a jacket structure, with the whole jacket structure being constructed as an entirely integrated unit. The jacket structure is attached to the seabed by pin piles which are attached to the jacket feet and either driven and/or drilled into the seabed, depending on the geotechnical conditions of the seabed.

3.4.2.2 Suction Caisson Jacket Structure

126. The suction caisson jacket structure differs from the piled jacket structure by the method in which the jacket is attached to the seabed. Suction caissons are typically hollow steel canisters, capped at the top and open at the bottom and attached underneath the legs of the jacket. The structure is installed by lowering it onto the prepared seabed and a pipe running through each caisson unit begins to pump/suck water out of each unit. As this happen, and as a result of the generated suction force, the buckets get pressed/pulled down into the seabed.

127. Once the required penetration depth has been achieved the pump is switched off and grout is injected under the bucket to fill the remaining airgap and ensure contact between soil within the bucket and the top of the bucket. Suction caisson jackets do not require to be drilled or hammered into the seabed.

3.4.2.3 Cable Supported Monopile

128. Monopile substructures consist of a pile typically fabricated from steel, driven into the seabed using methods such hammering or vibrating, but could also be drilled and grouted for example. Given the Broadshore Hub WFDAs' water depths and potential scale of WTG to be installed, traditional monopile FBSS are not considered a viable option for the projects. Cable supported monopiles, also known as fully restrained platforms, include aspects of the monopile substructure design, and mooring and anchor systems to provide stability to the monopile. This enables the use of well-established monopile technology in deeper waters without significantly increasing the weight of the substructure (e.g. increasing the cost and complexity of construction, transport and installation).

129. The anchors for the additional restraining equipment would also be required to be attached to the seabed using a suitable solution dependant on the site characteristics (e.g. pin piles which are hammered or drilled).

3.5 Station Keeping System

130. To maintain position of the FOU, it is necessary to connect the FSS to the seabed via a SKS. The SKS comprises mooring lines and anchors, which also provide stability to the FOU with various degrees of influence based on the system deployed. The mooring line and anchor Design Envelopes are outlined in **Table 3.5** and **Table 3.6** respectively**.**

131. There are several types of mooring configuration and anchoring solutions which are available for floating technology. **Section 3.5.1** outline the types of mooring configuration considered for the WFDAs and **Section 3.5.2** outlines the various types of anchors being considered.

132. In addition to the mooring lines and anchoring there are several ancillary elements not described in detail here, which are deployed as part of the SKS. These include, but may not be limited to:

- Buoyancy elements;
- Clump weights;
- Shackles and connectors; and
- Tensioners.

133. The design of the SKS depends on the site characteristics and the technology being used. It is possible that different mooring and anchoring solutions may be used across the Broadshore Hub WFDAs. This will be dependent on the site characteristics (i.e. ground conditions) and determined during the design development.

3.5.1 Mooring Lines

134. Mooring lines are connected to the FSS at various points or a single point (depending on the mooring system and/or the FSS concept).

135. Mooring lines for FSS purposes can be made of several different materials for example:

- Steel (e.g. chain, sheathed spiral strand wire rope, steel pipe); and
- Synthetic rope (e.g. polyester, nylon, high modulus polyethylene).

136. The mooring types within the design envelope are illustrated in **Plate 3.4** and discussed in the sections below.

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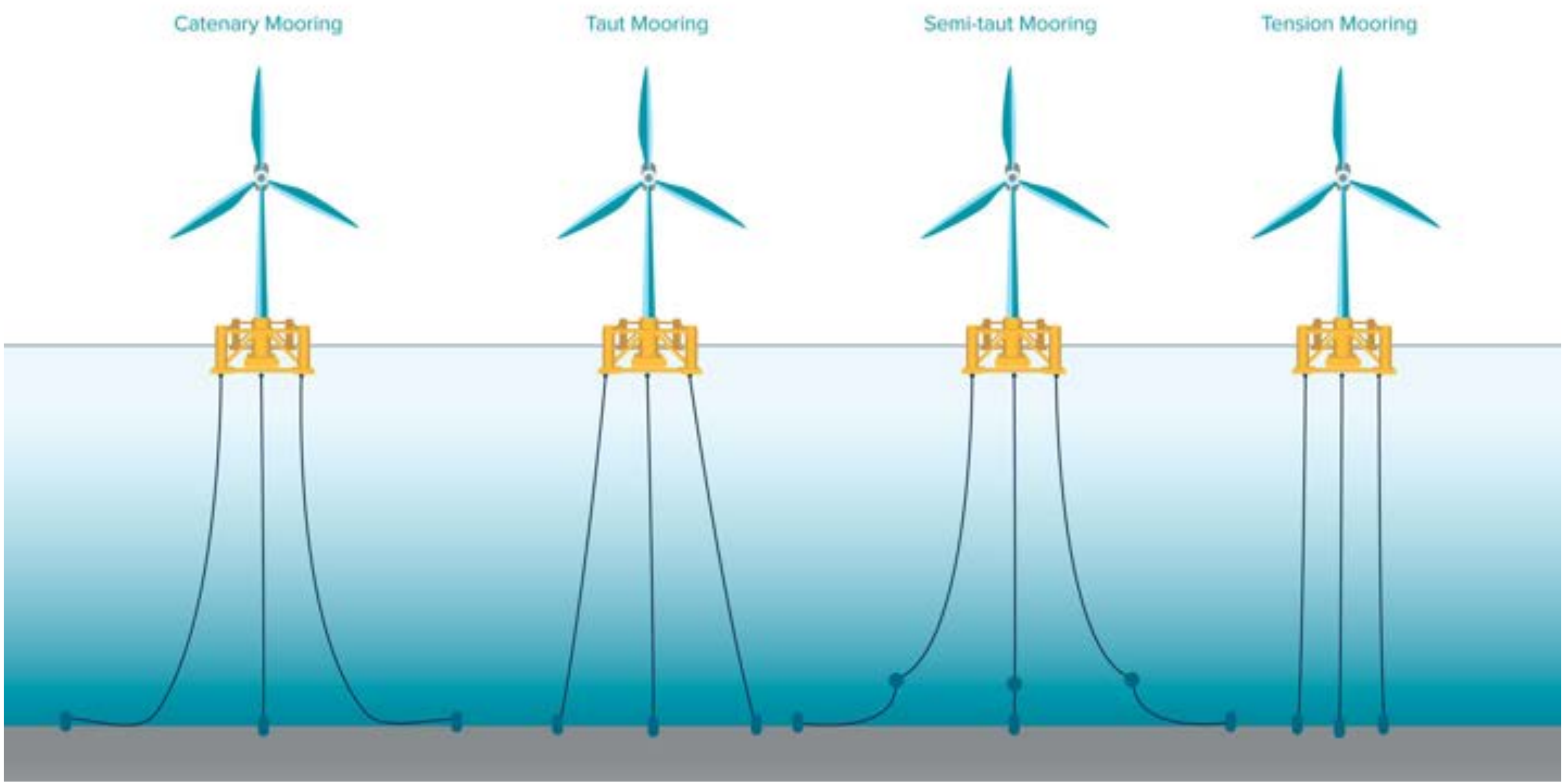
Plate 3.4: Example of Catenary, Taut, Semi-taut and Tension Mooring Configurations



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3.5.1.1 Catenary Mooring

137. This configuration uses free hanging chain, whose own weight leads to the catenary shape through the water column between the FSS and the anchor. There is a section of chain resting on the seabed prior to termination at a suitable anchor, meaning the anchors will generally only experience horizontal loading. Generally, the weight of the chain resists excursions and provides stability,

138. The length of the catenary system is typically six to eight times the water depth. This system works well in water depths of up to 300 m.

3.5.1.2 Taut Mooring

139. This configuration uses lines which are tensioned between the substructure and anchors until taut. The tension and flexibility in the lines are used to provide stability and control excursions. As the mooring is taut, there is no contact with the seabed.

140. In this configuration the load on the anchor is both vertical and horizontal, therefore pile or suction anchors are most likely to be used. It has a shorter length than a catenary system, at roughly two times the water depth. This system works well in a wide range of water depths.

3.5.1.3 Semi-taut Mooring

141. This configuration uses chain at the top and bottom of the mooring line, and rope in the mid-section forming a combination of a taut and catenary system. Buoyancy modules are used to lift the rope off the seabed and prevent damage to these sections, however, there remains some seabed contact with this mooring option.

142. The semi-taut solution, being a mix of taut and catenary systems, mean the anchors suitable for catenary systems can be used.

3.5.1.4 Tension Mooring

143. This type of system is used by TLP. Due to the vertical loading and high tension on these systems, tendons with low strain and high strength are used, which are typically steel pipe or chain but synthetic ropes or sheathed spiral strand wire rope could be used.

3.5.1.5 Shared Mooring

144. A shared mooring system is a system where adjacent FSSs share anchor points. These systems are innovative and offer potential programme, environment and cost benefits. Unlike the other SKS forms, this system will most likely only have three lines per FSS, with each of those lines connected to a buoy, with a line running vertically down from the buoy to an anchor with vertical tension capacity (i.e. a suction or driven type pile).

Table 3.5: Wind Turbine Generator Floating Substructure Design Envelope - Moorings

Parameter (per Wind Turbine Generator)	Minimum	Maximum
Number of mooring lines	N/A	12

145. Seabed footprints relating to the mooring system will be provided in the Broadshore Hub WFDAs EIA Report and RIAA.

3.5.2 Anchors

146. The anchor is the connection point between the mooring system and the seabed. Consideration needs to be given to the site-specific ground conditions and their associated properties. This is an important consideration in selection of the anchor type used. A brief description of the anchor types considered for the WFDAs is given in this section. **Plate 3.5** illustrates various types of anchors being considered with the Broadshore Hub WFDAs.

Plate 3.5: Different Anchor Types Being Considered for the Broadshore Hub WFDAs

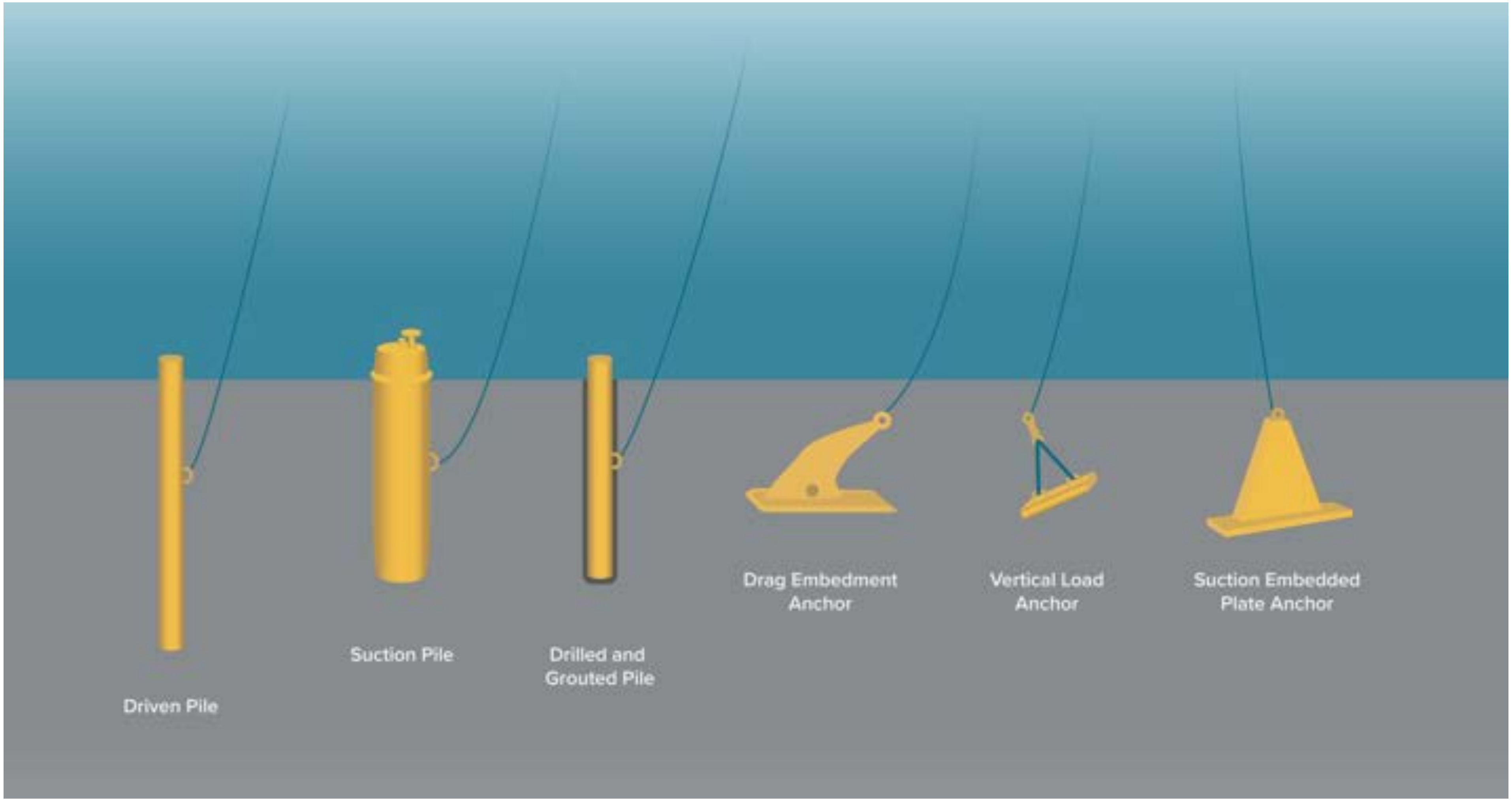

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Table 3.6: Wind Turbine Generator Floating Substructure Design Envelope - Anchors

Parameter (per Wind Turbine Generator) [1]	Minimum	Maximum
Number of anchors per floating substructure [2]	N/A	12
Anchor driven pile diameter (m)	-	3.5
Anchor driven pile length (m)	20	35
Anchor driven pile hammer energy (kJ)	250	3000
[1] These parameters will be further refined once more detailed engineering studies have been undertaken (which includes site-specific data). [2] Based upon a square/rectangular footprint with up to three mooring lines/anchors per corner.		

3.5.2.1 Driven Piles

147. Driven piles are steel tubes and are typically used for anchoring purposes in hard or challenging soil conditions (e.g. boulders). The pile is typically driven to the required penetration depth via an impact or vibratory hammer. These types of anchors can be used to support both vertical and horizontal loads.

3.5.2.2 Suction Piles

148. In suitable soil types (clays/sands) it may be possible to use suction piles (also known as suction caissons, suction cans). These use the same technique as outlined in **Section 3.4.2.2** to embed into the seabed. As with the driven pile, these anchors are good for both horizontal and vertical load resistance.

3.5.2.3 Drilled and Grouted Piles

149. Drilled and grouted piles are similar to driven piles and also typically used in hard soil conditions. However, these anchors (piles) are installed through drilling a void into the seabed to a target depth and then grouting in-situ to seal form the connection between the pile and the surrounding ground.

3.5.2.4 Drag Embedment Anchors

150. Drag embedment anchors (DEA) work by being dragged across the seabed, embedding themselves to the required depth. They are best suited for use with catenary and semi-taut mooring systems due to the fact that they support horizontal loading. They work well in sediments which contain a significant proportion of clay and when fully submerged in the seabed.

3.5.2.5 Vertical Load Anchors

151. Vertical load anchors (VLAs) are similar to DEAs in that they are installed by dragging the anchor across the seabed. However, these anchors are capable of bearing both vertical and horizontal loads.

3.5.2.6 Suction Embedded Plate Anchors

152. Suction embedded plate anchors (SEPLA) are similar to VLAs but are installed using a suction embedment method similar to the suction pile.

3.6 Summary of Substructure, Mooring and Anchor Systems

153. A summary of the potential turbine types, with associated substructure types and mooring, substructure and anchor options is presented in **Table 3.7** and **Table 3.8** below. **Table 3.7** and **Table 3.8** also identify which options would require scour protection and/or piling activities.

Table 3.7: Summary Matrix of Floating Substructure Type and Associated Station Keeping System Infrastructure

Substructure Type	Mooring Options	Floating Substructure Anchor Options	Scour Protection	Impact Piling
Tension leg platform (TLP)	Tension Mooring	Driven piles	Yes	Yes
		Drilled and grouted piles	Yes	No
		Suction piles	Yes	No
Semi-submersible Barge Buoy (modified spar-buoy) Semi-spar	Taut Mooring	Driven piles	Yes	Yes
		Drilled and grouted	Yes	No
		Suction piles	Yes	No
	Catenary Semi-taut	Driven piles	Yes	Yes
		Drilled and grouted	Yes	No
		Suction piles	Yes	No
		Drag embedment/Vertical load/Suction embedded plate	No	No
	Shared mooring	Driven piles	Yes	Yes
		Drilled and grouted	Yes	No
		Suction piles	Yes	No

Table 3.8: Summary Matrix of Fixed Bottom Substructure Type

Substructure Type	Mooring Options	Fixed Bottom Substructures	Scour Protection	Impact Piling
Piled jacket	N/A	Pin piles Driven Drilled and grouted	Yes	Yes, when driven
Suction caisson jacket	N/A	Suction caissons	Yes	No
Cable supported monopile	Taut lines between the monopile and anchor piles	Monopile • Driven • Drilled and grouted Anchor Piles supporting the taut lines • Driven • Drilled and grouted • Suction caissons	Yes	Yes, when driven (monopile and anchor piles)

3.7 Cables

154. Cables are a vital infrastructure, responsible for conducting the electricity generated by the WTGs to the OFSS for export to shore. The Broadshore Hub WFDAs will utilise IACs to conduct electricity between WTGs in a string and the last WTG to the OFSS, with the potential use of subsea cable hub(s) depending on the IAC design layout.

155. The Broadshore Hub OfTDAs consent applications will consider interconnector cables and offshore export cables.

156. No cable crossings of third-party cables are anticipated within the Broadshore Hub WFDAs. Cables, and proposed burial and protection methods, are discussed in the following sections.

3.7.1 Inter-array Cables

157. The IACs are armoured cables containing electrical and fibre optic cores, which link the wind turbines to each other and to the subsea cable hub(s) and/or the offshore substation(s) and include dynamic inter-array cable and static inter-array cable sections. It is typical for WTGs to be connected together via strings or loops of IACs, dependent on the electrical design selected.

158. Currently, the typical voltage rating of an IAC is 66 kV, however due to the increasing WTG capacity the supply chain is developing IACs with a voltage rating of 132 kV. These higher voltage IACs are therefore also being considered at this stage.

159. The IAC footprint, i.e., total length of cable to be installed multiplied by width of seabed to be affected during the installation, is not yet determined and will be specified within the Broadshore Hub WFDAs EIA Report.

160. For FBSS, static IAC risers are typically used, as these are attached to the jackets or monopiles. For FSS, due to the nature (and movement) of the structure, dynamic IACs are also required. Each IAC (between FOUs) will be a single IAC but will comprise both static (on the seabed) and dynamic (moving within the water column) sections connected together to form one continuous cable. The dynamic IAC section is designed to accommodate the dynamic movement of the FSS.

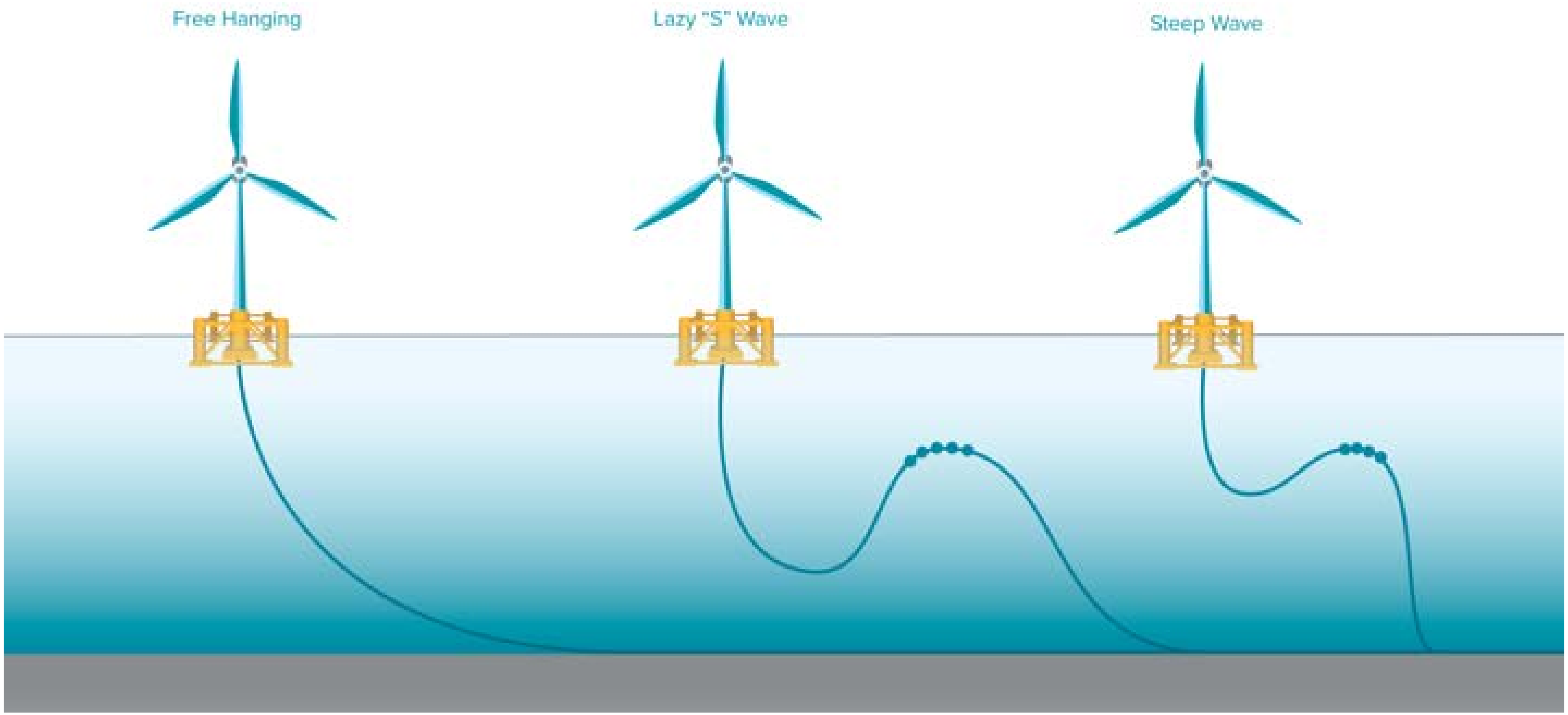
161. The section of the IAC from the WTG and approaching the OFSS (i.e., the riser section) can be either dynamic or static, depending on the type of OFSS selected (i.e., fixed bottom or floating).

162. Dynamic IACs can be deployed in various configurations, depending on a number of factors such as water depth and on-site conditions. These configurations may include:

- Free hanging;
- Lazy “S” wave; and
- Steep wave.

163. The lazy “S” wave configuration is the configuration most associated with floating wind applications. However, further detailed design is required to define the most suitable configuration for the Broadshore Hub WFDAs. **Plate 3.6** illustrates these potential configurations.

Plate 3.6: Dynamic Inter-array Cable Configuration Options



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164. Dynamic cable configurations require a number of auxiliary cable items, designed to help reduce fatigue and protect the cable, such as:

- Buoyancy modules;
- Bend stiffeners;
- Bend restrictors;
- Abrasion protection at the touchdown point; and
- Connector (joining the dynamic IAC to the static IAC).

165. At the point where the dynamic cable comes into contact with the seabed, the touchdown point, it essentially transitions to being a laid static cable, usually via a connector, and consideration needs to be given to cable protection at this stage. In addition, clump weights/ballast and tethering anchors are used to hold the cable in position.

166. A detailed Cable Burial Risk Assessment (CBRA) will be prepared where the static sections of the IACs that come into contact with the seabed are proposed to be buried to determine the target burial depth. The CBRA will also highlight instances where adequate burial cannot be achieved and alternative protection is needed (see **Section 3.7.2**).

167. Prior to any installation on the seabed, it is likely that seabed preparation activities will be required. This would involve activities such as boulder and sand wave clearance and management of unexploded ordnance (UXO). These are outlined in **Section 3.9.1**.

3.7.2 Cable Burial and Protection

168. The IAC static sections may be surface laid or buried. Should any portion of the IAC require burial, cable burial methods include jet trenching, mechanical trenching, cable ploughing and mass flow excavator. The exact cable installation, burial and protection methodology and measure will be selected post-consent and will be informed by the CBRA. The target burial depth will be defined by the CBRA. The CBRA will also highlight instances where adequate burial cannot be achieved, and alternative protection is needed. The maximum width of seabed affected by installation per cable and volume of material to be deployed for cable protection will be presented within the Broadshore Hub WFDAs RIAA.

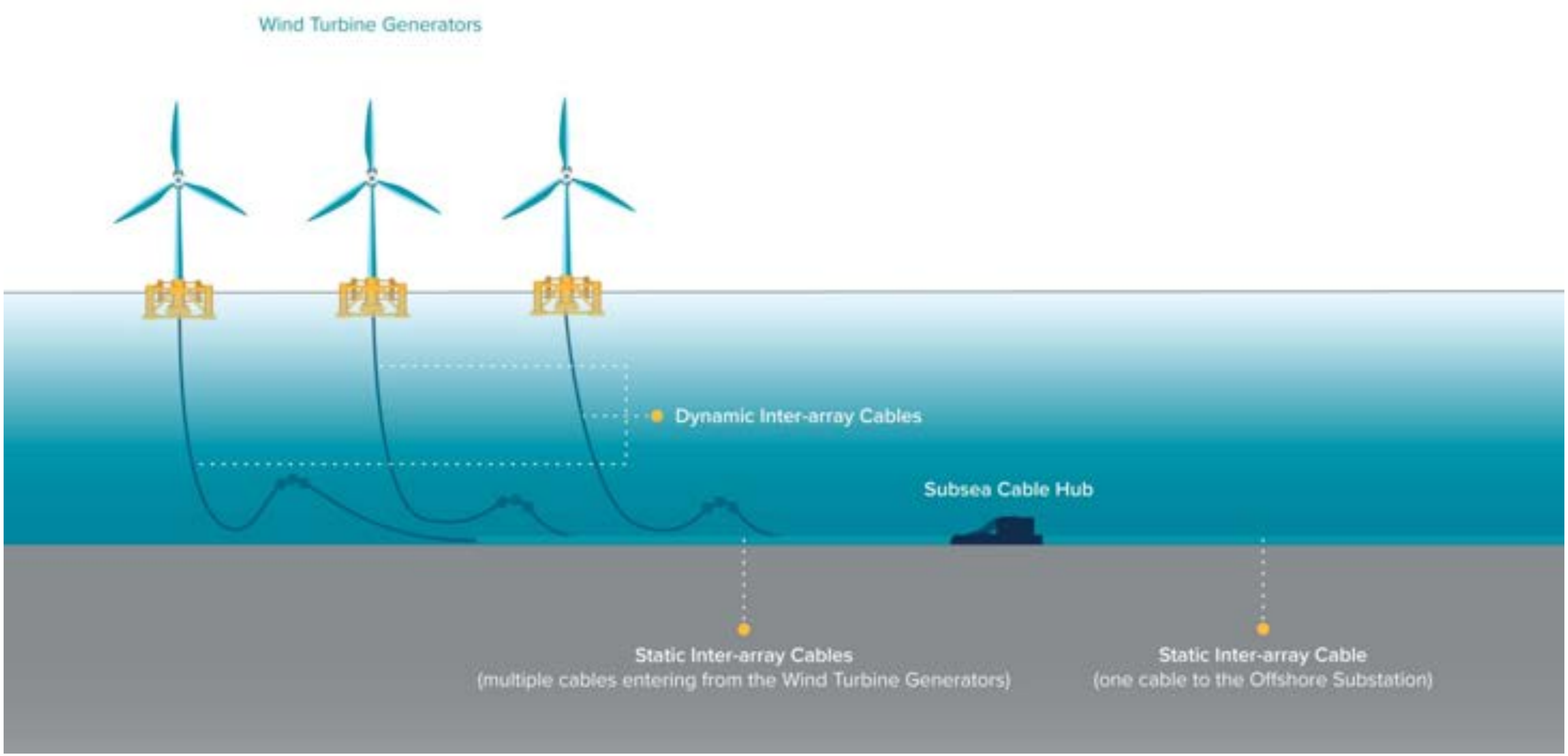
169. Where it is not possible to achieve the required burial depth, either due to seabed conditions or crossing of third-party pipes/cables, then further external cable protection may be required. The type of cable protection selected will be dependent on various factors, for example seabed and sediment conditions, the physical processes present health and safety considerations associated with installation, maintenance and decommissioning. Cable protection may include concrete mattresses, rock placement/rock bags, grout bags and cast-iron shells (articulated pipes).

3.7.3 Subsea Cable Hub

170. A subsea cable hub is designed to allow the connection of multiple WTGs into one subsea cable hub using IACs. It is a point where a number of the IACs gather together and transition to an IAC which then connects to the, OFSS for onward export.

171. The aim of the subsea cable hub is to increase the flexibility in design and construction, reduce cost, and increase power availability. The number of subsea cable hubs and their footprints will be defined within the Broadshore Hub WFDAs RIAA and is subject to further engineering studies. **Plate 3.7** provides an image of what a potential subsea cable hub system may look like.

Plate 3.7: Example of Subsea Cable Hub



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3.8 Scour Protection

172. Sediment transport where the sediment is soft enough to be mobilised can lead to scour, the formation of scour holes, around infrastructure installed on or in the seabed (e.g., substructures, anchors, subsea equipment). The depth of scour is dependent on the shape of the infrastructure installed, the characteristics of the seabed sedimentology and metocean (e.g. waves and currents) conditions.

173. Scour created around infrastructure can, in turn, lead to additional fatigue, wear and tear to the installed infrastructure. In the worst-case, it can lead to failures and need for complex corrective maintenance campaigns. Therefore, the use of scour protection, both in terms of volume and material, is an important consideration for projects. Commonly used scour protection types and those which are under consideration for the Broadshore Hub WFDAs includes concrete mattresses, graded rock placement/rock bags, grout bags, and artificial frond mats.

174. **Table 3.9** outlines the main types of scour protection that are commonly used in the offshore wind industry, and are under consideration for the Broadshore Hub WFDAs infrastructure.

Table 3.9: Scour Protection Design Envelope

Parameter	Minimum	Maximum
Scour Protection (Concrete Mattresses, Graded Rock Placement/Rock Bags, Grout bags, and Artificial Frond Mats) [1]		
FSS anchor scour protection (m^2) – per driven pile	75	241
FSS anchor scour protection (m^2) – per suction pile	N/A	265
FBSS scour protection footprint (m^2) [2] – per WTG	N/A	8,500
Artificial Fronds		
FBSS scour protection footprint	Will be further evaluated as part of the design process	
[1] Type and volume of scour protection is subject to the infrastructure installed and site-specific conditions. [2] Accounts for a radial footprint of up to 20 m and assuming a jacket substructure.		

3.9 Project Timeline

175. The Broadshore Hub WFDAs are at an early stage of development, therefore, the details provided below are indicative.

176. The timing and commencement of pre-construction and construction activities is subject to a number of variables including the grid connection dates, award of necessary consents (onshore

and offshore), securing project financing, and supply chain and port availability, and procurement and contract award.

177. Construction works for the Broadshore Hub WFDAs could start up to seven years after consent award. The Applicants will seek a suitable consent validity date from Scottish Ministers and Marine Directorate – Licensing Operations Team (MD-LOT) within the consent applications in due course.

3.9.1 Pre-construction Activities

178. Pre-construction activities are activities undertaken prior to formal commencement of construction. For the Broadshore Hub WFDAs, pre-construction activities include:

- Geophysical, geotechnical and visual surveys, which are typically carried out to inform on UXO, bedform and mapping of boulders, bathymetry, topography and subsurface layers.
- Seabed preparation, required prior to construction commencing to allow for the for successful laying of infrastructure on the seabed (e.g. cables, SKSs, FBSS). This is particularly important for cable laying works where sand wave and boulder clearance may need to be undertaken to provide a flat seabed free from obstructions and mobile sediments.

179. UXO on or in the seabed may exist as a result of previous conflict or munition dumping and, if present, poses a significant health and safety hazard. Therefore, UXO must be appropriately managed (e.g. identification of potential UXOs through undertaking desktop studies, geophysical surveys, and field investigations; avoiding potential UXOs through micro-siting, and ultimately relocation (if applicable and allowed as an option), or disposal in situ. If UXO clearance is considered necessary (including field investigation and disposal in situ), separate Marine License application(s) will be made prior to UXO clearance works, with an accompanying assessment of UXO clearance effects on relevant receptors.

180. Detailed layout design works need to be undertaken prior to conducting a detailed UXO survey prior to UXO clearance, in order to ensure the UXO survey is targeted in the areas where infrastructure is to be placed. A desktop UXO Threat and Risk Assessment for the Broadshore, Sinclair and Scaraben WFDAs was undertaken by 6 Alpha Associates (2023) based only on historical records. This assessment resulted in an overall UXO risk rating of low, although there remains the potential for some UXO be present. This will be confirmed as the understanding of the WFDAs evolve through geophysical surveys.

181. Pre-construction activities will be considered as appropriate within the technical chapters of the Broadshore Hub WFDAs EIA Report and RIAA where appropriate under construction phase impacts. While UXO clearance will be subject to a separate Marine Licence(s), an indicative assessment of potential impacts will be included for relevant receptors (e.g. benthic ecology, fish and shellfish ecology, and marine mammals).

3.9.2 Construction

182. To complete the construction of the Broadshore Hub WFDAs' infrastructure, a number of activities must be undertaken. An outline list (in no specific order) is provided below for both FSS and FBSS. This will be developed and defined as the Broadshore Hub WFDAs progresses.

183. The construction phase of the Broadshore WFDA is anticipated to take between two to three years. Note that these durations are indicative and the final durations will be subject to a number of factors, such as substructure construction methods, weather conditions, availability of resources and supply chain arrangements, among others factors. The construction phase of the Sinclair WFDA and Scaraben WFDA are anticipated to take between one to two years each depending on factors noted above.

3.9.2.1 Floating Substructures Construction

184. Following the pre-construction activities described in **Section 3.9.1**, general activities for installation of FSS are as follows:

- Pre and post-installation surveys across all offshore activities during construction, to plan and confirm offshore site suitability and infrastructure positions;
- Installation of the SKS (transported to the site and pre-laid at the installation locations, prior to the installation of the FOU);
- Towing of FOU (i.e. WTG and FSS which have been integrated at the port/ harbour), using an appropriate vessel, to the Broadshore Hub WFDAs from port/harbour or wet storage[6] location;
- If WTG and FSS integration does not take place at the assembly port, the FSSs will be towed to the Broadshore Hub WFDAs site and integrated with the WTG in situ using a suitable crane vessel;
- FOU installation and commissioning, including the deployment of scour protection (i.e. hooking up the FOU to the pre-installed mooring system and IAC, then undertaking the necessary testing);
- IAC and subsea hub (if adopted) installation, including cable burial and protection (where required); and
- Commissioning and snagging.

3.9.2.2 Fixed Bottom Substructures Construction

185. Following pre-construction activities, general activities for installation of FBSSs are as follows:

- Pre and post-installation surveys across all offshore activities during construction, to plan and confirm offshore site suitability and infrastructure positions;

[6] Temporary mooring of floating substructures and/or FOUs (known as 'wet storage') will be undertaken at port(s) or dedicated mooring locations under consents and Marine Licence(s), as required, of the relevant port(s)/storage locations. Therefore, wet storage of FOUs will be included within the in-combination section along with other projects and plans.

- Substructure installation, including the deployment of scour protection;
- IAC and subsea cable hub (if adopted) installation, including seabed preparation, cable burial and protection (where required);
- WTG installation and commissioning: WTG components will be loaded onto an appropriate vessel and transported to site for installation. The WTG tower is installed first followed by the nacelle and blades. The WTGs will then undergo the required testing and commissioning; and
- Commissioning and snagging.

3.9.2.3 Construction Vessels

186. Typical vessels used during an offshore wind farm construction period include:

- Survey vessels;
- Anchor handling tug supply (AHTS) vessels;
- Tow tug vessels;
- Cable installation vessels (pre lay grapnel run (PLGR), lay and burial);
- Remotely operated vehicle (ROV) support vessels;
- Scour protection installation vessels;
- Heavy lift vessels (HLV);
- Jack-up vessels (JUV);
- Support vessels;
- Service and commissioning vessels;
- Guard vessels;
- Service operation vessels (SOV);
- Crew transfer vessel (CTV); and
- Accommodation vessels.

3.9.3 Operation and Maintenance

187. The operational phase is anticipated to be between 25 and 50 years for the Broadshore Hub WFDAs[7].

[7] The Broadshore WFDA seabed lease is up to 60 years, and the Sinclair WFDA and Scaraben WFDA seabed leases are both up to 25 years. The Broadshore, Sinclair and Scaraben WFDAs' operational life is between 25 and 50 years. At the end of the operational life, any repowering will be subject to separate consents.

188. At this stage of the development, the overall operation and maintenance strategy is not finalised. Details such as the equipment to be procured and the operation and maintenance base location are currently not known, as is to be expected at this early stage of development.

189. Operation and maintenance activities will comprise of preventative and corrective maintenance. Further details will be provided in the Broadshore Hub WFDAs RIAA.

190. It is envisaged that that routine preventative and corrective maintenance activities will take place using the following vessels and transport:

- SOVs (potentially with daughter crafts);
- CTVs;
- Survey vessels;
- Helicopters;
- Drones;
- Unmanned surface vessel (USV); and
- ROV support vessels.

191. Major repairs requiring large component replacements and extensive remedial works will require additional vessels and logistics. These may involve replacement of WTG components (e.g. generator, blades, gearbox, etc.) or entire WTGs or repairs to the FOU, cables or mooring systems.

192. Major component exchanges for floating wind projects may take place in situ at the Broadshore Hub WFDAs or at a suitable port/sheltered waters[8].

193. Specialist HLVs and/or JUVs may be used for major maintenance campaigns in-situ. If the unit is to be repaired at shore, the activities may involve decoupling the FOU from its cable and mooring system and towing to a suitable port for the corrective maintenance to take place. For this purpose, AHTS, tow tugs, guard vessels, and other support vessels may be required.

3.9.4 Decommissioning

194. It is a requirement under Section 105 of the Energy Act 2004 that developers of offshore renewables projects are required to prepare a Decommissioning Programme for approval by Scottish Ministers.

195. The Decommissioning Programme must consider good industry practice, guidance and legislation for decommissioning works which includes anticipated costs and financial securities.

The Decommissioning Programme will be consulted on by stakeholders and is reviewed throughout the lifetime of the Broadshore Hub WFDAs infrastructure. Further details will be provided in the Broadshore Hub WFDAs RIAA.

[8] It is assumed that FOUs would be towed from a UK-based port.

4 Habitats

196. This section details the results of the process to identify European and Ramsar sites with qualifying Annex I habitat features to be taken forward for determination of likely significant effects (LSE).

4.1 Sites Designated for Annex I Habitat Features

197. The approach used to identify European sites with relevant Annex I habitat qualifying features to be carried forward for further assessment is detailed below, setting out the different criteria that have been applied. This is based on the methodology set out in **Section 2.3**.

Criterion 1 – The Broadshore Hub Wind Farm Development Areas (WFDAs) overlaps with one or more European/Ramsar sites

198. There are no European sites with relevant qualifying Annex I habitats which overlap with the Broadshore Hub WFDAs Screening Boundary. Therefore, no sites are screened in based on criterion 1.

Criterion 2 – The Broadshore Hub WFDAs overlaps with the ranges of qualifying mobile species of one or more European/Ramsar sites

199. There are no European sites which meet criterion 2 for relevant qualifying Annex I habitats, as Annex I habitats do not contain mobile features. Therefore, no sites are screened in based on criterion 2.

Criterion 3 – One or more European/Ramsar sites and/or their qualifying features are located within the potential Zone of Influence (ZoI) of impacts associated with the Broadshore Hub WFDAs

200. For this HRA Screening, the ZoI is defined by a 10 km wide buffer around the Broadshore Hub WFDAs Screening Boundary. This buffer is considered sufficiently precautionary to capture all sites likely to be in the ZoI from direct and indirect effects associated with increased suspended sediment concentrations arising from construction, operation and maintenance, and decommissioning of the Broadshore Hub WFDAs infrastructure**.** For details please see **Chapter 6: Benthic Ecology** of the **Broadshore Hub WFDAs Scoping Report** (BlueFloat | Renantis Partnership, 2024).

201. There are no European sites which meet criterion 3 for Annex I habitats. Therefore, no sites have been screened in based on criterion 3.

5 Fish and Shellfish

202. This section details the results of the process to identify European and Ramsar sites with qualifying Annex II fish and shellfish features to be taken forward for determination of likely significant effects (LSE).

5.1 Sites Designated for Annex II Fish and Shellfish

203. Based on experience from recent offshore wind farm (OWF) projects, the greatest impact ranges from OWF projects on fish and shellfish result from underwater noise, specifically noise produced by pile driving, but also seabed preparation, dredging, rock dumping, unexploded ordnance (UXO) clearance, cable installation, vessel presence and operational turbine sound. Worst-case impact ranges resulting from underwater noise modelling for large diameter monopiles (behavioural disturbance or temporary threshold shifts) on recent UK projects has never resulted in impact ranges of more than 75 km (please see **Appendix 2: Nature Conservation Marine Protected Areas (NCMPA) Screening Report** of the **Broadshore Hub Wind Farm Development Area (WFDAs) Scoping Report** (BlueFloat | Renantis Partnership, 2024) for further details on this Zone of Influence (ZoI)). On this basis, there is no potential for impacts from the Broadshore Hub WFDAs to directly affect any SAC designated for fish or shellfish species, with the closest site situated at 94 km from the Broadshore Hub WFDAs (please see **Table 7.6** in **Chapter 7: Fish and Shellfish Ecology** of the **Broadshore Hub WFDAs Scoping Report)**. Therefore, no sites or fish/shellfish species are screened in based on criterion 1.

204. This leaves a remaining potential for the Broadshore Hub WFDAs to impact on migratory diadromous fish species (Atlantic salmon, sea lamprey, and river lamprey) as they move into the ZoI of the Broadshore Hub WFDAs during migrations to, or from, a Special Area of Conservation (SAC) that they form part of a designated population (criterion 2 and 3).

205. However, it is the current position of NatureScot and Marine Directorate – Licensing Operations Team (MD-LOT), that the at-sea migrations of Annex II diadromous fish species (especially offshore, i.e. beyond the 12 nautical mile (nm) limit) is not well enough understood to enable apportioning of at-sea individuals to any SAC, thereby rendering a Habitats Regulations Appraisal (HRA) for these species not possible. This position was confirmed during the Scoping Workshop for the Broadshore Hub WFDAs held on the 13th September (**Table 2.2**). The Applicants agree with this position, and also agree with NatureScot and MD-LOT that impacts of the Broadshore Hub WFDAs on diadromous fish can be screened out of the HRA, based on current best evidence. Annex II diadromous fish will be considered in the Broadshore Hub OfTDAs HRA Screening Report. For further information on the approach to EIA for diadromous fish species, please consult **Chapter 7: Fish and Shellfish Ecology** of the **Broadshore Hub WFDAs Scoping Report**.

206. Therefore, no sites or Annex II fish and shellfish species are screened in based on criterion 2 and 3.

6 Marine Mammals

6.1 Sites Designated for Annex II Marine Mammal Features

207. Two cetacean species (harbour porpoise *Phocoena phocoena* and bottlenose dolphin *Tursiops truncatus*) and two seal species (grey seal *Halichoerus grypus* and harbour seal *Phoca vitulina*), present in UK waters are listed in Annex II of the Habitats Directive and are therefore afforded protection through the designation of Special Protection Areas (SACs) in the United Kingdom (UK).

208. In addition, all species of cetacean occurring in UK waters are listed in Annex IV of the Habitats Directive as European Protected Species (EPS), which prohibits the deliberate killing, disturbance or the destruction of these species or their habitat. EPS are considered further in the **Broadshore Hub WFDAs Scoping Report**.

209. Based on a review of key desk-based sources undertaken during the **Broadshore Hub WFDAs Scoping Report (Chapter 8: Marine Mammals)**, and the outputs of the first year of offshore aerial survey data collected through the Broadshore Hub WFDAs (**Section 1.2** in **Appendix 4** of the **Broadshore Hub WFDAs Scoping Report**) the following Annex II marine mammal species are considered likely to occur in the vicinity of the Broadshore Hub WFDAs, and are considered in this Habitat Regulations Assessment (HRA) Screening Report:

- Harbour porpoise;
- Bottlenose dolphin;
- Grey seal; and
- Harbour seal.

210. The Annex II species European otter *Lutra lutra*, is not considered as it will not be present in offshore waters and the potential for impact as a result of offshore works is highly unlikely due to the distance between the Broadshore Hub Wind Farm Development Areas (WFDAs) and the coast (approximately 47 km from Fraserburgh). This species will be covered in separate HRA documentation for the Broadshore Hub OnTDAs (Onshore Transmission Development Areas) (landward of mean high water springs; MHWS) and the Broadshore Hub OfTDAs (Offshore Transmission Development Areas) (seawards of mean low water springs; MLWS), if required.

211. The following sections describe the process used to define the list of SACs for which there is possible connectivity and therefore potential for a source – pathway – receptor relationship for marine mammal qualifying SAC features, i.e. harbour porpoise, bottlenose dolphin, grey seal and harbour seal, in line with the criteria set out in **Section 2.3**. No designated sites for marine mammals overlap with the Broadshore Hub WFDAs, and therefore, no sites have been screened in on the basis of criterion 1.

6.1.1 Harbour Porpoise

212. Harbour porpoise within the eastern North Atlantic are generally considered to be part of a continuous biological population that extends from the French coastline of the Bay of Biscay to northern Norway and Iceland (Tolley and Rosel, 2006; Fontaine et al., 2007, 2014; Inter-Agency Marine Mammal Working Group (IAMMWG), 2015). However, for conservation and management purposes, it is necessary to consider this population as smaller, discrete Management Units (MU). MUs provide an indication of the spatial scales at which effects of plans and projects alone, and in-combination, need to be assessed for the key cetacean species in UK waters, with consistency across the UK (IAMMWG, 2015). The IAMMWG defined three MUs for harbour porpoise: North Sea (NS); West Scotland (WS); and the Celtic and Irish Sea (CIS).

213. For harbour porpoise, connectivity is considered potentially possible between the Broadshore Hub WFDAs and any designated sites within the NS MU (IAMMWG, 2023) where harbour porpoise are listed as a qualifying feature. Therefore, all designated sites outside the NS MU have been screened out from further consideration.

214. A large scale survey (SCANS-IV) of the presence and abundance of cetacean species around the north-east Atlantic undertaken in summer 2022 (Gilles *et al*., 2023) shows harbour porpoise being the most commonly sighted species in survey block NS-E where the Broadshore Hub WFDAs is located and the and CS-K block which the Broadshore Hub WFDAs border.

215. The site-specific offshore aerial surveys for the Broadshore Hub WFDAs for March 2022 to February 2023 have recorded harbour porpoise as the most commonly sighted marine mammal species.

216. This HRA screening considers any designated sites within the harbour porpoise NS MU, where the species is considered as a grade A, B or C feature (Joint Nature Conservation Committee; JNCC, 2009). These represent populations equivalent to the following:

- Grade A: excellent representativity;
- Grade B: good representativity; and
- Grade C: significant representativity.

217. As grade D indicates a non-significant population, it has therefore not been considered further.

218. As harbour porpoise are wide-ranging within the NS MU, no discrete population can be assigned to an individual designated site. It is, therefore, assumed that at any one time, harbour porpoise within or in the vicinity of the Broadshore Hub WFDAs are associated with the nearest SAC. The nearest SAC to the Broadshore Hub WFDAs is the Southern North Sea SAC and the focus of the Conservation Objectives (JNCC, 2019) for harbour porpoise of this site is on addressing pressures that affect site integrity which include:

- killing or injuring harbour porpoise (directly or indirectly);
- preventing their use of significant parts of the site (disturbance / displacement);
- significantly damaging relevant habitats; or
- significantly reducing the availability of prey.

219. However, given the distance between the Broadshore Hub WFDAs to the Southern North Sea SAC (331 km), this designated site is beyond that of potential for direct or indirect effects, alone or in-combination and mitigation would be in place to prevent any potential injury (permanent Threshold Shift (PTS)). Therefore, the Southern North Sea SAC has been screened out, and harbour porpoise will not be considered further in the Report to Inform Appropriate Assessment (RIAA).

6.1.2 Bottlenose Dolphin

220. Throughout its range, the bottlenose dolphin occurs in a diverse range of habitats, from shallow estuaries and bays, coastal waters, continental shelf edge and deep open offshore ocean waters.

221. It has been determined that there are two ‘eco-types’ of bottlenose dolphin present in Europe; the coastal type and the pelagic type, and that these types are genetically and ecologically different from each other (Louis *et al*., 2014; Oudejans *et al*., 2015; Department of Business, Energy and Industrial Strategy (BEIS), 2022). However, it is primarily an coastal type (inshore species) in Scotland, with most sightings within 10 km of land, but they can also occur offshore, often in association with other cetaceans.

222. On the east coast of Scotland, bottlenose dolphin are often found within deep narrow channels (Hastie *et al*., 2003; Bailey & Thompson, 2006). Historically, individuals from the Moray Firth population occur along the east coast of Scotland to the Firth of Forth, although a small number were sighted further south (Cheney *et al.,* 2013, Quick *et al.,* 2014). Based on photo-identification (photo-ID) studies, 28.9% of bottlenose dolphin sighted within St Andrews Bay and the Tay estuary were also sighted within the Moray Firth SAC (Arso Civil *et al*., 2019). In more recent years, this population has been seen further south, along the east coast of England and as far as the Netherlands (Hoekendijk *et al*., 2021).

223. The site-specific offshore aerial surveys for the Broadshore Hub WFDAs for March 2022 to February 2023 have not recorded any bottlenose dolphin, however, one unidentified dolphin species was recorded. The SCANS-IV (Gilles et al., 2023) survey shows no bottlenose dolphin sighted within survey block NS-E where the Broadshore Hub WFDAs is located and the and CS-K block which the Broadshore Hub WFDAs borders.

224. For bottlenose dolphin, connectivity is considered potentially possible between the Broadshore Hub WFDAs and any designated sites within the Greater North Sea (GNS) and Coastal East Scotland MUs (IAMMWG, 2023) where bottlenose dolphin are listed as a qualifying feature. Therefore, all designated sites outside these MUs have been screened out from further consideration.

225. This HRA screening considers any designated sites where bottlenose dolphin is considered as a grade A, B or C feature (JNCC, 2009). Grade D indicates a non-significant population and have therefore not been considered further.

226. **Table 6.2** in **Section 6.4** provides the list of designated sites for bottlenose dolphin screened into the RIAA.

227. As a precautionary approach, it is assumed that all bottlenose dolphin in the vicinity of the Broadshore Hub WFDAs are from the Moray Firth SAC. Therefore, with regard to the potential effects of the Broadshore Hub WFDAs, connectivity of bottlenose dolphin from other designated sites, other than the Moray Firth SAC, is screened out from further consideration in the RIAA (Table 2.1**)**.The Moray Firth SAC is screened in on the basis of criterion 2; Table 2.1. Therefore, with regard to the potential effects of the Broadshore Hub WFDAs, connectivity of bottlenose dolphin from other designated sites, other than the Moray Firth SAC, is screened out from further consideration in the RIAA (**Table 2.1**). The Moray Firth SAC is screened in on the basis of criterion 2.

6.1.3 Grey Seal

228. Grey seals are wide ranging and can breed and forage in different areas (Russell *et al.,* 2013). Grey seal generally travel between known foraging areas and back to the same haul-out site, but will occasionally move to a new site. For example, movements have been recorded between haul-out sites on the east coast of England and the Outer Hebrides (Scottish Committee on Seals; SCOS, 2018), and tags deployed on grey seals at Donna Nook and Blakeney Point in May 2015 indicated that they used multiple haul-outs sites; with one hauling out in the Netherlands and one in Northern France (Russell, 2016).

229. Grey seals will typically forage in the open sea and return regularly to land to haul-out, although they may frequently travel up to 100 km between haul-out sites. Foraging trips generally occur within 100 km of their haul-out sites, although grey seal can travel up to 448 km to forage (SCOS, 2022; Carter *et al*., 2022).

230. For any SACs screened in, consideration will be given to the differences in grey seal distributions during their breeding and non-breeding seasons. Consideration will be given to the potential for effects on grey seals that may be foraging at-sea and effects to grey seals that may be hauled-out, and the increased sensitivities at certain times of the year (e.g. increased sensitivity to disturbance at haul-out sites during the breeding season).

231. To take into account the wide range and movements of grey seal, all designated sites where grey seal are a qualifying feature in the North Sea were considered. All designated sites outside this region were screened out from further consideration due to distance and a lack of evidence of connectivity. For grey seal, the screening process includes any designated site where the species is a grade A, B or C feature.

232. Connectivity of grey seal from designated SACs was based on the SAC density maps provided by Carter *et al.* (2022). Where grey seal associated with a specific SAC were identified to have presence at the Broadshore Hub WFDAs, or to be present within the potential zones of influence of the Broadshore Hub WFDAs, it has been assumed there is the potential for connectivity with that SAC. Due to their large foraging ranges, grey seals could come from any of the designated sites considered to have potential connectivity. As a result, any potential effects to grey seal will be assessed based on them being from a designated site with potential for connectivity, and that they have travelled away from the site(s) in order to forage.

233. The Isle of May SAC, Faray and Holm of Faray SAC and Berwickshire and North Northumberland Coast SACs, all designated for grey seal, have been screened into the RIAA,

taking into account the movements and foraging ranges of grey seal (on the basis of criterion 2; **Table 2.1**).

6.1.4 Harbour Seal

234. The Sea Mammal Research Unit (SMRU), in collaboration with others, has deployed telemetry tags on harbour seals around the UK. The spatial distributions indicate harbour seals persist in discrete regional populations, display heterogeneous usage, and generally stay within 50 km of the coast (Russell and McConnell, 2014). Tagged harbour seals were observed to have a more coastal distribution than grey seals and do not travel as far from haul-outs (Russell and McConnell, 2014).

235. Harbour seals generally make smaller foraging trips than grey seal. The typical and average foraging range for harbour seal is 50-80 km (SCOS, 2017). Tracking studies have shown that harbour seals travel 50-100 km offshore and can travel up to 273 km on foraging trips (Carter et al., 2022). The range of these trips varies depending on the location and surrounding marine habitat.

236. Genetic analysis of harbour seals around the UK and continental Europe (Carroll *et al.,* 2020) found there to be two metapopulations of Europe; one being the southern population (incorporating the South-East England MU and continental Europe) and one being the northern population (including all other UK MUs). Within the northern population itself, there was also genetic differences between most of the MUs, with the exception of between the West Scotland and Western Isles MU, and between the North Coast Scotland & Orkney and Moray Firth MUs. This genetic analysis also revealed movement of harbour seal from the Moray Firth and North Coast Orkney MUs to east Scotland, Shetland, and north-west Scotland (Carroll *et al.,* 2020). This indicates that while the foraging distances of harbour seal are not as large as grey seal, there is movement of some individuals between a number of the Scottish MUs, and therefore harbour seals within the Moray Firth have some connectivity with the north and north-west coasts of Scotland, Orkney, and the east coast of Scotland.

237. To take into account the wide range and movements of harbour seal, all designated sites where harbour seal are a qualifying feature in the North Sea were considered. All designated sites out with this region were screened out from further consideration. For harbour seal, the screening process includes any designated site where the species is a grade A, B or C feature.

238. As for grey seal, the potential connectivity of harbour seal from designated SACs was based on the SAC density maps provided by Carter *et al.* (2022). Where harbour seal associated with a specific SAC were identified to have presence at the Broadshore Hub WFDAs, or to be present within the potential zones of influence of the Broadshore Hub WFDAs, it is assumed there is the potential for connectivity with that SAC.

239. Harbour seals could come from any of the designated sites considered to have potential connectivity. As a result, any potential effects to harbour seal will be assessed based on them being from a designated site with potential connectivity, and that they have travelled away from the site(s) in order to forage.

240. The Dornoch Firth and Morrich More SAC is designated for harbour seal, has been screened into the RIAA , taking into account the movements and forging ranges of harbour seal (criterion 2, Table 2.1).

6.2 Determination of LSE for Annex II Marine Mammal Features

6.2.1 Potential Effects Considered in Screening

241. The key factors that will be considered during the HRA screening process for marine mammals are:

- Potential effects (source); and
- Proximity of source to feature (distance between the Broadshore Hub WFDAs and SACs, migration routes) (pathway and receptor).

242. The potential effects on marine mammals from the Broadshore Hub WFDAs have been identified within the **Broadshore Hub WFDAs Scoping Report** (**Chapter 8: Marine Mammals**). **Table 6.1** presents potential effects during construction, operation and maintenance and decommissioning considered in the HRA process.

Table 6.1: Summary of Potential Effects to Marine Mammals Screened into the RIAA

Potential Effects	Construction	Operation and Maintenance	Decommissioning
Underwater noise (all potential sources during construction, operation and maintenance and decommissioning)	✓	✓	✓
Collision risk with vessels	✓	✓	✓
Direct entanglement	x	x	x
Secondary entanglement	x	✓	x
Disturbance at seal haul-out sites	✓	✓	✓
Changes in water quality	x	x	x
Changes to prey availability	✓	✓	✓

243. The following sections present the potential effects on marine mammals that may result from the Broadshore Hub WFDAs. These effects will be taken into account when determining the

potential for LSE on the European sites and relevant marine mammal qualifying interest features.

6.2.1.1 Construction

6.2.1.1.1 Underwater Noise

244. Underwater noise can cause both physiological (e.g. lethal, physical injury and threshold shifts) and behavioural (e.g. disturbance, behavioural response and masking of communication) impacts on marine mammals (e.g. Bailey et al., 2010; Madsen et al., 2006; Southall, 2021; Stöber & Thomsen, 2019).

245. Activities that have the potential to generate underwater noise associated with the construction of the Broadshore Hub WFDAs are:

- Clearance of Unexploded Ordnance (UXO), if required;
- Geophysical surveys;
- Piling for fixed bottom and/or floating substructure (driven pile anchors);
- Installation of fixed bottom and/or floating substructures and anchors (non-piling methods);
- Other construction activities such as seabed preparation, cable laying and rock placement; and
- Use of vessels.

246. Underwater noise modelling will be undertaken to determine the potential impacts on marine mammals during the above activities and will include modelling for auditory injury (PTS). Further information on underwater noise modelling is provided in **Appendix 5: Approach to Marine Mammals and Underwater Noise** of the **Broadshore Hub WFDAs Scoping Report**).

247. The potential for disturbance to marine mammals will be assessed as described in **Appendix 5: Approach to Marine Mammals and Underwater Noise** of the **Broadshore Hub WFDAs Scoping Report**, with dose response curves to be used for all species (Graham *et al*., 2017 for harbour porpoise, and for bottlenose dolphin in the absence of species specific data, and Whyte *et al*., 2020 for both harbour seal and grey seal).

248. A Marine Mammal Mitigation Protocol (MMMP) will be produced to reduce the risk of physical injury or permanent auditory injury (PTS) in marine mammals from both unexploded ordnance clearance and impact piling (see **Section 8.5.1** in **Chapter 8: Marine Mammals** in the **Broadshore Hub WFDAs Scoping Report**).

249. It is important to note, if there is the potential for significant disturbance to result in a population-level effect, then alternatives and mitigation options will be considered and an EPS licence application submitted.

6.2.1.1.2 Vessel Interaction (Collision Risk)

250. An increase in vessel presence during the construction phase, could lead to a potential increase in the risk of vessel collision. The risk of vessel collision is associated with the vessels within

the Broadshore Hub WFDAs, as well as those vessels in transit to and from site. Despite the potential for marine mammals to detect and avoid vessels, ship strikes are known to occur (Wilson et al., 2007; Schoeman *et al*., 2020).

251. The increased risk of collision with marine mammals during construction has been screened in and will be assessed in the RIAA, taking into account the most recent and robust research, guidance and information available.

252. Vessel best practice measures will be produced to reduce the risk of collision with vessels associated with the construction of the Broadshore Hub WFDAs.

253. The assessment of the potential impact of vessel interaction will take into account the type and number of vessels to be used during the construction period and the potential collision risk associated with those vessels. A literature review will be undertaken to determine the sensitivity of each marine mammal species to vessel collisions (and their ability to avoid vessels), alongside a review of the risk of collision due to the type, size, and speed of vessels associated with the Broadshore Hub WFDAs The assessment of the potential impact of vessel interaction will take into account the type and estimated number of vessels to be used during the construction period and the potential collision risk associated with those vessels.

254. The increase in vessel movements during construction will be put into the context of current vessel movements in and around the Broadshore Hub WFDAs.

6.2.1.1.3 Disturbance at Seal Haul-Out Sites

255. Disturbance from vessel transits to and from the Broadshore Hub WFDAs and the construction port(s) has the potential to disturb seals at haul-out sites, depending on the route and proximity to the haul-out sites.

256. This HRA Screening Report is focused on the Broadshore Hub WFDAs only, and therefore potential for disturbance to haul-out sites due to activity in the offshore export cable corridor and landfall(s) is not included. This impact will be considered within the Broadshore Hub OfTDAs HRA Screening Report.

257. As the construction port(s) is not yet known, the potential for any disturbance of seals at or from seal haul-out sites during construction (due to vessel transits) has been screened in. Only seals at haul-out sites with potential connectivity to the relevant designated site will be considered and assessed, taking into account the most recent and robust research, guidance and information available.

258. The likelihood of increased vessels near to the locations of nearby seal haul-out sites will be used to determine the level of potential disruption and behavioural impact caused to the seals. An expert judgement will be made using current scientific knowledge. A literature review of the latest research and evidence of disturbance at seal haul-out sites will be undertaken to determine the potential magnitude and sensitivity of effect.

259. The duration of the construction vessels movement to and from the Broadshore Hub WFDAs will be based on the worst-case scenario, taking into account the possible phasing options and scenarios. The increase in vessel movements during construction will be put into the context of

current vessel movements in and around the Outer Moray Firth and North-East coast of Scotland.

6.2.1.1.4 Changes to Prey Resource

260. **Chapter 7: Fish and Shellfish Ecology** in the **Broadshore Hub WFDAs Scoping Report** outlines the potential impacts on fish species and therefore the prey resource for marine mammals during construction.

261. The potential for any changes to the prey resource for marine mammals during construction will be assessed further. Impacts will be based on the assessment in the fish and shellfish ecology chapter of the Broadshore Hub WFDAs EIA Report.

6.2.1.1.5 Changes to Water Quality

262. The increases in suspended sediments and the risk of accidental release of contamination during construction has the potential to impact marine mammals, and their prey. The potential for water quality changes will be determined in the marine geology, oceanography and physical processes Broadshore Hub WFDAs EIA Report, including the best practice and management measures that would be put in place. Any changes to water quality would be localised and short lived, and the potential for any impacts from changes in water quality on marine mammals is not expected to be significant. Potential impacts on marine mammals related to changes in water quality during construction are screened out of the RIAA. This was agreed in the Scoping Workshop with NatureScot (see **Table 2.2** for details).

6.2.1.2 Operation and Maintenance

6.2.1.2.1 Underwater Noise Impacts

263. Potential sources of underwater noise during the operation and maintenance phase include:

- Operational noise from Wind Turbine Generators (WTGs) and floating substructures and/or from movement of moorings on the seabed;
- Operation and maintenance preventive and corrective activities underwater, such as surveys, repairs, inter-array cable re-burial (if buried) and any additional rock placement; and
- Operation and maintenance vessel activity.

264. Underwater noise modelling will be undertaken to determine the potential impacts on marine mammals during the above activities and will include modelling for auditory injury (PTS). Further information on underwater noise modelling is provided in **Appendix 5: Approach to Marine Mammals and Underwater Noise** of the **Broadshore Hub WFDAs Scoping Report**).

6.2.1.2.2 Entanglement

265. Depending on the method used, there is the perceived potential for entanglement in the mooring lines of the station keeping systems for floating substructures, as well as the dynamic inter-array cables. To date, there have been no recorded instances of marine mammal entanglement from mooring systems of renewable devices (Sparling et al., 2013; Isaacman and Daborn,

2011), or for anchored Floating Production Storage and Offloading (FPSO) vessels in the oil and gas industry (Benjamins et al., 2014) with similar mooring lines as proposed for floating substructures. However, entanglement in fishing gear is known to occur in Scottish waters, and there is therefore the potential for a risk of secondary entanglement (i.e. entanglement on fishing gear which is entangled on mooring lines).

266. The level of risk to become entangled varies depending on the species (Benjamins et al., 2014). These varying factors include body size, flexibility of movement, the ability to detect mooring lines, and the feeding ecology of the species.

267. Toothed whales have a lower risk than baleen whales, primarily due to their small size and manoeuvrability. Seal species have a similar risk level to small toothed cetaceans, with an increase in manoeuvrability.

268. The potential for direct entanglement is considered to be very low risk, given the design of the mooring lines and dynamic cables. Therefore, the potential for direct entanglement has been screened out from consideration in the RIAA. However, there the potential for secondary entanglement, whereby anthropogenic debris, such as the lost, abandoned or discarded fishing gear and other marine debris is caught in the mooring lines and poses a risk to marine mammals transiting through. The potential for secondary entanglement has been screened in and will be assessed further in the RIAA.

6.2.1.2.3 Vessel Interaction (Collision Risk)

269. As outlined for construction (**Section 6.2.1.1.2**), the increased risk of collision with marine mammals will be given further consideration. It is anticipated that the impacts associated with vessel activities during operation and maintenance would be similar to, or less than those during the construction phase, due to a likely lower number of vessels, although vessels would be in the area periodically for the full lifetime of the Broadshore Hub WFDAs.

270. The increased risk of collision with marine mammals during operation has been screened in and will be assessed in the RIAA, taking into account the most recent and robust research, guidance and information available.

271. The operation and maintenance port(s) to be used for the Broadshore Hub WFDAs is not yet known. Vessel movements to and from any port will be incorporated within existing vessel routes where possible, however, there is an increased risk for any vessel interaction within the Broadshore Hub WFDAs only as well as during transit to and from site.

6.2.1.2.4 Disturbance at Seal Haul-Out Sites

272. As outlined for construction (**Section 6.2.1.1**), depending on the vessel routes, there is the potential for disturbance at seal haul-out sites. It is anticipated that the impacts associated with vessel activities during operation and maintenance would be similar to those during the construction phase, although the magnitude of impact (e.g. the number of vessels) will be lower.

273. There is no potential for any direct disturbance as a result of activities within the Broadshore Hub WFDAs, due to the distance to the nearest known seal haul-out sites, however, there is the potential for disturbance during vessel transits.

274. The potential for any disturbance of seals at or from seal haul-out sites during operation has been screened into the RIAA, taking into account the most recent and robust research, guidance and information available.

6.2.1.2.5 Impacts of Electromagnetic Fields (EMF)

275. Many marine organisms have evolved sensory abilities to use electric and magnetic cues in essential aspects of life history, such as prey detection, predatory behaviour, and navigation and these behaviours may be impacted by EMF emissions in the water column (Hutchison et al., 2020).

276. Dynamic inter-array cables for a floating wind farm will not be buried by design and the static inter-array cables may be laid directly on the seabed, and therefore have the potential to effect marine mammals both directly and indirectly through prey interaction pathways.

277. Studies indicate that magnetic fields decrease rapidly with vertical and horizontal distance from subsea cables, and that the reduction is greater the deeper cables are buried (Normandeau et al., 2011).

278. Although it is assumed that marine mammals are capable of detecting small differences in magnetic field strength, this is unproven and is based on circumstantial information. There is also, at present, no evidence to suggest that existing subsea cables influence cetacean movements.

279. Harbour porpoise are known to move in and out of the Baltic Sea, over several buried subsea high-voltage direct current (HVDC) cables in the Skagerrak and western Baltic Sea with no apparent effect to their migratory movements. There is also no evidence to suggest that seal species respond to EMF (Gill et al., 2005).

280. As a precautionary approach the potential for EMF to impact on marine mammal and their prey species is screened in for further assessment in the RIAA.

281. The RIAA will be based on a desk-based review of the potential effects of EMF, and the estimated EMF emissions for the Broadshore Hub WFDAs.

6.2.1.2.6 Changes to Prey Resource

282. **Chapter 7: Fish and Shellfish Ecology** of the **Broadshore Hub Scoping Report** outlines the potential impacts on fish species and therefore the prey resource for marine mammals during operation and maintenance.

283. The potential for any changes to the prey resource for marine mammals operation and maintenance has been screened into the RIAA. Impacts will be based on the assessment in the fish and shellfish ecology chapter of the Broadshore Hub WFDAs EIA Report.

284. The proposed approach for the assessment of changes to prey resources during operation and maintenance will be the same as for construction (as outlined in **Section 6.2.1.1**).

6.2.1.2.7 Changes to Water Quality

285. As with construction (**Section 6.2.1.1.5**), any changes to water quality would be localised and short lived and best practice and management measures would be put in place. Potential impacts to marine mammals related to changes in water quality during operation are screened out from assessment in the RIAA.

6.2.1.3 Decommissioning

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

6.3 In-Combination Assessment

287. The in-combination assessment will consider plans or projects where their predicted effects have the potential to interact with effects from the proposed construction, operation and maintenance or decommissioning of the Broadshore Hub WFDAs

288. The in-combination assessment considers potential effects firstly from the whole Broadshore Hub (i.e., the Broadshore Hub WFDAs, the Broadshore Hub OfTDAs and the Broadshore Hub OnTDAs) and secondly the in-combination effects of the whole Broadshore Hub alongside other plans or projects, in line with the approach set out in **Section 2.3.2**.

289. The plans and projects assessed for potential in-combination effects are located within (i) the relevant MU boundary for harbour porpoise, bottlenose dolphin, grey seal or harbour seal; and (ii) there is the potential for connectivity and clear pathway for the in-combination effect and marine mammals from the designated sites, e.g. the distance between the potential effect and a designated site with marine mammals as a qualifying feature is within the range for which there could be an interaction.

290. The projects identified for potential in-combination assessment with the Broadshore Hub WFDAs will be agreed during consultations with relevant stakeholders.

6.4 Summary of Screening of Sites for Annex II Marine Mammal Features

291. Of all the designated sites initially considered in this HRA Screening Report (presented in **Table 6.3**) for marine mammals, five SACs (**Figure 6.1 in Appendix 1** and **Table 6.2**) have been screened in for further assessment to determine the potential for any adverse effects on the integrity of the sites in relation to the conservation objectives as result of the Broadshore Hub WFDAs alone or in-combination with other projects and activities. The reason for scoping the five SACs into the HRA for further consideration are presented in **Table 6.2** below.

292. **Table 6.3** provides the screening assessment for all designated sites in the North Sea, with either harbour porpoise, bottlenose dolphin, grey seal or harbour seal listed as a qualifying feature with a population grade of A, B, or C, within the relevant screening areas.

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Table 6.2: Likely Significant Effect Matrix for Designated Sites where Marine Mammals are a Qualifying Feature (or Feature of Interest) Screened into the RIAA for Further Assessment

Site and Qualifying Feature of the Site	Underwater Noise (All Potential Sources)			Collision Risk with Vessels			Direct Entanglement			Secondary Entanglement			Disturbance at Seal Haul-Out Sites			Changes in Water Quality			Changes in Prey Availability			In-Combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Moray Firth SAC																											
Bottlenose dolphin	✓	✓	✓	✓	✓	✓		×			✓		×	×	×	×	×	×	✓	✓	✓	✓	✓	✓
Berwickshire and North Northumberland Coast SAC																											
Grey seal	✓	✓	✓	✓	✓	✓		×			✓		✓	✓	✓	×	×	×	×	×	×	✓	✓	✓
Isle of May SAC																											
Grey seal	✓	✓	✓	✓	✓	✓		×			✓		✓	✓	✓	×	×	×	×	×	×	✓	✓	✓
Faray and Holm of Faray SAC																											
Grey seal	✓	✓	✓	✓	✓	✓		×			✓		✓	✓	✓	×	×	×	×	×	×	✓	✓	✓
Dornoch Firth and Morrich More SAC																											
Harbour seal	✓	✓	✓	✓	✓	✓		×			✓		✓	✓	✓	×	×	×	×	×	×	✓	✓	✓

C = Construction, O&M = Operation and Maintenance, D = Decommissioning; ✓ = Potential for Likely Significant Effect, × = No Potential for Likely Significant Effect. Where there is no colour or mark, no pathway for significant effect is identified.

Table 6.3: Screening of Designated Sites with Bottlenose Dolphin, Harbour Porpoise, Grey Seal or Harbour Seal as a Qualifying Feature in the North Sea

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
BEMNZ0001	Belgium	Vlaamse Banken SAC	Harbour porpoise Harbour seal Grey seal	782	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
BEMNZ0002	Belgium	SBZ 1 / ZPS 1 SPA	Harbour seal	817	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
BEMNZ0005	Belgium	Vlakte van de Raan Site of Community Importance (SCI)	Harbour porpoise Grey seal Harbour seal	798	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00EY133	Denmark	Agger Tange, Nissum Bredning, Skibsted Fjord Og Agerø SAC	Harbour seal	608	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00FX122	Denmark	Ålborg Bugt, Randers Fjord Og Mariager Fjord SAC	Harbour seal	720	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00DX146	Denmark	Anholt Og Havet Nord For SAC	Harbour seal Grey seal	788	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
DK00EX026	Denmark	Dråby Vig SAC	Harbour seal	640	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00VA259	Denmark	Gule Rev SAC	Harbour porpoise	572	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00FX257	Denmark	Havet Omkring Nordre Rønner SAC	Harbour seal Grey seal	741	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK003X202	Denmark	Hesselø Med Omliggende Stenrev SAC	Harbour seal Grey seal	827	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00FX113	Denmark	Hirsholmene, Havet Vest Herfor Og Ellinge Å's Udløb SAC	Harbour seal Grey seal	717	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00EY124	Denmark	Løgstør Bredning, Vejlerne Og Bulbjerg SAC	Harbour seal	633	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00EY134	Denmark	Lovns Bredning, Hjarbæk Fjord Og Skals, Simested Og Nørre Ådal, Samt Skravad Bæk SAC	Harbour seal	666	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
DK00FX123	Denmark	Nibe Bredning, Halkær Ådal Og Sønderup Ådal SAC	Harbour seal	668	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00FX112	Denmark	Skagens Gren og Skagerrak SAC	Harbour porpoise	670	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00FX010	Denmark	Strandenge På Læsø Og Havet Syd Herfor SAC	Harbour seal Grey seal	740	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00VA258	Denmark	Store Rev SAC	Harbour porpoise	637	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00VA347	Denmark	Sydlige Nordsø SAC	Harbour porpoise Grey seal Harbour seal	585	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DK00AY176	Denmark	Vadehavet med Ribe Å, Tved Å og Varde Å vest for Varde SAC	Harbour porpoise Grey seal Harbour seal	651	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
DK00CY040	Denmark	Venø, Venø Sund SAC	Harbour seal	636	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR5300017	France	Abers – Côtes Des Legendes SAC	Grey seal	1064	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR3102005	France	Baie de Canche et couloir des trois estuaires SAC	Harbour porpoise	866	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
FR5300015	France	Baie De Morlaix SAC	Grey seal	1045	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2502020	France	Baie de Seine occidentale SAC	Harbour porpoise	949	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Harbour seal			
FR2502021	France	Baie de Seine orientale SAC	Harbour porpoise	970	Out	The distance between the potential impact range of the Broadshore Hub WFDAs and the site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Harbour seal			
FR2500077	France		Harbour seal	1035	Out	

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
		Baie Du Mont Saint-Michel SAC	Grey seal			The distance between the potential impact range of the Broadshore Hub WFDAs and the site is beyond that of potential for direct or indirect effects.
FR3102002	France	Bancs des Flandres SAC	Harbour porpoise	797	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
FR5300020	France	Cap Sizun SAC	Grey seal	1128	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2500079	France	Chausey SAC	Grey seal	1014	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR5302007	France	Chaussée de Sein SAC	Grey seal	1135	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR5300009	France	Cote De Granit Rose-Sept-Iles SAC	Grey seal	1016	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR5302006	France	Cotes de Crozon SAC	Grey seal	1113	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
FR3100482	France	Dunes de l'Authie et Mollieres de Berck SAC	Harbour seal	887	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects.
FR3100474	France	Dunes De La Plaine Maritime Flamande SAC	Harbour seal	826	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects.
FR3100480	France	Estuaire De La Canche, Dunes Picardes Plaquees Sur L'ancienne Falaise, Foret D'hardelot Et Falaise D'equihen SAC	Harbour seal	854	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2300121	France	Estuaire de la Seine SAC	Harbour seal	971	Out	The distance between the potential impact range of the Broadshore Hub WFDAs and the site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2200346	France	Estuaires et littoral picards (baies de Somme et d'Authie) SAC	Grey seal	888	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Harbour seal			
FR3100478	France	Falaises du Cran aux Oeufs et du Cap Gris-Nez, Dunes du Chatelet, Marais de Tardinghen et Dunes de Wissant SAC	Harbour porpoise	834	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
FR5300018	France	Ouessant-Molene SAC	Grey seal	1,088	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
						beyond that of potential for direct or indirect effects, alone or in-combination.
FR2500088	France	Marais du Cotentin et du Bessin – Baie Des Veys SAC	Grey seal	955	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Harbour seal			
FR5300019	France	Presqu'ile De Crozon SAC	Grey seal	1,105	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
FR2500085	France	Récifs et Marais Arrière-Littoraux du Cap Lévi À la Pointe de Saire SAC	Grey seal	933	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Harbour seal			
FR3102003	France	Recifs Gris-Nez Blanc-Nez SAC	Harbour porpoise	822	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
FR3102004	France	Ridens et dunes hydrauliques du detroit du Pas-de-Calais SAC	Harbour porpoise	823	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Harbour seal			
			Grey seal			
FR5300010	France	Tregor Goëlo SAC	Grey seal	1,016	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
						beyond that of potential for direct or indirect effects, alone or in-combination.
DE2104301	Germany	Borkum-Riffgrund SCI	Harbour porpoise	664	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
DE1003301	Germany	Doggerbank SCI	Harbour porpoise	424	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Harbour seal			
DE1115391	Germany	Dünenlandschaft Süd-Sylt SAC	Grey seal	708	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE2016301	Germany	Hamburgisches Wattenmeer SAC	Harbour porpoise	767	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
DE1813391	Germany	Helgoland mit Helgolander Felssockel SAC	Harbour porpoise	728	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
DE2507301	Germany	Hund und Paapsand SCI	Harbour seal	748	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
						beyond that of potential for direct or indirect effects, alone or in-combination.
DE1315391	Germany	Küsten- und Dünenlandschaften Amrums SAC	Grey seal	722	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE2424302	Germany	Muhlenberger Loch/Nesssand SAC	Harbour seal	871	Out	The distance between the potential impact range of the Broadshore Hub WFDAs and the site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE2306301	Germany	Nationalpark Niedersachsisches Wattenmeer SAC	Harbour porpoise	707	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
DE0916391	Germany	NTP S-H Wattenmeer und angrenzende Kustengebiete SAC	Harbour porpoise	681	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
DE2323392	Germany	Schleswig-Holsteinisches Elbastuar und angrenzende Flachen SAC	Harbour seal	794	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
DE1011401	Germany	SPA Ostliche Deutsche Bucht SPA	Harbour porpoise	629	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is
			Grey seal			

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
			Harbour seal			beyond that of potential for direct or indirect effects, alone or in-combination.
DE1714391	Germany	Steingrund SAC	Harbour porpoise	734	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
DE1209301	Germany	Sylter Außenriff SCI	Harbour porpoise	603	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
DE2018331	Germany	Unterelbe SAC	Harbour porpoise	796	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Harbour seal			
DE2507331	Germany	Unterems und Aussenems SAC	Harbour seal	747	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL2008001	Netherlands	Doggersbank SAC	Harbour porpoise	420	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			
NL3009005	Netherlands	Duinen Ameland SAC	Grey seal	692	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
						beyond that of potential for direct or indirect effects, alone or in-combination.
NL2003060	Netherlands	Duinen en Lage Land Texel SAC	Grey seal	687	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL9801079	Netherlands	Duinen Goeree & Kwade Hoek SAC	Grey seal	788	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Harbour seal			
NL2003059	Netherlands	Duinen Terschelling SAC	Grey seal	681	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL2003061	Netherlands	Duinen Vlieland SAC	Grey seal	683	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL4000021	Netherlands	Grevelingen SAC	Grey seal	791	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Harbour seal			
NL2008002	Netherlands	Klaverbank SAC	Harbour porpoise	510	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
			Harbour seal			

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
NL9802001	Netherlands	Noordzeekustzone SAC	Harbour porpoise Grey seal Harbour seal	674	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL3009016	Netherlands	Oosterschelde SPA and SAC	Harbour porpoise Grey seal Harbour seal	797	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL2008003	Netherlands	Vlakte van de Raan SAC	Harbour porpoise Grey seal Harbour seal	797	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL4000017	Netherlands	Voordelta SAC and SPA	Harbour porpoise Grey seal Harbour seal	772	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL1000001	Netherlands	Waddenzee SAC	Harbour porpoise Grey seal Harbour seal	682	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
NL9803061	Netherlands	Westerschelde & Saeftinghe SAC	Harbour porpoise Grey seal	806	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
			Harbour seal			beyond that of potential for direct or indirect effects, alone or in-combination.
SE0510050	Sweden	Balgö SAC	Harbour seal	820	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520171	Sweden	Gullmarsfjorden SAC	Harbour seal	755	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0420002	Sweden	Hallands Vadero SAC	Harbour seal	871	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520170	Sweden	Kosterfjorden-Väderöfjorden SAC	Harbour porpoise Harbour seal	725	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0510058	Sweden	Kungsbackafjorden 2011	Harbour seal	806	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0510084	Sweden	Nidingen 2011	Harbour seal	806	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520057	Sweden	Malmöfjord SAC	Harbour seal	754	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
						beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520058	Sweden	Måseskär SAC	Harbour seal	758	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520043	Sweden	Nordre Älvs Estuarium SAC	Harbour seal	782	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0420360	Sweden	Nordvästra Skånes havsområde SCI	Harbour seal	845	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
			Grey seal			
SE0520176	Sweden	Pater Noster-Skärgården SAC	Harbour seal	768	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520036	Sweden	Sälöfjorden SAC	Harbour seal	774	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
SE0520188	Sweden	Soteskär SAC	Harbour seal	747	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
SE0520001	Sweden	Vrångöskärgården SAC	Harbour seal	789	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
UK0017072	**UK**	**Berwickshire and North Northumberland Coast SAC**	**Grey seal**	**241**	**In**	**Potential connectivity. Grey seal in the Broadshore Hub WFDAs, or areas of potential effect, could be from this designated site.**
UK0019808	**UK**	**Moray Firth SAC**	**Bottlenose dolphin**	**93**	**In**	**Nearest UK designated site for bottlenose dolphin. It is assumed that all bottlenose dolphin in the Broadshore Hub WFDAs, or areas of potential effect, are from this designated site.**
UK0019806	**UK**	**Dornoch Firth and Morrich More SAC**	**Harbour seal**	**120**	**In**	**Potential connectivity. It is assumed that harbour seal in the Broadshore Hub WFDAs, or areas of potential effect, could be from this designated site.**
UK0017096	**UK**	**Faray and Holm of Faray SAC**	**Grey seal**	**115**	**In**	**Potential connectivity. It is assumed that grey seal in the Broadshore Hub WFDAs, or areas of potential effect, could be from this designated site.**
UK0030311	UK	Firth of Tay & Eden Estuary SAC	Harbour seal	188	Out	Based on the Carter *et al.* (2022) SAC data there is no potential connectivity between the Broadshore Hub WFDAs and this designated site for direct or indirect effects, alone or in-combination.
UK0030170	UK	Humber Estuary SAC	Grey seal	491	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
UK0030172	**UK**	**Isle of May SAC**	**Grey seal**	**218**	**In**	**Potential connectivity. It is assumed that grey seal in the Broadshore Hub WFDAs, or areas of potential effect, could be from this designated site.**

Site Code	Country	Designation Name	Qualifying Feature	Distance (km)	Screened In / Out	Rationale
UK9002361	UK	Mousa SAC	Harbour seal	191	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
UK0030069	UK	Sanday SAC	Harbour seal	109	Out	Based on the Carter *et al.* (2022) SAC data there is no potential connectivity between the Broadshore Hub WFDAs and this designated site for direct or indirect effects, alone or in-combination.
UK0012687	UK	Yell Sound Coast SAC	Harbour seal	235	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.
UK0030395	UK	Southern North Sea SAC	Harbour porpoise	331	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination[9].
UK0017075	UK	The Wash and North Norfolk Coast SAC	Harbour seal	572	Out	The distance between the potential effect range of the Broadshore Hub WFDAs and this designated site is beyond that of potential for direct or indirect effects, alone or in-combination.

[9] As advised on a nearby offshore wind project (Green Volt Offshore Wind Farm): https://marine.gov.scot/sites/default/files/appendix_i_-_consultation_responses_and_advice.pdf (page 117)

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7 Offshore Ornithology

7.1 Sites Designated for Annex I Marine Ornithological Features

7.1.1 Initial Identification of Sites and Potential Connectivity

293. The approach used to identify European sites with relevant ornithological qualifying features to be carried forward for further assessment of likely significant effects (LSE) is detailed below, setting out the different criteria that have been applied to assess the potential for connectivity with the Broadshore Hub Wind Farm Development Areas (WFDAs). The assessment has taken into account advice already provided by NatureScot in their scoping advice for several ScotWind offshore wind farm projects, including for the Caledonia Offshore Wind Farm (NatureScot, 2023a) which is also located in the North East ScotWind region. This Broadshore Hub WFDAs Habitats Regulations Appraisal (HRA) Screening Report also takes account of consultation with NatureScot and the Marine Directorate – Licensing Operations Team (MD-LOT) from the Broadshore Hub WFDAs Scoping Workshop held on 13th September 2023 (and as detailed in the **Broadshore Hub WFDAs Scoping Report** (BlueFloat | Renantis Partnership, 2024) – please also see **Table 2.2)**.

294. The criteria that have been considered in determining potential connectivity are as follows, in line with **Section 2.3**:

Criterion 1 - There is a physical overlap between the Broadshore Hub WFDAs Screening Boundary and any European sites; all sites with an overlapping boundary are screened in to be taken forward for determination of LSE.

295. As there are no European sites with relevant seabird species as qualifying features which overlap with the Broadshore Hub WFDAs Screening Boundary, no sites are screened in for further consideration for seabirds on the basis of this criterion.

Criterion 2 - There is an overlap between the Broadshore Hub WFDAs Screening Boundary and the range of any qualifying mobile species of the site. All sites where the Broadshore Hub WFDAs Screening Boundary overlaps with the range of one (or more) of its features, are taken forward for determination of LSE.

296. Birds are highly mobile species, which can forage and migrate over wide areas. Birds present in offshore waters and potentially affected by the construction, operation and maintenance and decommissioning of the Broadshore Hub WFDAs will be predominantly seabirds (defined for this Broadshore Hub WFDAs HRA Screening Report as auks, gulls, terns, gannets, skuas, shearwaters, petrels, cormorants, and divers). These species have the potential to be present in the vicinity of the Broadshore Hub WFDAs during the breeding and non-breeding seasons (including the spring and autumn passage periods). Other bird species that may be affected by the Broadshore Hub WFDAs include those which may fly through the area of the Broadshore Hub WFDAs during their spring and/or autumn migration (or passage) periods (e.g. waterfowl),

and any other species which may use the intertidal habitats or the inshore or offshore waters which are potentially affected by the Broadshore Hub WFDAs.

297. Based on the above, it is considered that (in relation to marine ornithology) the Special Protection Areas (SPAs) (and Ramsar sites) which have the potential to be affected by the Broadshore Hub WFDAs are those which:

- Include seabird qualifying features that may use the waters in and around the Broadshore Hub WFDAs (e.g. for foraging).
- Include qualifying features which may fly through the area of the Broadshore Hub WFDAs during migration.

Criterion 3 - Impacts occurring within the potential Zone of Influence (ZoI) for the Broadshore Hub WFDAs

298. The potential ZoI of impacts associated with the Broadshore Hub WFDAs (e.g., habitat loss/disturbance, noise, and risk of collision) is considered to be limited to the area within two km of the Broadshore Hub WFDAs for most bird species. This may extend to considerably greater distances for some species, notably red-throated diver, which shows particular sensitivity to various sources of anthropogenic disturbance (e.g. Mendel et al., 2019; Heinänen et al., 2020). Given the large distributions defined in criterion 2 for many species, the ZoI of key impacts are considered likely to occur well within the area defined by these wider distributions. Given this, no further SPAs and Ramsar sites with ornithological qualifying features would be screened in for further consideration under criterion 3.

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

- Breeding Seabird Colony SPAs and Ramsar sites;
- SPAs and Ramsar sites with migratory non-seabird qualifying features (subsequently termed Migratory non-Seabird SPAs for convenience). These are further subcategorised into Estuarine sites and Inland sites; and
- Marine SPAs.

7.1.1.1 Breeding Seabird Colony Special Protection Areas and Ramsar Sites

300. To determine the breeding seabird colony SPAs which may have connectivity with the Broadshore Hub WFDAs Screening Boundary, those SPAs on the east coast of Scotland and in north (including Orkney and Shetland) and north-west Scotland were considered in terms of the potential for connectivity during the breeding season. All such SPAs in north-west Scotland were included as far south as St Kilda, with the following also included on the basis of NatureScot's (2022) scoping advice for the Caledonia Offshore Wind Farm (noting that the distance from these SPAs to the Broadshore Hub WFDAs Screening Boundary will be greater, which ensures that all relevant SPAs in north-west Scotland with potential breeding season connectivity are included):

- Priest Island SPA;
- Shiant Isles SPA;
- Rum SPA;
- Canna and Sanday SPA; and
- Treshnish Isles SPA.

301. In addition, SPAs on the coasts or islands of Northern Ireland, Wales and England and with the potential for breeding season connectivity were also included for consideration, in line with advice from NatureScot (2022) to the Caledonia Offshore Wind Farm.

302. Connectivity during the breeding periods, for the majority of species, is based on whether the SPA lies within mean maximum foraging range +1 standard deviation (SD) from the Broadshore Hub WFDAs Screening Boundary, according to foraging range data in Woodward et al., (2019). The NatureScot Guidance Note 3 (NatureScot, 2023a) advises several exceptions to this general approach, relating to some SPA populations of gannet, guillemot and razorbill, as well as to those species for which there is insufficient data to calculate the mean maximum foraging range +1 SD. This guidance has been followed in determining potential connectivity in the current HRA Screening exercise. In terms of connectivity during the non-breeding periods, for the majority of species, consideration essentially extended to all UK breeding seabird colony SPAs (given the potential for birds to disperse more widely when not constrained by the location of their breeding sites), although for some it is assumed that the populations remain in the same regions as used during the breeding season. Further consideration of connectivity in the breeding and non-breeding seasons is provided below.

7.1.1.1.1 Connectivity in the Breeding Season

303. The initial stage of establishing potential connectivity during the breeding season involved determining whether the Broadshore Hub WFDAs Screening Boundary is within the mean maximum foraging range +1 SD (as determined by Woodward et al*.,* 2019) of each qualifying feature (or named component of an assemblage feature) from each of the SPAs (**Table 7.1**), but with exceptions applied as detailed in the NatureScot (2023a) Guidance Note 3 (see above). To provide further context, this is also determined in relation to the mean maximum foraging range of each seabird species. The potential connectivity is established on the basis of the 'by-sea' distance, which represents the shortest distance using a route around, as opposed to across, land masses and assumes that seabirds will generally avoid flying over larger land masses. The straight-line distance between each SPA and the Broadshore Hub WFDAs Screening Boundary is also presented, but only for context.

304. One full year of data (i.e., for March 2022 to February 2023) from the two-year aerial survey programme of the Broadshore Hub WFDAs offshore aerial survey area has been processed to date, with this survey area encompassing the Broadshore Hub WFDAs plus a four km buffer. The resulting data are summarised in the **Broadshore Hub WFDAs Scoping Report**, with further details presented in the interim survey reports (HiDef, 2023a;b). These data suggest that several of the 13 seabird species which are identified as having potential breeding season connectivity with the Broadshore Hub WFDAs Screening Boundary in **Table 7.2** occur infrequently and in very low numbers within the offshore aerial survey area during the breeding

season. Thus, there were no breeding season (as defined in NatureScot (2020)) records of lesser black-backed gull, Sandwich tern or Leach's storm petrel, and only single records of great skua and Manx shearwater and two records of European storm petrel. Clearly, these data derive from a single breeding season only and, when considered in isolation, the baseline survey data cannot provide a basis for concluding a lack of connectivity until the full two breeding seasons of data are available.

305. However, for several of these rarely occurring species other data and evidence are relevant to considerations of the potential for breeding season connectivity, as follows:

- **Lesser black-backed gull:** It is only the Forth Islands SPA population which is identified as having the potential for connectivity with the Broadshore Hub WFDAs Screening Boundary. The 'by-sea' distance of this SPA to the Broadshore Hub WFDAs Screening Boundary is 232 km, which is only four km less than the mean maximum +1 SD breeding season foraging range (**Table 7.1**, **Table 7.2**). This, together with the absence of any breeding season records in the offshore aerial survey area from the first year of surveys, is considered to be sufficient evidence to conclude that there is no breeding season connectivity between the Forth Islands SPA lesser black-backed gull population and the Broadshore Hub WFDAs Screening Boundary.
- **Sandwich tern:** It is only the Loch of Strathbeg SPA (and Ramsar site) population which is identified as having the potential for connectivity with the Broadshore Hub WFDAs Screening Boundary. The 'by-sea' distance of this SPA to the Broadshore Hub WFDAs Screening Boundary is 53 km, which is only five km less than the mean maximum +1 SD breeding season foraging range (**Table 7.1**, **Table 7.2**). Furthermore, the breeding population of Sandwich tern at the site is reported to be extinct (JNCC, 2021) since loss of natural nesting islands to erosion in 2001, with no breeding records at, or since, the last assessment of the site in 2013 (Equinor, 2022). This, together with the absence of any breeding season records in the offshore aerial survey area from the first year of surveys, is considered to be sufficient evidence to conclude that there is no breeding season connectivity between the Loch of Strathbeg SPA (and Ramsar site) population and the Broadshore Hub WFDAs Screening Boundary.
- **Leach's storm petrel:** There are five SPA populations identified as having the potential for connectivity with the Broadshore Hub WFDAs Screening Boundary, all of which are well within the estimated mean breeding season foraging range of this species (**Table 7.1**, **Table 7.2**)[10]. The available evidence suggests that during the breeding season Leach's storm petrels forage mainly in waters along the continental shelf edge west of Scotland rather than in North Sea waters (Stone et al., 1995; Kober et al., 2010), indicating that there will be no breeding season connectivity between the five SPA populations identified in **Table 7.2** and the Broadshore Hub WFDAs Screening Boundary. It is acknowledged that the abundance of Leach's storm petrel is likely to be underestimated by aerial surveys because of their nocturnal activity but the absence of any breeding season records during the first year of surveys of the offshore aerial survey area is consistent with the expectation of no connectivity with the Broadshore Hub WFDAs Screening Boundary. As such, it is concluded

[10] The mean range is used for Leach's storm petrel due to insufficient data being available for calculating the mean maximum +1 SD (Woodward et al. 2019; NatureScot (2023a) Guidance Note 3)

that there is no breeding season connectivity between the five SPA populations identified in **Table 7.2** and the Broadshore Hub WFDAs.

- **European storm petrel:** There are four SPA populations identified as having the potential for connectivity with the Broadshore Hub WFDAs Screening Boundary, all of which are within the estimated mean maximum breeding season foraging range of this species (**Table 7.1**, **Table 7.2**)[11]. The available evidence shows that during the breeding season European storm petrels are widely distributed across UK waters, with highest densities in the north and west (Stone et al., 1995; Kober et al., 2010; Waggit et al., 2020). The species is known to occur within the wider Moray Firth region, albeit at relatively low densities. Therefore, it is concluded that there is potential for breeding season connectivity between the four SPA populations identified in **Table 7.2** and the Broadshore Hub WFDAs Screening Boundary.
- **Manx shearwater:** There are five SPA populations identified as having the potential for connectivity with the Broadshore Hub, all of which are within the estimated mean maximum breeding season foraging range of this species (**Table 7.1**, **Table 7.2**). The available evidence from both detailed tracking studies and broader-level distributional data indicates that during the breeding season this species is largely confined to western waters (consistent with the location of the relevant SPAs). Thus, tracking studies from three of the five SPAs identified as having potential connectivity with the Broadshore Hub WFDAs (including Rum which is the closest of these SPAs) show no evidence of birds using the waters in the vicinity of the Broadshore Hub WFDAs, or indeed in the North Sea more generally (Dean 2012; Dean et al., 2015). Broader-scale distributional information indicates that during the breeding season Manx shearwater are scarce in the wider Moray Firth region (and in UK eastern waters more generally), with areas of moderate to high densities confined to western and (more) northern waters (Stone et al., 1995; Kober et al., 2010; Waggit et al., 2020). Thus, the available evidence suggests that there will be no breeding season connectivity between the five SPA populations identified in **Table 7.2** and the Broadshore Hub WFDAs Screening Boundary. The scarcity of breeding season records during the first year of surveys of the offshore aerial survey area is consistent with the expectation of no connectivity with the Broadshore Hub WFDAs Screening Boundary.
- **Great skua:** There are nine SPA populations identified as having the potential for connectivity with the Broadshore Hub WFDAs Screening Boundary, all of which are within the estimated mean maximum +1 SD breeding season foraging range of this species (**Table 7.1**, **Table 7.2**). The available evidence shows that during the breeding season the distribution of great skuas in UK waters is concentrated around the main breeding areas in Shetland and, to a lesser extent, Orkney and parts of north-western Scotland (Kober et al., 2010; Waggit et al., 2020). Densities within the wider Moray Firth are relatively low, overall, but suggest that there is the potential for connectivity between the SPA populations of this species identified in **Table 7.2** and the Broadshore Hub WFDAs Screening Boundary, despite the near absence of breeding season records during the first year of surveys of the offshore aerial survey area.

306. The above conclusions on whether SPA populations of the above six species should be considered to have potential connectivity with the Broadshore Hub WFDAs Screening Boundary

[11] The mean maximum range is used for European storm petrel due to insufficient data being available for calculating the mean maximum +1 SD (Woodward et al*.* 2019, NatureScot (2023a) Guidance Note 3).

will be subject to review following the completion of the second year of the offshore aerial survey programme. Should this further baseline data lead to any change in the conclusions on potential connectivity, this will be set out and justified in a specific section of the Broadshore Hub WFDAs Report to Inform Appropriate Assessment (RIAA).

307. Given the above, it is considered that 35 of the 49 breeding seabird colony SPAs identified in **Table 7.2** have potential connectivity with the Broadshore Hub WFDAs Screening Boundary during the breeding season. Thus, eight of these 49 SPAs are considered to lack potential connectivity because none of the qualifying features are within mean maximum +1 SD breeding season foraging range (or the advised equivalent) of the Broadshore Hub WFDAs Screening Boundary when the 'by-sea' distance is considered (see **Table 7.2**). In addition, the potential for breeding season connectivity is excluded for a further six SPAs on the basis that the available evidence suggests that the only qualifying features within potential breeding season foraging range of the Broadshore Hub WFDAs Screening Boundary are likely to be scarce or absent within the offshore aerial survey area during the breeding season. These six SPAs are:

- Loch of Strathbeg SPA (and Ramsar site) for which only Sandwich tern is within potential foraging range of the Broadshore Hub WFDAs Screening Boundary.
- Ramna Stacks and Gruney SPA for which only Leach's storm petrel is within potential foraging range of the Broadshore Hub WFDAs Screening Boundary.
- Rum SPA, Copeland Islands SPA, Glannau Aberdaron ac Ynys Enlli/Aberdaron Coast and Bardsey Island SPA, and Skomer, Skokholm and Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA for which only Manx shearwater is within potential foraging range of the Broadshore Hub WFDAs Screening Boundary.

Table 7.1: The Advised Foraging Ranges of Breeding Seabirds (from NatureScot (2023a) Guidance Note 3)

Species	Foraging Range (km) ±1 Standard Deviation (SD) (Where Available for the Mean Maximum Value)
Red-throated diver	9.0*
European storm petrel	336.0*
Leach's storm petrel	657.0**
Northern fulmar	542.3 ± 657.9
Manx shearwater	1346.0 ± 1018.7
Northern gannet	
• Forth Islands SPA	590.0***
• St Kilda SPA	709.0***
• Grassholm SPA	516.7***
• All other SPAs	315.2 ± 194.2
European shag	13.2 ± 10.5

Species	Foraging Range (km) ±1 Standard Deviation (SD) (Where Available for the Mean Maximum Value)
Cormorant	25.6 ± 8.3
Black-legged kittiwake	156.1 ± 144.5
Black-headed gull	18.5*
Common gull	50.0*
Great black-backed gull	73.0*
Herring gull	58.8 ± 26.8
Lesser black-backed gull	127.0 ± 109
Sandwich tern	34.3 ± 23.2
Little tern	5.0*
Roseate tern	12.6 ± 10.6
Common tern	18.0 ± 8.9
Arctic tern	25.7 ± 14.8
Great skua	443.3 ± 487.9
Arctic skua	2 ± 0.7**
Common guillemot SPAs in Orkney and Shetland (inclusive of Fair Isle data) SPAs outside Orkney and Shetland (exclduing Fair isle data)	 73.2 ± 80.5 55.5 ± 39.7
Razorbill SPAs in Orkney and Shetland (i.e. Northern Isles) (inclusive of Fair Isle data) SPAs south of the Pentland Firth (i.e. excluding the Northern Isles) (excluding Fair Isle data)	 88.7 ± 75.9 73.8 ± 48.4
Black guillemot	4.8 ± 4.3
Atlantic puffin	137.1 ± 128.3
Notes: [#] Values are the mean maximum ±1 standard deviation unless otherwise indicated (from Woodward et al., 2019), as advised by NatureScot (2023a) Guidance Note 3. * Mean maximum value only – no standard deviation available. ** Mean value – no mean maximum or maximum values available. *** Site-specific maximum values	

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Table 7.2: European Sites Designated for Marine Ornithological Features with Potential Connectivity to the Broadshore Hub WFDAs Screening Boundary

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4], [5]	Within Mean Maximum Foraging Range +1SD[4], [5]
Breeding Seabird Colony Special Protection Areas							
1	Troup, Pennan and Lion's Heads SPA	UK9002471	50.6	50.6	Kittiwake (breeding)	Y	Y
					Guillemot (breeding)	Y[6]	Y[6]
					Seabird assemblage (breeding) including the components:		
					Fulmar	Y	Y
					Herring gull	Y	Y
					Razorbill	Y[6]	Y[6]
2	Loch of Strathbeg SPA and Ramsar[9]	UK9002211 UK13041	52.6	52.6	Sandwich tern (breeding)	N	Y
3	Buchan Ness to Collieston Coast SPA	UK9002491	70.0	70.0	Seabird assemblage (breeding) including the components:		
					Kittiwake	Y	Y
					Herring gull	N	Y
					Guillemot	N[6]	Y[6]
					Shag	N	N

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4], [5]	Within Mean Maximum Foraging Range +1SD[4], [5]
					Fulmar	Y	Y
4	East Caithness Cliffs SPA	UK9001182	70.5	70.5	Guillemot (breeding)	N[6]	Y[6]
					Razorbill (breeding)	Y[6]	Y[6]
					Herring gull (breeding)	N	Y
					Kittiwake (breeding)	Y	Y
					Shag (breeding)	N	N
					Seabird assemblage (breeding) including the components:		
					Great black-backed gull	Y	N/A
					Cormorant	N	N
					Fulmar	Y	Y
5	North Caithness Cliffs SPA	UK9001181	75.8	75.8	Guillemot (breeding)	N[6]	Y[6]
					Seabird assemblage (breeding) including the components:		
					Fulmar	Y	Y
					Kittiwake	Y	Y
					Razorbill	N[6]	Y[6]

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Puffin	Y	Y
6	Pentland Firth Islands SPA	UK9001131	77.4	77.4	Arctic tern (breeding)	N	N
7	Copinsay SPA	UK9002151	79.4	83.0	Seabird assemblage (breeding) including the components:		
					Guillemot	N[7]	Y[7]
					Kittiwake	Y	Y
					Great black-backed gull	N	N/A
					Fulmar	Y	Y
8	Ythan Estuary, Sands of Forvie and Meikle Loch SPA, Ythan Estuary and Meikle Loch Ramsar[9]	UK9002221 UK13061	78.1	89.7	Sandwich tern (breeding)	N	N
					Common tern (breeding)	N	N
					Little tern (breeding)	N	N
9	Auskerry SPA	UK9002381	91.7	91.7	European storm petrel (breeding)	Y	N/A
					Arctic tern (breeding)	N	N
10	Hoy SPA	UK9002141	98.3	98.3	Red-throated diver (breeding)	N	N/A
					Great skua (breeding)	Y	Y

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Seabird assemblage (breeding) including the components:		
					Puffin	Y	Y
					Kittiwake	Y	Y
					Arctic skua	N	N
					Fulmar	Y	Y
					Great black-backed gull	N	N/A
					Guillemot	N[7]	Y[7]
11	Calf of Eday SPA	UK9002431	113.5	128.0	Seabird assemblage (breeding) including the components:		
					Cormorant	N	N
					Great black-backed gull	N	N/A
					Guillemot	N[7]	Y[7]
					Fulmar	Y	Y
					Kittiwake	Y	Y
12	Rousay SPA	UK9002371	116.6	129.3	Arctic tern (breeding)	N	N

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Seabird assemblage (breeding) including the components:		
					Arctic skua	N	N
					Kittiwake	Y	Y
					Guillemot	N[7]	Y[7]
					Fulmar	Y	Y
13	Fair Isle SPA	UK9002091	132.4	132.4	Arctic tern (breeding)	N	N
					Guillemot (breeding)	N[7]	Y[7]
					Seabird assemblage (breeding) including the components:		
					Puffin	N	Y
					Razorbill	N[7]	Y[7]
					Kittiwake	Y	Y
					Great skua	Y	Y
					Arctic skua	N	N
					Shag	N	N
					Gannet	Y	Y

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4], [5]	Within Mean Maximum Foraging Range +1SD[4], [5]
					Fulmar	Y	Y
14	Marwick Head SPA	UK9002121	125.2	136.5	Guillemot (breeding)	N[7]	Y[7]
					Seabird assemblage (breeding) including the components:		
					Kittiwake	Y	Y
15	West Westray SPA	UK9002101	126.6	140.1	Arctic tern (breeding)	N	N
					Guillemot (breeding)	N[7]	Y[7]
					Seabird assemblage (breeding) including the components:		
					Razorbill	N[7]	Y[7]
					Kittiwake	Y	Y
					Arctic skua	N	N
					Fulmar	Y	Y
16	Fowlsheugh SPA	UK9002271	131.8	141.9	Seabird assemblage (breeding) including the components:		
					Fulmar	Y	Y
					Guillemot	N[6]	N[6]

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Herring gull	N	N
					Kittiwake	Y	Y
					Razorbill	N[6]	N[6]
17	Sumburgh Head SPA	UK9002511	172.9	172.9	Arctic tern (breeding)	N	N
					Seabird assemblage (breeding) including the components:		
					Guillemot	N[7]	N[7]
					Kittiwake	N	Y
					Fulmar	Y	Y
18	Sule Skerry and Sule Stack SPA	UK9002181	170.8	181.9	European storm petrel (breeding)	Y	N/A
					Leach's storm petrel (breeding)	Y	N/A
					Gannet (breeding)	Y	Y
					Puffin (breeding)	N	Y
					Seabird assemblage (breeding) including the components:		
					Guillemot	N[7]	N[7]
					Shag	N	N

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
19	Cape Wrath SPA	UK9001231	173.8	191.6	Seabird assemblage (breeding) including the components:		
					Kittiwake	N	Y
					Guillemot	N[6]	N[6]
					Razorbill	N[6]	N[6]
					Puffin	N	Y
					Fulmar	Y	Y
20	Foula SPA	UK9002061	199.6	199.6	Arctic tern (breeding)	N	N
					Leach's storm petrel (breeding)	Y	N/A
					Red-throated diver (breeding)	N	N/A
					Great skua (breeding)	Y	Y
					Guillemot (breeding)	N[7]	N[7]
					Puffin (breeding)	N	Y
					Shag (breeding)	N	N
					Seabird assemblage (breeding) including the components:		
					Kittiwake	N	Y

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Razorbill	N[7]	N[7]
					Arctic skua	N	N
					Fulmar	Y	Y
21	Noss SPA	UK9002081	206.2	206.2	Gannet (breeding)	Y	Y
					Great skua (breeding)	Y	Y
					Guillemot (breeding)	N[7]	N[7]
					Seabird assemblage (breeding) including the components:		
					Fulmar	Y	Y
					Kittiwake	N	Y
					Puffin	N	Y
22	Mousa SPA	UK9002361	191.5	210.9	European storm petrel (breeding)	Y	N/A
					Arctic tern (breeding)	N	N
23	Papa Stour SPA	UK9002051	224.7	224.7	Arctic tern (breeding)	N	N
24	Handa SPA	UK9001241	191.4	231.0	Guillemot	N[6]	N[6]
					Razorbill	N[6]	N[6]

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4], [5]	Within Mean Maximum Foraging Range +1SD[4], [5]
					Seabird assemblage (breeding) including the components:		
					Great skua	Y	Y
					Kittiwake	N	Y
					Fulmar	Y	Y
25	Forth Islands SPA	UK9004171	215.6	232.1	Arctic tern (breeding)	N	N
					Common tern (breeding)	N	N
					Roseate tern (breeding)	N	N
					Sandwich tern (breeding)	N	N
					Gannet (breeding)	Y[8]	Y[8]
					Shag (breeding)	N	N
					Lesser black-backed gull (breeding)	N	Y
					Puffin (breeding)	N	Y
					Seabird assemblage (breeding) including the components:		
					Guillemot	N[6]	N[6]
					Razorbill	N[6]	N[6]

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Kittiwake	N	Y
					Herring gull	N	N
					Cormorant	N	N
26	St Abb's Head to Fast Castle SPA	UK9004271	242.9	253.3	Seabird assemblage (breeding) including the components		
					Guillemot	N[6]	N[6]
					Herring gull	N	N
					Razorbill	N[6]	N[6]
					Kittiwake	N	Y
					Shag	N	N
27	Ronas Hill – North Roe and Tingon SPA	UK9002041	246.7	261.6	Red-throated diver (breeding)	N	N/A
					Great skua (breeding)	Y	Y
					Seabird assemblage (breeding) including the components:		
					Arctic skua	N	N
					Black guillemot	N	N
28		UK9001011	244.8	265.0	Gannet (breeding)	Y	Y

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
	North Rona and Sula Sgeir SPA				Guillemot (breeding)	N[7]	N[7]
					Seabird assemblage (breeding) including the components:		
					Great black-backed gull	N	N/A
					Kittiwake	N	Y
					Razorbill	N[7]	N[7]
					Puffin	N	Y
					Fulmar	Y	Y
29	Fetlar SPA	UK9002031	254.1	274.9	Arctic tern (breeding)	N	N
					Great skua (breeding)	Y	Y
					Seabird assemblage (breeding) including the components:		
					Arctic skua	N	N
					Fulmar	Y	Y
30	Ramna Stacks and Gruney SPA	UK9002021	263.2	279.9	Leach's storm petrel (breeding)	Y	N/A
31	Farne Islands SPA	UK9006021	274.6	281.4	Arctic tern (breeding)	N	N

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Common tern (breeding)	N	N
					Roseate tern (breeding)	N	N
					Sandwich tern (breeding)	N	N
					Guillemot (breeding)	N[6]	N[6]
					Seabird assemblage (breeding) including the components (* = additional, as advised by Natural England within Berwick Bank Offshore Wind Farm scoping advice):		
					Kittiwake	N	Y
					Shag	N	N
					Cormorant	N	N
					Puffin	N	N
					Fulmar*	Y	Y
					Black-headed gull*	N	N/A
					Great black-backed gull*	N	N/A
					Lesser black-backed gull*	N	N
					Herring gull*	N	N

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Razorbill*	N[6]	N[6]
32	Priest Island (Summer Isles) SPA	UK9001261	213.3	288.6	European storm petrel (breeding)	Y	N/A
33	Hermaness, Saxa Vord and Valla Field SPA	UK9002011	273.7	301.4	Red-throated diver (breeding)	N	N/A
					Gannet (breeding)	Y	Y
					Great skua (breeding)	Y	Y
					Puffin (breeding)	N	N
					Seabird assemblage (breeding) including the components:		
					Fulmar	Y	Y
					Shag	N	N
					Guillemot	N[7]	N[7]
					Kittiwake	N	N
34	Shiant Isles SPA	UK9002091	260.3	307.9	Shag (breeding)	N	N
					Razorbill (breeding)	N[6]	N[6]
					Puffin (breeding)	N	N

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4], [5]	Within Mean Maximum Foraging Range +1SD[4], [5]
					Seabird assemblage (breeding) including the components:		
					Fulmar	Y	Y
					Guillemot	N[6]	N[6]
					Kittiwake	N	N
35	Coquet Island SPA	UK9006031	309.3	309.3	Arctic tern (breeding)	N	N
					Common tern (breeding)	N	N
					Roseate tern (breeding)	N	N
					Sandwich tern (breeding)	N	N
					Seabird assemblage (breeding) including the components:		
					Puffin	N	N
					Black-headed gull	N	N/A
					Fulmar	Y	Y
					Herring gull	N	N
					Lesser black-backed gull	N	N
					Kittiwake	N	N

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
36	Flannan Isles SPA	UK9001021	330.6	363.4	Leach's storm petrel (breeding)	Y	N/A
					Seabird assemblage (breeding) including the components:		
					Guillemot	N[6]	N[6]
					Razorbill	N[6]	N[6]
					Puffin	N	N
					Fulmar	Y	Y
					Kittiwake	N	N
37	Canna and Sanday SPA	UK9001431	295.7	420.3	Seabird assemblage (breeding) including the components:		
					Guillemot	N[6]	N[6]
					Herring gull	N	N
					Kittiwake	N	N
					Puffin	N	N
					Shag	N	N
38	Rum SPA	UK9001341	279.8	421.5	Red-throated diver (breeding)	N	N/A
					Manx shearwater (breeding)	Y	Y

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Seabird assemblage (breeding) including the components:		
					Guillemot	N[6]	N[6]
					Kittiwake	N	N
39	St Kilda SPA	UK9001031	386.7	436.7	European storm petrel (breeding)	N	N/A
					Leach's storm petrel (breeding)	Y	N/A
					Gannet (breeding)	Y[8]	Y[8]
					Great skua (breeding)	Y	Y
					Puffin (breeding)	N	N
					Seabird assemblage (breeding) including the components:		
					Guillemot	N[6]	N[6]
					Razorbill	N	N
					Kittiwake	N	N
					Manx shearwater	Y	Y
					Fulmar	Y	Y
40		UK9006101	438.8	438.8	Gannet (breeding)	N	Y

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
	Flamborough and Filey Coast SPA				Kittiwake (breeding)	N	N
					Guillemot (breeding)	N[6]	N[6]
					Razorbill (breeding)	N[6]	N[6]
					Seabird assemblage (breeding) including the components:		
					Fulmar	Y	Y
					Puffin	N	N
					Herring gull	N	N
					Shag	N	N
					Cormorant	N	N
41	Mingulay and Berneray SPA	UK9001121	368.8	462.1	Razorbill (breeding)	N[6]	N[6]
					Seabird assemblage (breeding) including the components:		
					Fulmar	Y	Y
					Guillemot	N[6]	N[6]
					Kittiwake	N	N
					Puffin	N	N

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Shag	N	N
42	Treshnish Isles SPA	UK9003041	323.3	471.0	European storm petrel (breeding)	N	N/A
43	North Colonsay and Western Cliffs SPA	UK9003171	339.4	520.6	Seabird assemblage (breeding) including the components:		
					Kittiwake	N	N
					Guillemot	N[6]	N[6]
44	Rathlin Island SPA	UK9020011	408.8	606.7	Guillemot (breeding)	N[6]	N[6]
					Razorbill (breeding)	N[6]	N[6]
					Kittiwake (breeding)	N	N
					Seabird assemblage (breeding) including the components:		
					Fulmar	N	Y
					Common gull	N	N/A
					Lesser black-backed gull	N	N
					Herring gull	N	N
					Puffin	N	N
45	Ailsa Craig SPA	UK9003091	371.8	678.7	Gannet (breeding)	N	N

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Lesser black-backed gull (breeding)	N	N
					Seabird assemblage (breeding) including the components:		
					Guillemot	N[6]	N[6]
					Herring gull	N	N
					Kittiwake	N	N
46	Copeland Islands SPA	UK9020291	441.5	709.9	Manx shearwater (breeding)	Y	Y
					Arctic tern (breeding)	N	N
47	Glannau Aberdaron ac Ynys Enlli/Aberdaron Coast and Bardsey Island SPA	UK9013121	613.9	932.1	Manx shearwater (breeding)	Y	Y
48	Skomer, Skokholm and Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA	UK9014051	737.6	1037.6	Manx shearwater (breeding)	Y	Y
					Puffin (breeding)	N	N
					Storm petrel (breeding)	N	N/A
					Lesser black-backed gull (breeding)	N	N
					Seabird assemblage (breeding) including the components:		
					Razorbill	N[6]	N[6]

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Guillemot	N[6]	N[6]
					Kittiwake	N	N
49	Grassholm SPA	UK9014041	744.9	1045.3	Gannet (breeding)	N[8]	N[8]
Marine Special Protection Areas							
50	Moray Firth SPA	UK9020313	62.6	N/A	Great northern diver (non-breeding)	N/A	N/A
					Red-throated diver (non-breeding)		
					Slavonian grebe (non-breeding)		
					Greater scaup (non-breeding)		
					Eider (non-breeding)		
					Long-tailed duck (non-breeding)		
					Common scoter (non-breeding)		
					Velvet scoter (non-breeding)		
					Common goldeneye (non-breeding)		
					Red-breasted merganser (non-breeding)		
					European shag (breeding)		
					European shag (non-breeding)		

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
Migratory Non-seabird SPAs (Estuarine)							
51	Loch of Strathbeg SPA and Ramsar site[9]	UK9002211 UK13041	52.6	N/A	[Svalbard] barnacle goose (non-breeding)	N/A	N/A
					Greylag goose (non-breeding)		
					Pink-footed goose (non-breeding)		
					Whooper swan (non-breeding)		
					Waterfowl assemblage (non-breeding) including the components:		
					Eurasian teal		
					Common goldeneye		
52	Ythan Estuary, Sands of Forvie and Meikle Loch SPA, Ythan Estuary and Meikle Loch Ramsar site[9]	UK9002221 UK13061	78.1	N/A	Pink-footed goose (non-breeding)	N/A	N/A
					Waterfowl assemblage (non-breeding) including the components:		
					Eider		
					Lapwing		
					Redshank		
53	Moray and Nairn Coast SPA and Ramsar	UK9001625 UK13048	86.8	N/A	Bar-tailed godwit (non-breeding)	N/A	N/A
					Greylag goose (non-breeding)		

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Pink-footed goose (non-breeding)		
					Redshank (non-breeding)		
					Waterfowl assemblage (non-breeding) including the components:		
					Dunlin		
					Oystercatcher		
					Red-breasted merganser		
					Eurasian wigeon		
54	Dornoch Firth and Loch Fleet SPA and Ramsar	UK9001622 UK13011	114.4	N/A	Bar-tailed godwit (non-breeding)	N/A	N/A
					Greylag goose (non-breeding)		
					Eurasian wigeon (non-breeding)		
					Waterfowl assemblage (non-breeding) including the components:		
					Curlew		
					Dunlin		
					Oystercatcher		
					Redshank		

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Greater scaup		
					Eurasian teal		
55	Cromarty Firth SPA and Ramsar	UK9001623 UK13009	131.5	N/A	Bar-tailed godwit (non-breeding)	N/A	N/A
					Greylag goose (non-breeding)		
					Whooper swan (non-breeding)		
					Waterfowl assemblage (non-breeding) including the components:		
					Curlew		
					Dunlin		
					Knot		
					Oystercatcher		
					Northern pintail		
					Red-breasted merganser		
					Redshank		
					Greater scaup		
					Eurasian wigeon		

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
56	Inner Moray Firth SPA and Ramsar	UK9001624 UK13025	134.9	N/A	Bar-tailed godwit (non-breeding)	N/A	N/A
					Greylag goose (non-breeding)		
					Red-breasted merganser (non-breeding)		
					Redshank (non-breeding)		
					Waterfowl assemblage (non-breeding) including the components:		
					Cormorant		
					Curlew		
					Common goldeneye		
					Goosander		
					Oystercatcher		
					Greater scaup		
					Eurasian teal		
					Eurasian wigeon		
57	Montrose Basin SPA and Ramsar	UK9004031 UK13046	158.9	N/A	Greylag goose (non-breeding)	N/A	N/A
					Pink-footed goose (non-breeding)		

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Redshank (non-breeding)		
					Waterfowl assemblage (non-breeding) including the components:		
					Oystercatcher		
					Eider		
					Wigeon		
					Knot		
					Dunlin		
					Shelduck		
58	Firth of Tay and Eden Estuary SPA and Ramsar	UK9004121 UK13018	188.5	N/A	Bar-tailed godwit (non-breeding)	N/A	N/A
					Greylag goose (non-breeding)		
					Pink-footed goose (non-breeding)		
					Redshank (non-breeding)		
					Waterfowl assemblage (non-breeding) including the components:		
					Black-tailed godwit		
					Common scoter		

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Cormorant		
					Dunlin		
					Eider		
					Common goldeneye		
					Goosander		
					Grey plover		
					Long-tailed duck		
					Oystercatcher		
					Red-breasted merganser		
					Sanderling		
					Shelduck		
					Velvet scoter		
59	Firth of Forth SPA and Ramsar	UK9004411 UK13017	209.2	N/A	Bar-tailed godwit (non-breeding)	N/A	N/A
					Golden plover (non-breeding)		
					Knot (non-breeding)		

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Pink-footed goose (non-breeding)		
					Red-throated diver (non-breeding)		
					Redshank (non-breeding)		
					Shelduck (non-breeding)		
					Slavonian grebe (non-breeding)		
					Turnstone (non-breeding)		
					Waterfowl assemblage (non-breeding) including the components:		
					Scaup		
					Great crested grebe		
					Cormorant		
					Curlew		
					Eider		
					Long-tailed duck		
					Common scoter		
					Velvet scoter		

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
					Common goldeneye		
					Red-breasted merganser		
					Oystercatcher		
					Ringed plover		
					Grey plover		
					Dunlin		
					Mallard		
					Lapwing		
					Wigeon		
Migratory Non-seabird SPAs (Inland)							
60	Loch Spynie SPA and Ramsar site	UK9002201 UK13043	94.8	N/A	Greylag goose (non-breeding)	N/A	N/A
61	Loch of Kinnordy SPA and Ramsar	UK9004051 UK13038	174.6	N/A	Greylag goose (non-breeding)	N/A	N/A
					Pink-footed goose (non-breeding)		
62	Loch of Lintrathen SPA and Ramsar	UK9004061	177.2	N/A	Greylag goose (non-breeding)	N/A	N/A

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
		UK13039					
63	Cameron Reservoir SPA and Ramsar	UK9004131 UK13005	211.7	N/A	Pink-footed goose (non-breeding)	N/A	N/A
64	Loch Leven SPA and Ramsar	UK9004111 UK13033	230.0	N/A	Pink-footed goose (non-breeding)	N/A	N/A
					Shoveler (non-breeding)		
					Whooper swan (non-breeding)		
					Waterfowl assemblage (non-breeding) including the components:		
					Cormorant		
					Gadwall		
					Common goldeneye		
					Pochard		
					Teal		
					Tufted duck		
65	Fala Flow SPA and Ramsar	UK9004241 UK13015	262.8	N/A	Pink-footed goose (non-breeding)	N/A	N/A

ID	European Site	Site Code	Straight Line Distance to Broadshore Hub WFDAs (km)[1]	'By-Sea' Distance to Broadshore Hub WFDAs (km)[2]	Relevant Qualifying Features[3]	Within Mean Maximum Foraging Range[4, 5]	Within Mean Maximum Foraging Range +1SD[4, 5]
66	Greenlaw Moor SPA and Ramsar	UK9004281 UK13022	266.8	N/A	Pink-footed goose (non-breeding)	N/A	N/A
67	Gladhouse Reservoir SPA and Ramsar	UK9004231 UK13021	271.1	N/A	Pink-footed goose (non-breeding)	N/A	N/A
68	Din Moss – Hoselaw Loch SPA and Ramsar	UK9004291 UK13010	283.2	N/A	Greylag goose (non-breeding)	N/A	N/A
					Pink-footed goose (non-breeding)		

Notes:

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

2. Measured for the breeding seabird colony SPAs as the closest distance when avoiding larger land masses. *Where the 'by-sea' distance is further than the straight-line distance this has been used for calculating whether the features of the SPA are within foraging range (as defined in **Table 7.1**).

3. This includes all qualifying features of the marine SPA, all seabird qualifying features of the breeding seabird colony SPAs and all passage and wintering qualifying features of the migratory non-seabird SPAs (and Ramsar sites). The definitions of seabirds and migratory non-seabirds used in this Broadshore Hub WFDAs HRA Screening Report are given in the text.

4. Relevant to qualifying features of breeding seabird colony SPAs only (and not applicable (N/A) to the qualifying features of other SPAs). Breeding seabird foraging ranges are from NatureScot Guidance Note 3 (2023a).

5. For a small number of species no estimate of the mean maximum foraging range is available, with the mean or maximum foraging range being used instead. Also, exceptions to using the generic mean maximum foraging range +1 SD are made in a small number of instances, in accordance with NatureScot (2023a) Guidance Note 3 (see **Table 7.1**).

6. Foraging range applied is mean maximum and SD from Woodward et al., (2019) from which specific data from Fair Isle is excluded (see **Table 7.1**).

7. Foraging range applied is mean maximum and SD from Woodward et al., (2019) in which specific data from Fair Isle is included (see **Table 7.1**).

8. Foraging ranges used for assessing connectivity for northern gannet of this SPA used colony-specific foraging ranges (see **Table 7.1**).

9. Loch of Strathbeg SPA and Ramsar site, and Ythan Estuary and Sands of Forvie SPA and Ramsar site, are included under both Breeding Seabird Colonies and Migratory non-Seabird Sites (Estuarine) as their qualifying features include both breeding terns and non-breeding migratory waterbirds.

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7.1.1.1.2 Connectivity in the Non-breeding Season

308. Outside the breeding season seabirds are not constrained by the requirement to attend nests and may disperse over greater distances than during the breeding season. As such, there is potential for connectivity with a greater range of qualifying features from breeding seabird colony SPAs than during the breeding season. NatureScot (2023b) Guidance Note 4 advises that consideration of the potential for non-breeding season effects on the qualifying features from breeding seabird colony SPAs should be based upon the Biologically Defined Minimum Population Scales (BDMPS) approach (Furness, 2015) for all species with the exception of guillemot. However, it is also noted that the NatureScot scoping advice for the Ossian Wind Farm (NatureScot, 2023c) recognises further exceptions in this regard for herring gull and puffin. For these three species it is assumed that connectivity in the non-breeding season is determined as follows:

- **Guillemot:** Considered not to disperse as widely from the breeding areas as several other seabird species during the non-breeding season (following Buckingham et al*.*, 2022), so that connectivity is based on the breeding season foraging range (and connectivity with the Broadshore Hub WFDAs Screening Boundary during the non-breeding period is as determined for the breeding season).
- **Puffin:** It is considered that no assessment is required for the non-breeding season due to the fact that puffin disperse widely at this time, as outlined in the scoping advice provided to the Berwick Bank Offshore Wind Farm (NatureScot, 2021) and as also appears to be consistent with the approach of the HRA Screening for the Ossian Wind Farm (SSE Renewables, 2023; NatureScot, 2023c).
- **Herring gull:** As for guillemot, considered not to disperse as widely as several other seabird species during the non-breeding season, so that connectivity is based on the breeding season foraging range (and connectivity with the Broadshore Hub WFDAs Screening Boundary during the non-breeding period is as determined for the breeding season) (NatureScot, 2023c).

309. For most seabird species there are only two BDMPS regions defined within UK waters (with the main division being between the North Sea and western waters), although there are up to five for some species (Furness, 2015). For almost all species, the BDMPS of relevance to the Broadshore Hub WFDAs Screening Boundary is defined as the UK North Sea and Channel or the UK North Sea (although for red-throated diver, shag and cormorant it is the north-west North Sea and for roseate tern it is the East Coast and Channel). Within these large expanses of offshore waters, it is generally assumed that there is even mixing of birds from the different ‘source’ populations (from the UK and elsewhere), as well as amongst the different age classes, during passage and other non-breeding periods (Furness, 2015).

310. Processed and analysed data from the Broadshore Hub WFDAs aerial survey programme are currently available for the period March 2022 to February 2023 (inclusive) and so encompass one full non-breeding period. The available survey data include no records of red-throated diver, roseate tern, Sandwich tern, common tern[12], Arctic tern[3], little tern, Arctic skua, great skua, Manx shearwater, European storm petrel, Leach’s storm petrel, shag or cormorant from within the

[12] Although records of these species within the offshore aerial survey area were limited to the breeding season, the survey area is beyond their mean maximum +1 SD foraging range from any SPA breeding population and all records were from the August survey suggesting that these involved birds on passage (as opposed to actively breeding birds).

offshore aerial survey area during the respective non-breeding periods of these species. On the basis of their scarcity or absence within the offshore aerial survey area, it is considered that connectivity with SPA populations of most of these species during the non-breeding season is highly unlikely (except in the context of these species as qualifying features of migratory non-seabird SPAs – **Table 7.2**).

311. However, the above considerations rely on data from one non-breeding season only and, when considered in isolation, the baseline survey data cannot provide a basis for concluding a lack of connectivity until the full two non-breeding seasons of data are available. For eight of the above 13 species, it is considered that potential connectivity during the non-breeding period can be excluded on the basis of other evidence, as follows:

- **Red-throated diver:** Occurrence and distribution in the non-breeding period is known to be restricted to relatively inshore, shallow, waters (O'Brien et al*.,* 2008; Furness, 2015) and, as such, it is considered that there is no potential for connectivity between SPA breeding populations and the Broadshore Hub WFDAs Screening Boundary during the non-breeding period.
- **Roseate tern:** All SPA breeding populations of this species are located to the south of the Broadshore Hub WFDAs Screening Boundary, with the closest being the Forth Islands SPA at a distance of over 200 km (and where the species is a rare and intermittent breeder) (**Table 7.2**). Given that the passage movements for the SPA populations of this species are unlikely extend to the north of the Forth Islands SPA (Furness, 2015), it is considered that there is no potential for connectivity between SPA populations and the Broadshore Hub WFDAs Screening Boundary during the non-breeding period.
- **Little tern:** All SPA breeding populations of this species are located to the south of the Broadshore Hub WFDAs Screening Boundary, with the closest being the Ythan Estuary, Sands of Forvie and Meikle Loch SPA at a distance of almost 90 km (**Table 7.2**). The Broadshore Hub WFDAs are more than 47 km from shore, whereas little tern are considered to have strongly inshore habitat associations (Urban et al*.,* 1986; del Hoyo et al., 1996; Stienen et al*.,* 2007). Given that the passage movements for the SPA populations of this species are unlikely extend to the north of the Ythan Estuary, Sands of Forvie and Meikle Loch SPA (Furness, 2015), or as far offshore as the Broadshore Hub WFDAs, it is considered that there is no potential for connectivity between SPA populations and the Broadshore Hub WFDAs Screening Boundary during the non-breeding period.
- **Manx shearwater:** None of the UK SPA breeding Manx shearwater populations are considered to contribute to the UK North Sea BDMPS (Furness, 2015), so there is no potential for connectivity with SPA populations of this species during the non-breeding period.
- **European storm petrel:** The available distributional data show an absence or scarcity of this species from the waters in the region of the Broadshore Hub WFDAs Screening Boundary during the non-breeding period, and an apparent absence (or near absence) from UK waters between December and April (Stone et al*.,* 1995; Waggit et al*.,* 2020). Therefore, it is considered that there is no potential for connectivity with SPA breeding populations during the non-breeding period.
- **Leach's storm petrel:** The available distributional data show an absence or scarcity of this species from the waters in the region of the Broadshore Hub WFDAs Screening Boundary during the non-breeding period, and an apparent absence from Scottish waters between

December and April (Stone et al., 1995; Deakin et al., 2022). Therefore, it is considered that there is no potential for connectivity with SPA breeding populations during the non-breeding period.

- **Shag:** Known to have a largely inshore distribution, with the available distributional data showing an absence of the species from the waters in the region of the Broadshore Hub WFDAs Screening Boundary during the non-breeding period (Stone et al., 1995; Kober et al., 2010; Waggit et al., 2020). Therefore, it is considered that there is no potential for connectivity with SPA breeding populations during the non-breeding period.
- **Cormorant:** Known to have a largely inshore distribution, with the available distributional data showing an apparent absence of the species from the waters in the region of the Broadshore Hub WFDAs Screening Boundary during the non-breeding period (Stone et al., 1995; Kober et al., 2010). Therefore, it is considered that there is no potential for connectivity with SPA breeding populations during the non-breeding period.

312. For the remaining five species identified above, potential connectivity with SPA breeding populations during the non-breeding period cannot be excluded at this stage, despite the absence of records of these species from the first year of offshore ornithology aerial surveys. Further consideration of the SPA populations of these species which have potential connectivity is provided below (along with such consideration for the remaining seabird species of relevance). However, the above conclusions on potential connectivity during the non-breeding period for these 13 species will be subject to review following the completion of the offshore aerial ornithology survey programme. Should the further baseline data lead to any change in the conclusions on potential connectivity, this will be set out and justified in a specific section of the Broadshore Hub WFDAs RIAA.

313. In relation to considering potential connectivity with SPA breeding populations during the non-breeding period, the remaining species of relevance are fulmar, lesser black-backed gull, great black-backed gull, kittiwake, gannet, and razorbill. The 11 species of relevance with regard to non-breeding season connectivity include some of the species recorded in greatest abundance on the offshore aerial survey area during the first year of the baseline aerial surveys (noting that consideration has already been given to the determination of non-breeding season connectivity for guillemot and puffin). For these 11 species it is assumed that there is the potential for non-breeding season connectivity for any of the SPA populations for which breeding season connectivity is established (as determined from the species' advised breeding season foraging range in **Table 7.1** – see **Table 7.2** and associated text above). The potential for connectivity with other SPA populations of these species during the non-breeding season is determined on the basis of the contribution of these SPA (adult) populations to the relevant BDMPS (adult) population (**Table 7.3**). Total number of adult birds and birds of all age classes in the BDMPS population for each species in **Table 7.3** is shown in **Table 7.4**.

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Table 7.3: The Percentage Contribution of Different SPA Populations to the Biologically Defined Minimum Population Scales Population Relevant to the Broadshore Hub WFDAs Screening Boundary (Based on Adult Birds Only), as Derived from Furness (2015)

SPA	Percentage Contribution to the BDMPS Population (%)										
	Fulmar	Great skua	Arctic skua	Lesser black-backed gull	Great black-backed gull	Kittiwake	Common tern	Arctic tern	Sandwich tern	Gannet	Razorbill
Troup, Pennan and Lion's Heads SPA	-	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	N/A	-
Loch of Strathbeg SPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00	N/A	N/A
Buchan Ness to Collieston Coast SPA	-	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	N/A	N/A
East Caithness Cliffs SPA	-	N/A	N/A	N/A	-	-	N/A	N/A	N/A	N/A	-
North Caithness Cliffs SPA	-	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	N/A	-
Pentland Firth Islands SPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00	N/A	N/A	N/A
Copinsay SPA	-	N/A	N/A	N/A	1.36	-	N/A	N/A	N/A	N/A	N/A
Ythan Estuary, Sands of Forvie and Meikle Loch SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.00	N/A	4.42	N/A	N/A
Auskerry SPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.16	N/A	N/A	N/A
Hoy SPA	-	-	1.01	N/A	0.37	-	N/A	N/A	N/A	N/A	N/A
Calf of Eday SPA	-	N/A	N/A	N/A	1.75	-	N/A	N/A	N/A	N/A	N/A
Rousay SPA	-	N/A	3.03	N/A	N/A	-	N/A	0.09	N/A	N/A	N/A

SPA	Percentage Contribution to the BDMPS Population (%)										
	Fulmar	Great skua	Arctic skua	Lesser black-backed gull	Great black-backed gull	Kittiwake	Common tern	Arctic tern	Sandwich tern	Gannet	Razorbill
Cromarty Firth SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.11	N/A	N/A	N/A	N/A
Inner Moray Firth SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.00	N/A	N/A	N/A	N/A
Marwick Head SPA	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	N/A	N/A
Fair Isle SPA	-	-	1.52	N/A	N/A	-	N/A	0.04	N/A	-	-
West Westray SPA	-	N/A	2.22	N/A	N/A	-	N/A	0.78	N/A	N/A	-
Papa Westray SPA	N/A	N/A	1.82	N/A	N/A	N/A	N/A	0.27	N/A	N/A	N/A
Fowlsheugh SPA	-	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	N/A	2.33
Sumburgh Head SPA	-	N/A	N/A	N/A	N/A	-	N/A	0.31	N/A	N/A	N/A
Sule Skerry and Sule Stack SPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	-	N/A
Cape Wrath SPA	-	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	N/A	0.39
Foula SPA	-	-	2.83	N/A	N/A	-	N/A	0.03	N/A	N/A	0.24
Noss SPA	-	-	N/A	N/A	N/A	-	N/A		N/A	-	N/A
Mousa SPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.03	N/A	N/A	N/A
Papa Stour SPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.82	N/A	N/A	N/A
Handa SPA	-	-	N/A	N/A	N/A	-	N/A	N/A	N/A	N/A	0.97

SPA	Percentage Contribution to the BDMPS Population (%)										
	Fulmar	Great skua	Arctic skua	Lesser black-backed gull	Great black-backed gull	Kittiwake	Common tern	Arctic tern	Sandwich tern	Gannet	Razorbill
Forth Islands SPA	N/A	N/A	N/A	2.23	N/A	-	0.04	0.46	0.00	-	1.74
Imperial Dock Lock SPA	N/A	N/A	N/A	N/A	N/A	N/A	1.30	N/A	N/A	N/A	N/A
St Abb's Head to Fast Castle SPA	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	N/A	0.81
Ronas Hill – North Roe and Tingon SPA	N/A	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
North Rona and Sula Sgeir SPA	-	N/A	N/A	N/A	0.01	-	N/A	N/A	N/A	-	0.21
Fetlar SPA	-	-	6.67	N/A	N/A	N/A	N/A	0.03	N/A	N/A	N/A
Farne Islands SPA	-	N/A	N/A	N/A	N/A	-	0.15	3.31	6.44	N/A	N/A
Hermaness, Saxa Vord and Valla Field SPA	-	-	N/A	N/A	N/A	0.12	N/A	N/A	N/A	-	N/A
Shiant Isles SPA	-	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	0.08
Coquet Island SPA	-	N/A	N/A	N/A	N/A	N/A	1.65	2.11	5.24	N/A	N/A
Flannan Isles SPA	-	N/A	N/A	N/A	N/A	0.01	N/A	N/A	N/A	N/A	0.02
Canna and Sanday SPA	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A
Rum SPA	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A

SPA	Percentage Contribution to the BDMPS Population (%)										
	Fulmar	Great skua	Arctic skua	Lesser black-backed gull	Great black-backed gull	Kittiwake	Common tern	Arctic tern	Sandwich tern	Gannet	Razorbill
St Kilda SPA	-	-	N/A	N/A	N/A	0.01	N/A	N/A	N/A	-	0.32
Flamborough and Filey Coast SPA	-	N/A	N/A	N/A	N/A	12.01	N/A	N/A	N/A	-	6.62
The Wash SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.35	N/A	N/A	N/A	N/A
North Norfolk Coast SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.31	N/A	32.31	N/A	N/A
Alde-Ore Estuary SPA	N/A	N/A	N/A	0.89	N/A	N/A	N/A	N/A	0.02	N/A	N/A
Mingulay and Berneray SPA	-	N/A	N/A	N/A	N/A	0.01	N/A	N/A	N/A	N/A	1.9
North Colonsay and Western Cliffs SPA	N/A	N/A	N/A	N/A	N/A	0.03	N/A	N/A	N/A	N/A	N/A
Glas Eileanan SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.00	N/A	N/A	N/A	N/A
Ailsa Craig SPA	N/A	N/A	N/A	0.13	N/A	0	N/A	N/A	N/A	0	N/A
Rathlin Island SPA	-	N/A	N/A	0.07	N/A	0.04	N/A	N/A	N/A	N/A	1.45
Carlingford Lough SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.03	N/A	0.00	N/A	N/A
Larne Lough SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.05	N/A	0.00	N/A	N/A
Lough Neagh and Lough Beg SPA	N/A	N/A	N/A	0.34	N/A	N/A	0.02	N/A	N/A	N/A	N/A

SPA	Percentage Contribution to the BDMPS Population (%)										
	Fulmar	**Great skua**	**Arctic skua**	**Lesser black-backed gull**	**Great black-backed gull**	**Kittiwake**	**Common tern**	**Arctic tern**	**Sandwich tern**	**Gannet**	**Razorbill**
Outer Ards SPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00	N/A	N/A	N/A
Strangford Lough SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.08	0.00	0.00	N/A	N/A
Bowland Fells SPA	N/A	N/A	N/A	3.18	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Morecambe Bay and Duddon Estuary SPA	N/A	N/A	N/A	3.46	N/A	N/A	N/A	N/A	0.00	N/A	N/A
Ribble and Alt Estuary SPA	N/A	N/A	N/A	5.74	N/A	N/A	0.02	N/A	N/A	N/A	N/A
The Dee Estuary SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.04	N/A	N/A	N/A	N/A
Anglesey Terns SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.04	0.00	0.00	N/A	N/A
Skomer, Skokholm and Seas off Pembrokeshire SPA	N/A	N/A	N/A	4.02	N/A	0.01	N/A	N/A	N/A	N/A	0.57
Grassholm SPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A
Breydon Water SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.15	N/A	N/A	N/A	N/A
Foulness SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.04	N/A	0.00	N/A	N/A
Dungeness, Romney Marsh and Rye Bay SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.13	N/A	N/A	N/A	N/A
Chichester and Langstone Harbour SPA	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.05	N/A	N/A

SPA	Percentage Contribution to the BDMPS Population (%)										
	Fulmar	**Great skua**	**Arctic skua**	**Lesser black-backed gull**	**Great black-backed gull**	**Kittiwake**	**Common tern**	**Arctic tern**	**Sandwich tern**	**Gannet**	**Razorbill**
Poole Harbour SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.26	N/A	N/A	N/A	N/A
Solent and Southampton Water SPA	N/A	N/A	N/A	N/A	N/A	N/A	0.44	N/A	0.00	N/A	N/A
Isles of Scilly SPA	N/A	N/A	N/A	0.47	0.06	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

1. SPA populations are included for those species with potential connectivity to the Broadshore Hub WFDAs Screening Boundary during the non -breeding season but for which the SPA population does not have breeding season connectivity (see text). For species with multiple non-breeding periods (e.g., spring and autumn passage), the maximum percentage contribution to the BDMPS population is presented.

2. 'N/A' indicates that the species is not a qualifying feature of the SPA. '–' indicates that the SPA population has breeding season connectivity with the Broadshore Hub WFDAs Screening Boundary (so that non-breeding season connectivity is assumed).

Table 7.4: The Total the Biologically Defined Minimum Population Scales Populations Relevant to the Broadshore Hub WFDAs Screening Boundary, as Derived from Furness (2015)

	Fulmar	Great skua	Arctic skua	Lesser black-backed gull	Great black-backed gull	Kittiwake	Common tern	Arctic tern	Sandwich tern	Gannet	Razorbill
Numbers of adult birds in BDMPS population[1]	408,808 – 573,641	125 – 11,436	990 – 3,872	37,302 – 144,012	32,070	375,815 – 480,815	88,154	115,968	25,594	163,701 – 284,747	106,183 – 302,314
Numbers of all birds (adults and immatures) in BDMPS population[1]	568,736 – 957,502	143 – 19,556	1,227 – 6,427	39,314 – 209,007	91,399	627,816 – 829,937	144,911	163,930	38,051	248,385 – 534,632	218,622 – 591,874

Notes:

1. A range is given for species with multiple non-breeding periods, encompassing the minimum and maximum BDMPS population size.

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314. The data in **Table 7.3** and **Table 7.4** demonstrate that many of the SPA populations beyond the advised breeding season foraging range from the Broadshore Hub WFDAs Screening Boundary (and, hence, with no potential connectivity during the breeding season) generally constitute a small part of the overall BDMPS population of the species. Limiting consideration to the adult age class, these SPA populations often comprise less than 1% of the wider BDMPS population, even when this percentage contribution is calculated in relation to the adult component of the BDMPS population (**Table 7.3**), as opposed to the total BDMPS population. Given the assumption of even mixing of birds from different populations (and age classes), it is highly unlikely that there could be any substantive degree of connectivity between most of these SPA populations and the Broadshore Hub WFDAs Screening Boundary during the non-breeding season because of the low likelihood that the birds using the Broadshore Hub WFDAs will derive from these populations. Therefore, for the SPA populations of these 11 species which do not have potential connectivity in the breeding season, it is considered that the potential for connectivity is limited to those SPA populations which comprise 1% or more of the adult component of the relevant BDMPS population. On this basis, potential connectivity in the non-breeding season only is limited to the following SPA populations:

- **Arctic skua:** Hoy SPA, Rousay SPA, Fair Isle SPA, West Westray SPA, Papa Westray (North Hill and Holm) SPA, Foula SPA and Fetlar SPA;
- **Lesser black-backed gull:** Forth Islands SPA, Bowland Fells SPA, Morecambe Bay and Duddon Estuary SPA, Ribble and Alt Estuaries SPA and Skomer, Skokholm and Seas off Pembrokeshire SPA;
- **Great black-backed gull:** Copinsay SPA and Calf of Eday SPA;
- **Kittiwake:** Flamborough and Filey Coast SPA;
- **Common tern:** Imperial Dock Lock SPA and Coquet Island SPA;
- **Arctic tern:** Auskerry SPA, Papa Stour SPA, Farne Islands SPA and Coquet Island SPA;
- **Sandwich tern:** Ythan Estuary, Sands of Forvie and Meikle Loch SPA, Farne Islands SPA, Coquet Island SPA and North Norfolk Coast SPA; and
- **Razorbill:** Fowlsheugh SPA, Forth Islands SPA, Flamborough and Filey Coast SPA, Mingulay and Berneray SPA and Rathlin Island SPA.

7.1.1.2 Migratory Non-seabird Special Protection Areas (and Ramsar Sites)

315. European sites designated for migratory non-seabirds which have potential connectivity with the Broadshore Hub WFDAs Screening Boundary were identified using resources providing national-scale mapping and supplementary information of over-sea migratory routes and migratory fronts (Wright et al., 2012; Wildfowl and Wetlands Trust (WWT) & MacArthur Green, 2014). The migratory fronts and corridors of migrant species associated with SPAs in Scotland, as mapped by WWT and MacArthur Green (2014), were examined along with species accounts in the same publication. Migratory information for the same species within Wright et al., (2012) was used to supplement understanding of species movements. When examining mapped migratory corridors of each species, SPAs (and Ramsar sites) were identified for further consideration for LSE if they were situated:

- On the Scottish mainland north-east coast (in the case of species migrating between Scandinavian, Russian Arctic or mainland European breeding ranges and Scottish non-breeding grounds as mapped by the red line in WWT and MacArthur Green (2014)); or
- On the eastern Scottish mainland at sites south of the Broadshore Hub WFDAs Screening Boundary (for species migrating between Icelandic breeding ranges and Scottish non-breeding grounds, including Icelandic greylag goose, pink-footed goose and whooper swan).

316. European sites meeting the above criteria, and all of their qualifying features, were taken forward for consideration for LSE. Marine SPAs were considered separately to this process (see **Section 7.1.1.3**).

317. Applying the approach described above resulted in the identification of a total of 18 SPAs (identified in **Table 7.2**) for which at least one migratory non-seabird qualifying feature was considered to have potential connectivity with the Broadshore WFDAs Screening Boundary during passage periods. These sites are taken forward for determination of LSE.

7.1.1.3 Marine Special Protection Areas

318. The Moray Firth SPA, the marine SPA in greatest proximity to the Broadshore Hub WFDAs Screening Boundary, lies approximately 60 km west of the Screening Boundary. The site is therefore beyond the 15 km proximity to the Broadshore Hub WFDAs Screening Boundary for which connectivity based on direct in-situ effects is considered likely (NatureScot, 2023b). However, examination of migration routes and migratory fronts of migratory non-seabirds to Scotland and Scottish waters (Wright et al., 2012; WWT & MacArthur Green, 2014) for initial screening highlighted that some qualifying features of this marine SPA may migrate through the mouth of the Moray Firth and hence have the potential for connectivity with the Broadshore Hub WFDAs Screening Boundary. Two qualifying features concluded to have no potential connectivity are:

- Great northern diver (non-breeding), on the basis that this qualifying feature comprises birds originating from breeding grounds north and west of the SPA, in Greenland, Iceland and mainland Canada (Weir et al., 1996); whereas the Broadshore Hub WFDAs Screening Boundary lies east of the SPA.
- Shag (breeding, non-breeding), on the basis that migration from breeding colonies (East Caithness Cliffs SPA being the citation breeding colony relevant to this SPA, itself screened out in **Table 7.2** on the basis that the Screening Boundary is outside mean-maximum foraging range + 1 S.D.) to non-breeding waters involves short distances and local movements only, tracking the coastline in a narrow band from 0 to 10 km from shore (WWT & MacArthur Green, 2014) and therefore not expected to enter proximity to the Broadshore Hub WFDAs Screening Boundary (see also **Section 7.1.1.1.2** for the justification for excluding potential connectivity of SPA breeding populations during the non-breeding season).

319. All other non-breeding qualifying features of Moray Firth SPA are considered to have the potential for connectivity with the Broadshore Hub WFDAs Screening Boundary and are taken forward for consideration for LSE.

7.1.2 Sites Taken Forward for Determination of Likely Significant Effect

320. As detailed above, the initial screening process identifies 63 European sites with seabirds or migratory non-seabirds as qualifying features to be taken forward for detailed determination of LSE in **Section 7.4** of this Broadshore Hub WFDAs HRA Screening Report. These sites are identified, together with the qualifying features of relevance, in **Table 7.5** below (noting that the further details outlined in **Section 7.3** mean that 14 of the 49 breeding seabird colony SPAs identified in **Table 7.2** are excluded from further consideration). The locations of these sites are shown in **Figure 7.1** in **Appendix 1**.

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Table 7.5: The Special Protection Areas and Ramsar Sites Taken Forward for Determination of Likely Significant Effects, with Details of the Associated Qualifying Features

European Site	Relevant Qualifying Features[1]
Breeding Seabird Colony Sites	
Troup, Pennan and Lion's Heads SPA	Kittiwake (breeding)
	Guillemot (breeding)
	Seabird assemblage (breeding) including the components: Fulmar Herring gull Razorbill
Buchan Ness to Collieston Coast SPA	Seabird assemblage (breeding) including the components: Kittiwake Herring gull Guillemot Fulmar
East Caithness Cliffs SPA	Guillemot (breeding)
	Razorbill (breeding)
	Herring gull (breeding)
	Kittiwake (breeding)
	Seabird assemblage (breeding) including the components: Great black-backed gull

European Site	Relevant Qualifying Features[1]
	Fulmar
North Caithness Cliffs SPA	Guillemot (breeding)
	Seabird assemblage (breeding) including the components: Fulmar Kittiwake Razorbill Puffin[2]
Copinsay SPA	Seabird assemblage (breeding) including the components: Guillemot Kittiwake Great black-backed gull[3] Fulmar
Ythan Estuary, Sands of Forvie and Meikle Loch SPA and Ythan Estuary and Meikle Loch Ramsar site[4]	Sandwich tern (breeding)[3]
Auskerry SPA	European storm petrel (breeding)[2]
	Arctic tern (breeding)[3]
Hoy SPA	Great skua (breeding)
	Seabird assemblage (breeding) including the components: Puffin[2] Kittiwake Arctic skua [3]

European Site	Relevant Qualifying Features[1]
	Fulmar Guillemot
Calf of Eday SPA	Seabird assemblage (breeding) including the components: Great black-backed gull[3] Guillemot Fulmar Kittiwake
Rousay SPA	Seabird assemblage (breeding) including the components: Kittiwake Arctic skua[3] Guillemot Fulmar
Marwick Head SPA	Guillemot (breeding)
	Seabird assemblage (breeding) including the components: Kittiwake
Fair Isle SPA	Guillemot (breeding)
	Seabird assemblage (breeding) including the components: Puffin[2] Razorbill Kittiwake Arctic skua[3] Great skua

European Site	Relevant Qualifying Features[1]
	Gannet Fulmar
Papa Westray (North Hill and Holm) SPA	Arctic skua[3]
West Westray SPA	Guillemot (breeding)
	Seabird assemblage (breeding) including the components: Razorbill Kittiwake Fulmar
Fowlsheugh SPA	Seabird assemblage (breeding) including the components: Fulmar Kittiwake Razorbill[3]
Sumburgh Head SPA	Seabird assemblage (breeding) including the components: Kittiwake Fulmar
Sule Skerry and Sule Stack SPA	European storm petrel (breeding)[2]
	Gannet (breeding)
	Puffin (breeding)[2]
Cape Wrath SPA	Seabird assemblage (breeding) including the components: Kittiwake

European Site	Relevant Qualifying Features[1]
	Puffin[2] Fulmar
Foula SPA	Great skua (breeding)
	Puffin (breeding)[2]
	Seabird assemblage (breeding) including the components: Kittiwake Arctic skua[3] Fulmar
Noss SPA	Gannet (breeding)
	Great skua (breeding)
	Seabird assemblage (breeding) including the components: Fulmar Kittiwake Puffin[2]
Mousa SPA	European storm petrel (breeding) [2]
Papa Stour SPA	Arctic tern (breeding) [3]
Handa SPA	Seabird assemblage (breeding) including the components: Great skua Kittiwake Fulmar

European Site	Relevant Qualifying Features[1]
Forth Islands SPA	Gannet (breeding)
	Lesser black-backed gull (breeding) [3]
	Puffin (breeding)[2]
	Seabird assemblage (breeding) including the components: Razorbill[3] Kittiwake
Imperial Dock Lock SPA	Common tern (breeding)[3]
St Abb's Head to Fast Castle SPA	Seabird assemblage (breeding) including the components:
	Kittiwake (breeding)
Ronas Hill – North Roe and Tingon SPA	Great skua (breeding)
North Rona and Sula Sgeir SPA	Gannet (breeding)
	Fulmar (breeding)
	Seabird assemblage (breeding) including the components: Kittiwake Puffin[2]
Fetlar SPA	Great skua (breeding)
	Seabird assemblage (breeding) including the components: Arctic skua[3] Fulmar

European Site	Relevant Qualifying Features[1]
Farne Islands SPA	Arctic tern (breeding)[3]
	Sandwich tern (breeding)[3]
	Seabird assemblage (breeding) including the components (* = advised by Natural England within Berwick Bank Offshore Wind Farm Scoping Opinion): Kittiwake Fulmar*
Priest Island (Summer Isles) SPA	European storm petrel (breeding)[2]
Hermaness, Saxa Vord and Valla Field SPA	Gannet (breeding)
	Great skua (breeding)
	Seabird assemblage (breeding) including the components: Fulmar
Shiant Isles SPA	Seabird assemblage (breeding) including the components: Fulmar
Coquet Island SPA	Arctic tern (breeding)[3]
	Common tern (breeding)[3]
	Sandwich tern (breeding)[3]
	Seabird assemblage (breeding) including the components: Fulmar
Flannan Isles SPA	Seabird assemblage (breeding) including the components:

European Site	Relevant Qualifying Features[1]
	Fulmar
St Kilda SPA	Gannet (breeding)
	Great skua (breeding)
	Seabird assemblage (breeding) including the components: Fulmar
Flamborough and Filey Coast SPA	Gannet (breeding)
	Kittiwake (breeding)[3]
	Razorbill (breeding)[3]
	Seabird assemblage (breeding) including the components: Fulmar
Morecambe Bay and Duddon Estuary SPA	Lesser black-backed gull (breeding)[3]
Bowland Fells SPA	Lesser black-backed gull (breeding)[3]
Ribble and Alt Estuaries SPA	Lesser black-backed gull (breeding)[3]
North Norfolk Coast SPA	Sandwich tern (breeding)[3]
Mingulay and Berneray SPA	Razorbill (breeding)[3]
	Seabird assemblage (breeding) including the components: Fulmar
Rathlin Island SPA	Razorbill (breeding)[3]

European Site	Relevant Qualifying Features[1]
	Seabird assemblage (breeding) including the components: Fulmar
Skomer, Skokholm and Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA	Lesser black-backed gull (breeding)[3]
	Seabird assemblage (breeding) including the above components
Marine SPAs	
Moray Firth SPA	Red-throated diver (non-breeding)
	Slavonian grebe (non-breeding)
	Greater scaup (non-breeding)
	Eider (non-breeding)
	Long-tailed duck (non-breeding)
	Common scoter (non-breeding)
	Velvet scoter (non-breeding)
	Common goldeneye (non-breeding)
	Red-breasted merganser (non-breeding)
Migratory Non-seabird Sites (Estuarine)	
Loch of Strathbeg SPA and Ramsar site[4]	[Svalbard] barnacle goose (non-breeding)
	Greylag goose (non-breeding)

European Site	Relevant Qualifying Features[1]
	Pink-footed goose (non-breeding)
	Whooper swan (non-breeding)
	Waterfowl assemblage (non-breeding) including the components: Eurasian teal Common goldeneye
Ythan Estuary, Sands of Forvie and Meikle Loch SPA, Ythan Estuary and Meikle Loch Ramsar site[4]	Pink-footed goose (non-breeding)
	Waterfowl assemblage (non-breeding) including the components: Eider Lapwing Redshank
Moray and Nairn Coast SPA and Ramsar site	Bar-tailed godwit (non-breeding)
	Greylag goose (non-breeding)
	Pink-footed goose (non-breeding)
	Redshank (non-breeding)
	Waterfowl assemblage (non-breeding) including the components: Dunlin Oystercatcher Red-breasted merganser Eurasian wigeon
	Bar-tailed godwit (non-breeding)

European Site	Relevant Qualifying Features[1]
Dornoch Firth and Loch Fleet SPA and Ramsar site	Greylag goose (non-breeding)
	Eurasian wigeon (non-breeding)
	Waterfowl assemblage (non-breeding) including the components: Curlew Dunlin Oystercatcher Redshank Greater scaup Eurasian teal
Cromarty Firth SPA and Ramsar site	Bar-tailed godwit (non-breeding)
	Greylag goose (non-breeding)
	Whooper swan (non-breeding)
	Waterfowl assemblage (non-breeding) including the components: Curlew Dunlin Knot Oystercatcher Northern pintail Red-breasted merganser Redshank Greater scaup

European Site	**Relevant Qualifying Features[1]**
	Eurasian wigeon
Inner Moray Firth SPA and Ramsar site	Bar-tailed godwit (non-breeding)
	Greylag goose (non-breeding)
	Red-breasted merganser (non-breeding)
	Redshank (non-breeding)
	Waterfowl assemblage (non-breeding) including the components: Cormorant Curlew Common goldeneye Goosander Oystercatcher Greater scaup Eurasian teal Eurasian wigeon
Montrose Basin SPA and Ramsar site	Greylag goose (non-breeding)
	Pink-footed goose (non-breeding)
	Redshank (non-breeding)
	Waterfowl assemblage (non-breeding) including the components: Oystercatcher Eider

European Site	Relevant Qualifying Features[1]
	Wigeon Knot Dunlin Shelduck
Firth of Tay and Eden Estuary SPA and Ramsar site	Bar-tailed godwit (non-breeding)
	Greylag goose (non-breeding)
	Pink-footed goose (non-breeding)
	Redshank (non-breeding)
	Waterfowl assemblage (non-breeding) including the components: Black-tailed godwit islandica Common scoter Cormorant Dunlin Eider Common goldeneye Goosander Grey plover Long-tailed duck Oystercatcher Red-breasted merganser Sanderling Shelduck

European Site	Relevant Qualifying Features[1]
	Velvet scoter
Firth of Forth SPA and Ramsar site	Bar-tailed godwit (non-breeding)
	Golden plover (non-breeding)
	Knot (non-breeding)
	Pink-footed goose (non-breeding)
	Red-throated diver (non-breeding)
	Redshank (non-breeding)
	Shelduck (non-breeding)
	Slavonian grebe (non-breeding)
	Turnstone (non-breeding)
	Waterfowl assemblage (non-breeding) including the components: Scaup Great crested grebe Cormorant Curlew Eider Long-tailed duck Common scoter Velvet scoter Common goldeneye

European Site	Relevant Qualifying Features[1]
	Red-breasted merganser Oystercatcher Ringed plover Grey plover Dunlin Mallard Lapwing Wigeon
Migratory Non-Seabird Sites (Inland Waterbodies)	
Loch Spynie SPA and Ramsar site	Greylag goose (non-breeding)
Loch of Kinnordy SPA and Ramsar site	Greylag goose (non-breeding)
	Pink-footed goose (non-breeding)
Loch of Lintrathen SPA and Ramsar site	Greylag goose (non-breeding)
Cameron Reservoir SPA and Ramsar site	Pink-footed goose (non-breeding)
Loch Leven SPA and Ramsar site	Pink-footed goose (non-breeding)
	Shoveler (non-breeding)
	Whooper swan (non-breeding)
	Waterfowl assemblage (non-breeding) including the components: Cormorant Gadwall

European Site	Relevant Qualifying Features[1]
	Common goldeneye Pochard Teal Tufted duck
Fala Flow SPA and Ramsar site	Pink-footed goose (non-breeding)
Greenlaw Moor SPA and Ramsar site	Pink-footed goose (non-breeding)
Gladhouse Reservoir SPA and Ramsar site	Pink-footed goose (non-breeding)
Din Moss – Hoselaw Loch SPA and Ramsar site	Greylag goose (non-breeding)
	Pink-footed goose (non-breeding)

Notes:

1. The named components of the assemblage features which are listed exclude those which are also qualifying features in their own right.
2. Breeding seabird qualifying features which are included on the basis of potential connectivity during the breeding season only.
3. Breeding seabird qualifying features which are included on the basis of potential connectivity during the non-breeding season only.
4. Ythan Estuary, Sands of Forvie and Meikle Loch SPA and Ramsar site is included under both Breeding Seabird Colony Sites and Migratory non-Seabird Sites (Estuarine) as its qualifying features include both breeding terns and migratory waterbirds.

7.2 Determination of Likely Significant Effects for Annex I Marine Ornithological Features

7.2.1 Potential Effects Considered in Screening

321. A range of potential effects on the marine ornithological features have been identified which may occur during the construction, operation and maintenance, and decommissioning phases of the Broadshore Hub WFDAs. These are the impacts which are taken into account when determining the potential for LSE on the designated sites and seabirds or migratory non-seabird features identified in **Section 7.1.1**. The list of potential impacts on seabirds and migratory non-seabirds has been compiled using the NatureScot (2023d) Guidance Note 6 which advises on impact pathways to offshore ornithology receptors; NatureScot Guidance Notes specifically on collision risk and distributional responses (displacement and barrier effects) (NatureScot, 2023e; 2023f); and experience and knowledge gained from previous offshore wind farm projects, as well as published literature. At this stage in the programme, full analysis of baseline survey information for the Broadshore Hub WFDAs offshore aerial survey area has not yet been completed, therefore, a precautionary approach is taken to the HRA Screening.

322. Consideration of the potential impacts identified for the marine ornithological features is presented in the following sections to inform the determination of LSE. Many of the European sites screened in include an assemblage qualifying feature, with the named components of each of these assemblage features also being identified in **Table 7.6** to **Table 7.67**. For the purposes of considering the potential impacts, these named components are treated as if they are qualifying features in their own right (with the potential impacts also considered for the overall assemblage feature).

323. While there is potential for physical presence of offshore infrastructure to impact birds from European sites, these impacts will increase incrementally as the Broadshore Hub WFDAs infrastructure is constructed with the greatest potentially impacts resulting from the completed Broadshore Hub WFDAs. These impacts are therefore screened out from further consideration in relation to the construction and decommissioning phases, to avoid double counting, but included under operation.

7.2.2 Construction

7.2.2.1 Temporary Direct Habitat Loss

324. There is potential for temporary direct habitat loss and disturbance during construction operations (e.g. seabed preparation, inter-array cable laying and station keeping system installation). This effect, however, is restricted to discrete areas within the footprint of the Broadshore Hub WFDAs there is no spatial overlap between the Broadshore Hub WFDAs Screening Boundary and any European sites designated for seabird species. On this basis, there is no potential for direct impacts to supporting habitats for seabird species within any European site.

325. There is potential for seabird qualifying features to be present in the waters in and around the Broadshore Hub WFDAs and therefore be affected by temporary habitat loss/disturbance (e.g. effects on feeding grounds) during foraging and migration. However, considering the highly mobile nature of seabird qualifying features and the small spatial extent of supporting habitats affected with the similar available habitats present across the wider North Sea, significant impacts on foraging and food availability are not predicted.

326. On this basis, there is no potential for LSE on any seabird qualifying interest features of European sites as a result of temporary direct habitat loss during the construction phase, and this impact is screened out from further consideration for all European sites.

7.2.2.2 Disturbance and Displacement

327. For the purposes of determining LSE, disturbance and displacement are considered together although these effects will be treated as separate pathways in the assessment for adverse effects on integrity.

328. The presence of vessels and construction works may disturb seabirds from offshore foraging or roosting areas in the short term, causing changes in behaviour or displacing them from the affected areas (NatureScot, 2023e). Temporary disturbance/displacement may lead to a reduction in foraging opportunities or increased energy expenditure, resulting in decreased survival rates or productivity in the population. This would only be likely to apply to seabirds which use the area of the marine environment in which construction activities will occur. The effects of such displacement are likely to be minimal for species such as gannet and fulmar (irrespective of their sensitivity to the effect), which have particularly large foraging ranges, because the resultant habitat loss will represent a small proportion of the available habitat.

329. However, based on NatureScot (2021) and Marine Scotland Science (MSS) (2021) advice (which in part results from the increasing number of offshore wind farms, with implications for the in-combination effects), the potential for LSE due to the displacement of gannets during the breeding and non-breeding season will be considered. Guillemot, razorbill and kittiwake will be considered for both breeding and non-breeding season effects, but, for puffin, effects are considered to be limited to the breeding season, as advised by NatureScot (2021).

330. Migratory non-seabird species would not be significantly affected when passing through (or over) the Broadshore Hub WFDAs on migration (as they are not expected to forage or rest in the marine environment around the Broadshore Hub WFDAs).

331. It is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the gannet, puffin, guillemot, razorbill, kittiwake, and seabird assemblage qualifying features.

7.2.2.3 Changes to Prey Availability

332. Indirect impacts on seabirds may occur as a result of changes in prey distribution, availability or abundance (NatureScot, 2023d), caused by construction activities that disturb the seabed (and cause increased suspended sediment concentrations) or increase subsea noise levels. Reduction or disruption to prey availability to seabirds may cause displacement from foraging grounds in the area or reduced energy intake, affecting survival rates or productivity in the population in the short-term. As above, migratory non-seabird species would not be significantly affected when passing

through (or over) the Broadshore Hub WFDAs on migration (as they are not expected to forage or rest in the marine environment around the Broadshore Hub WFDAs).

333. The potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species and this impact cannot be screened out. The only exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species.

7.2.2.4 Accidental Pollution

334. In line with advice from NatureScot (2021) and MSS (2021) in relation to Berwick Bank Offshore Wind Farm, accidental pollution associated with construction activities is not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for management and contingency plans.

335. On this basis, there is no potential for LSE on any seabird qualifying interest features of European sites as a result of accidental pollution during the construction phase, and this effect pathway is screened out from further consideration for all European sites.

7.2.3 Operation and Maintenance

7.2.3.1 Direct Habitat Loss

336. Direct habitat loss may occur during the operation and maintenance phase of the Broadshore Hub WFDAs. Given the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting), direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations. Similarly, no effects are predicted on migratory non-seabird populations as a result of birds passing through (or over) the Broadshore Hub WFDAs on migration.

337. On this basis, there is no potential for LSE on any seabird qualifying interest features of European sites as a result of direct habitat loss during the operation and maintenance phase, and this impact is screened out from further consideration for all European sites.

7.2.3.2 Disturbance and Displacement

338. As noted for the construction period, disturbance and displacement are considered together for the purposes of determining LSE but will be treated as separate pathways in the assessment for adverse effects on integrity.

339. The presence of operational wind turbine generators, as well as the associated maintenance activities (NatureScot 2023e), may disturb seabirds and displace them from foraging or roosting areas over the long-term. This may lead to a reduction in foraging opportunities or increased competition and energy expenditure, resulting in decreased survival rates or productivity in the population. Such effects may be most likely in relation to seabirds using the marine habitats within the Broadshore Hub WFDAs, although species are known to vary in their sensitivity to displacement (e.g. large gull species show little evidence of displacement from offshore wind farms whereas gannet and red-throated diver show marked displacement - Dierschke et al., 2016; Heinänen et al., 2020). The effects of such displacement are likely to be minimal for species such

as gannet and fulmar (irrespective of their sensitivity to the effect), which have particularly large foraging ranges, because the resultant habitat loss will represent a small proportion of the available habitat.

340. However, based on NatureScot (2021) and MSS (2021) advice (which in part results from the increasing number of offshore wind farms, with implications for the in-combination effects), the potential for LSE due to the displacement of gannets during the breeding and non-breeding season will be considered. Kittiwake, guillemot and razorbill will be considered for both breeding and non-breeding season effects, but, for puffin, effects are considered to be limited to the breeding season, as advised by NatureScot (2021).

341. Such disturbance and displacement effects do not have the potential for LSE in relation to migratory non-seabirds because they do not forage or roost in the marine habitats around the Broadshore Hub WFDAs and only transit the area on migration.

7.2.3.3 Collision Risk

342. Collisions of seabirds and/or migratory non-seabirds with the rotating blades of the wind turbine generators may result in the death or injury of individuals (NatureScot, 2023f). Such mortality may be additive, so could cause population declines or, in some situations, prevent population recovery. Therefore, seabird species which forage within, or commute through, the Broadshore Hub WFDAs may be vulnerable to such effects, as is also the case for migratory non-seabirds which transit this area on migration. For seabirds, collision risk may vary between species in relation to a range of factors associated with flight behaviour but with flight heights being of fundamental importance in predicting the vulnerability to this effect (Johnston et al., 2014a;b). Thus, species which fly at low heights and below the rotor swept area (e.g. fulmar and auk species) are not vulnerable to this effect pathway, in contrast to other species which generally fly at greater heights and are at risk of collision for a proportion of their flight time (e.g. kittiwake, large gull species and gannet) (NatureScot, 2023f). Given the offshore location of the Broadshore Hub WFDAs Screening Boundary, it is extremely unlikely that any of the migratory non-seabird species associated with European sites would make more frequent movements across the Broadshore Hub WFDAs (e.g. when commuting between foraging and roosting sites), and it is considered that collision risk for these species is limited to their migratory movements. The evidence used to identify species susceptible to collision is presented in **Table 7.6** to **Table 7.67.**

343. There is potential for LSE in relation to collision to certain seabird and migratory non-seabird species as a result of the presence of the Broadshore Hub WFDAs, therefore, this impact is screened into the assessment.

7.2.3.4 Barrier to Movement

344. Large scale offshore wind farms may act as barriers to seabird and/or migratory non-seabird movements, causing individuals to fly around or over wind turbine arrays (NatureScot, 2023e). For cannot be excluded in relation to barrier effects on certain seabird species as a result of the presence of the Broadshore Hub WFDAs, and this impact is, therefore, screened into the assessment.

7.2.3.5 Changes to Prey Availability

345. Indirect impacts on seabirds may occur as a result of changes in prey distribution, availability or abundance in the marine environment due to the presence of offshore infrastructure, and as a result of operation and maintenance activities that disturb the seabed (and cause increased suspended sediment concentrations) or increase subsea noise levels. In comparison to construction, however, subsea noise levels will be significantly lower in the operation and maintenance phase (e.g. there will be no piling), therefore, the potential for adverse effects on prey species as a result is greatly reduced. Similarly, seabed disturbance and associated increased suspended sediment concentrations will also be substantially lower in the operation and maintenance phase, namely occurring during cable or substructure maintenance activities. However, in accordance with NatureScot (2023d) guidance, this effect pathway is considered in relation to breeding seabird qualifying features during the operation and maintenance phase.

346. Migratory non-seabird species would not be significantly affected when passing through (or over) the Broadshore Hub WFDAs on migration (as they are not expected to forage or rest in the marine environment around the Broadshore Hub WFDAs).

7.2.3.6 Entanglement

347. With the advent of floating offshore wind, the potential for entanglement of diving seabirds with dynamic inter-array cables and mooring lines associated with floating substructures has been raised. Currently there is no clear guidance on the assessment approaches required for bird entanglement. A short review of published reports from similar floating offshore wind farm projects and other moored infrastructures does not provide examples of where entanglement for seabirds has been screened in for assessment. This is most likely due to this potential impact being an incredibly rare occurrence (U.S. Offshore Wind Synthesis of Environmental Effects Research (SEER), 2022).

348. Primary entanglement risk is thought to be unlikely due to the design parameters, with the mooring lines being under varying degrees of tension and the large dimensions of the chain reducing the likelihood of full or partial entanglement to be highly unlikely (SEER, 2022).

349. Offshore infrastructure may act as hard substrate leading to likely habitat development, acting as a fish aggregation device, providing refuge for prey species increasing attraction factors within the Broadshore Hub WFDAs and may increase entanglement risk. While possible in theory, best available evidence from the Pentland Floating Offshore Windfarm indicates that the level of fish aggregation around floating wind turbine designs is minimal and therefore decreases the likelihood of increased prey fish densities influencing entanglement.

350. Secondary entanglement risk could arise from fishing gear caught on the mooring lines. Maintenance and monitoring practices of the deployed infrastructure are proposed to decrease this risk, such as that proposed for Kincardine Offshore Wind Farm which will use remotely operated vehicles (ROVs) and vessel-mounted sensors (such as multibeam sonar) to periodically survey dynamic inter-array cables and mooring lines, which could also monitor for the presence of derelict fishing gear (SEER, 2022). Such mitigation, if adopted, would help reduce the potential likelihood of any entanglement.

351. Whilst entanglement is a rare occurrence and can be mitigated as outlined above, it remains a possibility for diving species and the potential for LSE cannot be excluded. Entanglement is therefore screened in for assessment.

7.2.3.7 Accidental Pollution

352. As per the construction phase, accidental pollution is not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans (NatureScot, 2021; MSS, 2021).

353. On this basis, there is no potential for LSE on any seabird qualifying interest features of European sites as a result of accidental pollution during the construction phase, and this impact is screened out from further consideration for all European sites.

7.2.4 Decommissioning

354. The impacts during the decommissioning phase are considered to be similar and potentially less than those outlined above for the construction phase. The impacts of direct habitat loss, collision and barriers to movement are not applicable to the decommissioning phase and, therefore, have been greyed out in **Table 7.6** to **Table 7.67**.

7.3 In-combination Assessment

355. Where one or more effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs Screening Boundary for a qualifying feature, it is considered that there is potential for the Broadshore Hub WFDAs to contribute to in-combination effects. Other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

7.4 Summary of Screening of Sites for Annex I Marine Ornithological Features

356. **Table 7.6** to **Table 7.67** present the conclusions in relation to the determination of LSE as a result of the Broadshore Hub WFDAs Screening Boundary. Separate LSE screening tables are presented for each of the 66 European sites which are taken forward for determination of LSE on the basis of the information and analysis in **Section 7.2** and which are listed in **Table 7.5**). The European sites are listed in the same order as in **Table 7.5**, the breeding seabird colony SPAs in **Table 7.6** to **Table 7.49** and the migratory non-seabird SPAs in (**Table 7.50** to **Table 7.67).** The conclusion on whether LSE can be excluded or not is presented for each of the qualifying features screened in for each of these sites in relation to each effect pathway.

357. In **Table 7.6** to **Table 7.67**, C = Construction, O&M = Operation and Maintenance, D = Decommissioning; ✓ = Potential for Likely Significant Effect, × = No Potential for Likely Significant Effect.

358. The footnotes to these tables briefly outline the rationale for the conclusion in relation to LSE for each qualifying feature. Effects that are not applicable to a particular feature are greyed out.

359. The sites screened in with potential LSE are:

- Troup, Pennan and Lion's Head SPA;
- Buchan Ness to Collieston Coast SPA;
- East Caithness Cliffs SPA;
- North Caithness Cliffs SPA;
- Copinsay SPA;
- Ythan Estuary, Sands of Forvie and Meikle Loch SPA/Ythan Estuary and Meikle Loch Ramsar site;
- Auskerry SPA;
- Hoy SPA;
- Calf of Eday SPA;
- Rousay SPA;
- Marwick Head SPA;
- Fair Isle SPA;
- Papa Westray (North Hill and Holm) SPA;
- West Westray SPA;
- Fowlsheugh SPA;
- Sumburgh Head SPA;
- Sule Skerry and Sule Stack SPA;
- Cape Wrath SPA;
- Foula SPA;
- Noss SPA;
- Papa Stour SPA;
- Handa SPA;
- Forth Islands SPA;
- Imperial Dock Lock SPA;
- St Abb's Head to Fast Castle SPA;
- Ronas Hill – North Roe and Tingon SPA;

- North Rona and Sula Sgeir SPA;
- Fetlar SPA;
- Farne Islands SPA;
- Hermaness, Saxa Vord and Valla Field SPA;
- Coquet Island SPA;
- St Kilda SPA;
- Flamborough and Filey Coast SPA;
- Morecambe Bay and Duddon Estuary SPA;
- Bowland Fells SPA;
- Ribble and Alt Estuaries SPA;
- North Norfolk Coast SPA;
- Mingulay and Berneray SPA;
- Rathlin Island SPA;
- Skomer, Skokholm and Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA;
- Moray Firth SPA;
- The Loch of Strathbeg SPA;
- Moray and Nairn Coast SPA and Ramsar site;
- Dornoch Firth and Loch Fleet SPA and Ramsar site;
- Cromarty Firth SPA and Ramsar site;
- Inner Moray Firth SPA and Ramsar site;
- Montrose Basin SPA and Ramsar site;
- Firth of Tay and Eden Estuary SPA and Ramsar site;
- Firth of Forth SPA and Ramsar site;
- Loch Spynie SPA and Ramsar site;
- Loch of Kinnordy SPA and Ramsar site;
- Loch of Lintrathen SPA and Ramsar site;
- Cameron Reservoir SPA and Ramsar site;
- Loch Leven SPA and Ramsar site;
- Fala Flow SPA and Ramsar site;
- Greenlaw Moor SPA and Ramsar site;
- Gladhouse Reservoir SPA and Ramsar site; and
- Din Moss – Hoselaw Loch SPA and Ramsar site.

360. The sites screened out for no potential for LSE are:

- Mousa SPA;
- Priest Island (Summer Isles) SPA;
- Shiant Isles SPA; and
- Flannan Isles SPA.

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Table 7.6: Likely Significant Effect Matrix for Marine Ornithological Features of the Troup, Pennan and Lion's Heads SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Guillemot (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Razorbill (breeding)				✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Herring gull (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – guillemot, razorbill and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst herring gull is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, razorbill, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake and herring gull may be vulnerable to collisions within the Broadshore Hub WFDAs. Guillemot, razorbill and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, herring gull and seabird assemblage qualifying features of this SPA. d: Barrier to movement – guillemot, razorbill and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst herring gull is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, razorbill, kittiwake and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs, therefore it is considered there is potential for LSE for the guillemot, razorbill and seabird assemblage qualifying features of this SPA. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution is not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.7: Likely Significant Effect Matrix for Marine Ornithological Features of the Buchan Ness to Collieston Coast SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Guillemot (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Herring gull (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – guillemot and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst herring gull is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake and herring gull may be vulnerable to collisions within the Broadshore Hub WFDAs. Guillemot and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, herring gull and seabird assemblage qualifying features of this SPA.

d: Consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst herring gull is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, kittiwake and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for guillemot and the seabird assemblage qualifying features of this SPA. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.8: Likely Significant Effect Matrix for Marine Ornithological Features of the East Caithness Cliffs SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Guillemot (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Razorbill (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Herring gull (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Great black-backed gull (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – guillemot, razorbill and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst herring gull and great black-backed gull are considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, razorbill, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake, herring gull and great black-backed gull may be vulnerable to collisions within the Broadshore Hub WFDAs. Guillemot, razorbill and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, herring gull, great black-backed gull and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – guillemot, razorbill and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst herring gull and great black-backed gull are considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, razorbill, kittiwake and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species.

f: Entanglement – as detailed in **Section 7.2.1** entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for guillemot and razorbill and the seabird assemblage qualifying features of this SPA.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.9: Likely Significant Effect Matrix for Marine Ornithological Features of the North Caithness Cliffs SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Guillemot (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Razorbill (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Puffin (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – guillemot, razorbill, puffin and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. The potential effects of disturbance and displacement on puffin are likely to be limited to the breeding season only, whilst for kittiwake and the two other auk species the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021,2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, razorbill, puffin, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake may be vulnerable to collisions within the Broadshore Hub WFDAs. Guillemot, razorbill, puffin and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – guillemot, razorbill, puffin and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. The potential for barrier effects on puffin is likely to be limited to the breeding season only, whilst for kittiwake and the two other auk species the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, razorbill, puffin, kittiwake and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species.

f: Entanglement – as detailed in **Section 7.2.1,** entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for guillemot, razorbill, puffin and the seabird assemblage qualifying features of this SPA. (Potential for entanglement effects on puffin is likely to be limited to the breeding season only, whilst for guillemot and razorbill the effect pathway is considered relevant to both the breeding and non-breeding seasons).

g: Accidental pollution – as detailed in **Section 7.2.1,** accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

Table 7.10: Likely Significant Effect Matrix for Marine Ornithological Features of the Copinsay SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Guillemot (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Great black-backed gull (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – guillemot and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst great black-backed gull is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake and great black-backed gull may be vulnerable to collisions within the Broadshore Hub WFDAs. Guillemot and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, great black-backed gull and seabird assemblage qualifying features of this SPA. d: Barrier to movement – guillemot and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst great black-backed gull is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, kittiwake and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the guillemot and seabird assemblage qualifying features of this SPA. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.11: Likely Significant Effect Matrix for Marine Ornithological Features of the Ythan Estuary, Sands of Forvie and Meikle Loch SPA/Ythan Estuary and Meikle Loch Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Sandwich tern (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Eider (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Lapwing (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Redshank (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Waterfowl assemblage (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Direct habitat loss due to the Broadshore Hub WFDAs is

incapable of having effects on SPA non-seabird populations due to their use of terrestrial, freshwater or intertidal habitats only. Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA. b: Disturbance and displacement – sandwich tern from this SPA is considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Pink-footed goose, eider, lapwing and redshank will not be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds due to their use of terrestrial, freshwater or intertidal habitats only, and the distance of the Broadshore Hub WFDAs from these habitats within the SPA. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA. c: Collision – sandwich tern may be vulnerable to collisions within the Broadshore Hub WFDAs. This species is identified as having potential connectivity with the Broadshore Hub WFDAs during the non-breeding season only, so the potential for collision effects is limited to this period. Pink-footed goose, eider, lapwing and redshank undertaking migratory movements to and from the SPA may also be vulnerable to collisions within the Broadshore Hub WFDAs. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the Sandwich tern, pink-footed goose, eider, lapwing, redshank and waterfowl assemblage qualifying features of this SPA. d: Barrier to movement – sandwich tern from this SPA is considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. Pink-footed goose, eider, lapwing and redshank undertaking migratory movements to and from the SPA may also be affected by barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the pink-footed goose, eider, lapwing, redshank and waterfowl assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects on breeding seabird species resulting from effects on the availability or abundance of prey species. LSE can be excluded in relation to indirect effects on pink-footed goose, eider, lapwing and redshank resulting from effects on the availability or abundance of prey species during the construction, operation and maintenance, and decommissioning phases due to their use of terrestrial, freshwater or intertidal habitats only, and the distance of the Broadshore Hub WFDAs from these habitats within the SPA. Therefore, the potential for LSE in relation to this effect pathway cannot be excluded for the Sandwich tern qualifying feature of this SPA. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution is not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.12: Likely Significant Effect Matrix for Marine Ornithological Features of the Auskerry SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
European storm petrel (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Arctic tern (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – Arctic tern from this SPA is considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The foraging habitat preference of European storm petrel for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022) means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – Arctic tern may be vulnerable to collisions within the Broadshore Hub WFDAs. This species is identified as having potential connectivity with the Broadshore Hub WFDAs during the non-breeding season only, so the potential for collision effects is limited to this period. As reported in a Marine Scotland (MSS 2022) review, European storm petrel generally fly significantly below the lower rotor swept height (typically within two m of the surface, occasionally up to five m (Flood and Thomas 2007), and may fly lower in higher wind conditions (Ainley et al., 2015)), and are not considered vulnerable to collision effects (King et al., 2009, Cook et al., 2012, Furness et al., 2012, Furness et al., 2013, Bradbury et al., 2014, Certain et al., 2015). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the Arctic tern qualifying features of this SPA.

d: Barrier to movement – Arctic tern from this SPA is considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. The foraging habitat preference of European storm petrel for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022) means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species (the Broadshore Hub WFDAs is not situated between breeding colonies and these oceanic waters). Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot generally be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species, but an exception in this regard is European storm petrel, for which this effect pathway is unlikely to be important because of its foraging habitat preference for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022).

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is European storm petrel, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.13: Likely Significant Effect Matrix for Marine Ornithological Features of the Hoy SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Great skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Arctic skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Guillemot (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Puffin (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1,** direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – guillemot, puffin and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst Arctic skua and great skua are considered to be relatively insensitive to such effects. The potential effects of disturbance and displacement on puffin are likely to be limited to the breeding season only, whilst for kittiwake and guillemot the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, puffin, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake, Arctic skua and great skua may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects on Arctic skua are limited to the non-breeding season because the species is identified as having connectivity with the Broadshore Hub WFDAs during this period only. Guillemot, puffin and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, Arctic skua, great skua and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – guillemot, puffin and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst Arctic skua and great skua are considered to be relatively insensitive to such effects. The potential for barrier effects on puffin is likely to be limited to the breeding season only, whilst for kittiwake and guillemot the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, puffin, kittiwake and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the guillemot, puffin and seabird assemblage qualifying features of this SPA. (Potential for entanglement effects on puffin is likely to be limited to the breeding season only, whilst for guillemot the effect pathway is considered relevant to both the breeding and non-breeding seasons).

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.14: Likely Significant Effect Matrix for Marine Ornithological Features of the Calf of Eday SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Guillemot (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Great black-backed gull (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – guillemot and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst great black-backed gull is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake and great black-backed gull may be vulnerable to collisions within the Broadshore Hub WFDAs. Guillemot and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, great black-backed gull and seabird assemblage qualifying features of this SPA. d: Barrier to movement – guillemot and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst great black-backed gull is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, kittiwake and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the guillemot and seabird assemblage qualifying features of this SPA. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.15: Likely Significant Effect Matrix for Marine Ornithological Features of the Rousay SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Arctic skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Guillemot (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – guillemot and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst Arctic skua is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake and Arctic skua may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects on Arctic skua are limited to the non-breeding season because the species is identified as having connectivity with the Broadshore Hub WFDAs during this period only. Guillemot and fulmar generally fly below the

lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, Arctic skua and seabird assemblage qualifying features of this SPA. d: Barrier to movement – guillemot and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst Arctic skua is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, kittiwake and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the guillemot and seabird assemblage qualifying features of this SPA. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.16: Likely Significant Effect Matrix for Marine Ornithological Features of the Marwick Head SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Guillemot (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a : Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – guillemot and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake may be vulnerable to collisions within the Broadshore Hub WFDAs. Guillemot generally fly below the lower rotor swept height and is not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – guillemot and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, kittiwake and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects

cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the guillemot and seabird assemblage qualifying features of this SPA. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.17: Likely Significant Effect Matrix for Marine Ornithological Features of the Fair Isle SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Great skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Arctic skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Gannet (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Guillemot (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Razorbill	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Puffin (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Notes:																								

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – guillemot, razorbill, puffin, gannet and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst Arctic skua and great skua are considered to be relatively insensitive to such effects. The potential effects of disturbance and displacement on puffin are likely to be limited to the breeding season only, whilst for gannet, kittiwake and the two other auk species the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, razorbill, puffin, gannet, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake, Arctic skua, great skua and gannet may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects on Arctic skua are limited to the non-breeding season because the species is identified as having connectivity with the Broadshore Hub WFDAs during this period only. Guillemot, razorbill, puffin and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the Arctic skua, great skua, gannet, kittiwake and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – guillemot, razorbill, puffin and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst Arctic skua and great skua are considered to be relatively insensitive to such effects. The potential for barrier effects on puffin is likely to be limited to the breeding season only, whilst for gannet, kittiwake and the two other auk species the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, razorbill, puffin, gannet, kittiwake and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the guillemot, razorbill, puffin and seabird assemblage qualifying features of this SPA. (Potential for entanglement effects on puffin is likely to be limited to the breeding season only, whilst for guillemot and razorbill the effect pathway is considered relevant to both the breeding and non-breeding seasons).

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.18: Likely Significant Effect Matrix for Marine Ornithological Features of the Papa Westray (North Hill and Holm) SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Arctic skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – Arctic skua is considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – Arctic skua may be vulnerable to collisions within the Broadshore Hub WFDAs. This species is identified as having potential connectivity with the Broadshore Hub WFDAs during the non-breeding season only, so potential collision effects are limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the Arctic skua qualifying feature of this SPA.

d: Barrier to movement – Arctic skua is considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

Table 7.19: Likely Significant Effect Matrix for Marine Ornithological Features of the West Westray SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Guillemot (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Razorbill (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – guillemot, razorbill and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, razorbill, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake may be vulnerable to collisions within the Broadshore Hub WFDAs. Guillemot, razorbill and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – guillemot, razorbill and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the guillemot, razorbill, kittiwake and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the guillemot, razorbill and seabird assemblage qualifying features of this SPA. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.20: Likely Significant Effect Matrix for Marine Ornithological Features of the Fowlsheugh SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Razorbill (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – razorbill and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The potential for effects of disturbance and displacement on razorbill is limited to the non-breeding season because the species is identified as having the potential for connectivity during this period only. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the razorbill, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake may be vulnerable to collisions within the Broadshore Hub WFDAs. Razorbill and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – razorbill and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The potential for barrier effects on razorbill is limited to the non-breeding season because the species is identified as having the potential for connectivity during this period only. The particularly large foraging range of fulmar

means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the razorbill, kittiwake and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the razorbill and seabird assemblage qualifying features of this SPA. (Potential for entanglement effects on razorbill is likely to be limited to the non-breeding season only). g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.21: Likely Significant Effect Matrix for Marine Ornithological Features of the Sumburgh Head SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake may be vulnerable to collisions within the Broadshore Hub WFDAs. Fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.22: Likely Significant Effect Matrix for Marine Ornithological Features of the Sule Skerry and Sule Stack SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
European storm petrel (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Puffin (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Gannet (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – puffin and gannet from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The foraging habitat preference of European storm petrel for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022) means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. The potential for disturbance and displacement effects on puffin is likely to be limited to the breeding season only, whilst for gannet the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the puffin, gannet and seabird assemblage qualifying features of this SPA.

c: Collision – gannet may be vulnerable to collisions within the Broadshore Hub WFDAs. European storm petrel and puffin generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the gannet and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – puffin and gannet from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The foraging habitat preference of European storm petrel for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022) means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. The potential for barrier effects on puffin is likely to be limited to the breeding season only, whilst for gannet the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the puffin, gannet and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot generally be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species, but an exception in this regard is European storm petrel, for which this effect pathway is unlikely to be important because of their foraging habitat preference for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022). f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the puffin and seabird assemblage qualifying features of this SPA. (Potential for entanglement effects on puffin is likely to be limited to the breeding season only). g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is European storm petrel, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.23: Likely Significant Effect Matrix for Marine Ornithological Features of the Cape Wrath SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Puffin (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – puffin and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. The potential effects of disturbance and displacement on puffin are likely to be limited to the breeding season only, whilst for kittiwake they are considered relevant to both breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the puffin, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake may be vulnerable to collisions within the Broadshore Hub WFDAs. Puffin and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – puffin and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. The potential for barrier effects on puffin is likely to be limited to the breeding season only, whilst for kittiwake they are considered relevant to both breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot

2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the puffin, kittiwake and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the puffin and seabird assemblage qualifying features of this SPA. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.24: Likely Significant Effect Matrix for Marine Ornithological Features of the Foula SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Great skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Arctic skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Puffin (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – puffin and kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst Arctic skua and great skua are considered to be relatively insensitive to such effects. The potential effects of disturbance and displacement on puffin are likely to be limited to the breeding season only, whilst for kittiwake they are considered relevant to both breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021).

Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the puffin, kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake, Arctic skua and great skua may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects on Arctic skua is limited to the non-breeding season because the species is identified as having potential connectivity with the Broadshore Hub WFDAs during the non-breeding period only. Puffin and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, Arctic skua, great skua and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – puffin and kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst Arctic skua and great skua are considered to be relatively insensitive to such effects. The potential for barrier effects on puffin is likely to be limited to the breeding season only, whilst for kittiwake they are considered relevant to both breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the puffin, kittiwake and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the puffin and seabird assemblage qualifying features of this SPA.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.25: Likely Significant Effect Matrix for Marine Ornithological Features of the Noss SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Great skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Puffin (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Gannet (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – puffin, kittiwake and gannet from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst great skua are considered to be relatively insensitive to such effects. The potential effects of disturbance and displacement on puffin are likely to be limited to the breeding season only, whilst for gannet and kittiwake the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot

2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the puffin, kittiwake, gannet and seabird assemblage qualifying features of this SPA. c: Collision – kittiwake, great skua and gannet may be vulnerable to collisions within the Broadshore Hub WFDAs. Puffin and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, great skua, gannet and seabird assemblage qualifying features of this SPA. d: Barrier to movement – puffin, kittiwake and gannet from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst great skua are considered to be relatively insensitive to such effects. The potential for barrier effects on puffin is likely to be limited to the breeding season only, whilst for gannet and kittiwake the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the puffin, kittiwake, gannet and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the puffin and seabird assemblage qualifying features of this SPA. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.26: Likely Significant Effect Matrix for Marine Ornithological Features of the Mousa SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
European storm petrel (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – The foraging habitat preference of European storm petrel for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022) means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – European storm petrel generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

d: Barrier to movement – The foraging habitat preference of European storm petrel for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022) means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot generally be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species but an exception in this regard is European storm petrel, for which this effect pathway is unlikely to be important because of its foraging habitat preference for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022).

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – There is no potential for in-combination effects, because only storm petrel is included in assessment for the site and no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs for the species.

Table 7.27: Likely Significant Effect Matrix for Marine Ornithological Features of the Papa Stour SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Arctic tern (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – Arctic tern from this SPA is considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – Arctic tern may be vulnerable to collisions within the Broadshore Hub WFDAs. This species is identified as having potential connectivity with the Broadshore Hub WFDAs during the non-breeding season only, so the potential for collision effects on this species is limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the Arctic tern qualifying feature of this SPA.

d: Barrier to movement – Arctic tern from this SPA is considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.28: Likely Significant Effect Matrix for Marine Ornithological Features of the Handa SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Great skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst great skua are considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake and great skua may be vulnerable to collisions within the Broadshore Hub WFDAs. Fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, great skua and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst great skua are considered to be relatively insensitive to

such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.29: Likely Significant Effect Matrix for Marine Ornithological Features of the Forth Islands SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Razorbill (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Puffin (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Lesser black-backed gull (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Gannet (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – razorbill, puffin, kittiwake and gannet from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Lesser black-backed gull is considered to be relatively insensitive to such effects The potential effects of disturbance and displacement on puffin are likely to be limited to the breeding season only, whilst for gannet and kittiwake the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). The potential for effects of disturbance and displacement on razorbill is limited to the non-breeding season because the species is identified as having the potential for connectivity during this period only. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the razorbill, puffin, kittiwake, gannet and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake, lesser black-backed gull and gannet may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects on lesser black-backed gull is limited to the non-breeding season because the species is identified as having connectivity during the non-breeding season only. Razorbill and puffin generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, lesser black-backed gull, gannet and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – razorbill, puffin, kittiwake and gannet from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. Lesser black-backed gull is considered to be relatively insensitive to such effects. The potential for barrier effects on puffin is likely to be limited to the breeding season only, whilst for razorbill the effect pathway is considered relevant to the non-breeding season only, and for gannet and kittiwake the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). The potential for barrier effects on razorbill is limited to the non-breeding season because the species is identified as having the potential for connectivity during this period only. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the razorbill, puffin, kittiwake, gannet and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the puffin, razorbill and seabird assemblage qualifying features of this SPA. (Potential for entanglement effects on puffin is likely to be limited to the breeding season only, whilst for razorbill the effect pathway is considered relevant to the non-breeding season only).

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.30: Likely Significant Effect Matrix for Marine Ornithological Features of the Imperial Dock Lock SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Common tern (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – common tern from this SPA is considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – common tern may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects on this species is limited to the non-breeding season because the species is identified as having the potential for connectivity during this period only. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the common tern qualifying feature of this SPA.

d: Barrier to movement – common tern from this SPA is considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.31: Likely Significant Effect Matrix for Marine Ornithological Features of the St Abb's Head to Fast Castle SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake may be vulnerable to collisions within the Broadshore Hub WFDAs. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

d: Barrier to movement –kittiwake from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.32: Likely Significant Effect Matrix for Marine Ornithological Features of the Ronas Hill – North Roe and Tingon SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Great skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – great skua is considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – great skua may be vulnerable to collisions within the Broadshore Hub WFDAs. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the great skua qualifying feature of this SPA.

d: Barrier to movement – great skua is considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.33: Likely Significant Effect Matrix for Marine Ornithological Features of the North Rona and Sula Sgeir SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Puffin (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Gannet (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – puffin, kittiwake and gannet from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. The potential effects of disturbance and displacement on puffin are likely to be limited to the breeding season only, whilst for gannet and kittiwake the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the puffin, kittiwake, gannet and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake and gannet may be vulnerable to collisions within the Broadshore Hub WFDAs. Puffin and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, gannet and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – puffin, kittiwake and gannet from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. The potential for barrier effects puffin is likely to be limited to the breeding season only, whilst for gannet and kittiwake the effect pathway is considered relevant to both the breeding and non-breeding seasons (Royal HaskoningDHV 2022; NatureScot 2021, 2023e; MSS 2021). Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the puffin, kittiwake, gannet and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the puffin and seabird assemblage qualifying features of this SPA. (Potential for entanglement effects on puffin is likely to be limited to the breeding season only). g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.34: Likely Significant Effect Matrix for Marine Ornithological Features of the Fetlar SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Great skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Arctic skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – the particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst Arctic skua and great skua are considered to be relatively insensitive to such effects. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – great skua and Arctic skua may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects on Arctic skua is limited to the non-breeding season because the species is identified as having the potential for connectivity during this period only. Fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the great skua, Arctic skua and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – the particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst Arctic skua and great skua are considered to be relatively insensitive to such effects. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.35: Likely Significant Effect Matrix for Marine Ornithological Features of the Farne Islands SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Arctic tern (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Sandwich tern (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – kittiwake from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Arctic tern and Sandwich tern are considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake, Arctic tern and Sandwich tern may be vulnerable to collisions within the Broadshore Hub WFDAs. Fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. For Sandwich and Arctic tern the potential for collision effects is limited to the non-breeding season because these species are identified as having the potential for connectivity during the non-breeding season. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, Arctic tern, Sandwich tern and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – kittiwake, from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. Arctic tern and Sandwich tern are considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.36: Likely Significant Effect Matrix for Marine Ornithological Features of the Priest Island (Summer Isles) SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
European storm petrel (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – The foraging habitat preference of European storm petrel for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022) means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the European storm petrel qualifying feature of this SPA.

c: Collision – European storm petrel generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

d: Barrier to movement – The foraging habitat preference of European storm petrel for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022) means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the European storm petrel qualifying feature of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot generally be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species but an exception in this regard is European storm petrel, for which this effect pathway is unlikely to be important because of its foraging habitat preference for deeper oceanic waters over and around the outer shelf to the north-west of Scotland (MSS 2022).

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – There is no potential for in-combination effects, because only storm petrel is included in assessment for the site and no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs for the species.

Table 7.37: Likely Significant Effect Matrix for Marine Ornithological Features of the Hermaness, Saxa Vord and Valla Field SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Great skua (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Gannet (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – gannet from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst great skua is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the gannet and seabird assemblage qualifying features of this SPA.

c: Collision – gannet and great skua may be vulnerable to collisions within the Broadshore Hub WFDAs. Fulmar generally fly below the lower rotor swept height and is not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the gannet, great skua and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – gannet from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst great skua is considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the gannet and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.38: Likely Significant Effect Matrix for Marine Ornithological Features of the Shiant Isles SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Seabird assemblage (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – the particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

d: Barrier to movement – the particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot generally be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species during the construction phase but an exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – there is no potential for in-combination effects, because only storm petrel is included in assessment for the site and no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs for the species.

Table 7.39: Likely Significant Effect Matrix for Marine Ornithological Features of the Coquet Island SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Arctic tern (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Common tern (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Sandwich tern (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – Arctic tern, common tern and Sandwich tern from this SPA are considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – Arctic tern, common tern and Sandwich tern may be vulnerable to collisions within the Broadshore Hub WFDAs. Fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. The potential for collision effects on Arctic tern, common tern and Sandwich tern is limited to the non-breeding season because these species are identified as having the potential for connectivity during the non-breeding season only. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the Arctic tern, common tern, Sandwich tern and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – Arctic tern, common tern and Sandwich from this SPA are considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.40: Likely Significant Effect Matrix for Marine Ornithological Features of the Flannan Isles SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Seabird assemblage (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – the particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

d: Barrier to movement – the particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot generally be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species but an exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of its particularly large foraging range.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – there is no potential for in-combination effects, because only storm petrel is included in assessment for the site and no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs for the species.

Table 7.41: Likely Significant Effect Matrix for Marine Ornithological Features of the St Kilda SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Great skua (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Gannet (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – gannet from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal, whilst great skua are considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the gannet and seabird assemblage qualifying features of this SPA.

c: Collision – gannet and great skua may be vulnerable to collisions within the Broadshore Hub WFDAs. Fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the gannet, great skua and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – gannet from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species, whilst great skua are considered to be relatively insensitive to such effects. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the gannet and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of its particularly large foraging range. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA. g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.42: Likely Significant Effect Matrix for Marine Ornithological Features of the Flamborough and Filey Coast SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Razorbill (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Kittiwake (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Gannet (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		✓c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – razorbill, kittiwake and gannet from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. The potential effects of disturbance and displacement on kittiwake and razorbill are limited to the non-breeding season because these species are identified as having the potential for connectivity during this period only. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the razorbill, kittiwake, gannet and seabird assemblage qualifying features of this SPA.

c: Collision – kittiwake and gannet may be vulnerable to collisions within the Broadshore Hub WFDAs. Razorbill and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Kittiwake is identified as having potential connectivity with the Broadshore Hub WFDAs during the non-breeding season only, so

potential collision effects are limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the kittiwake, gannet and seabird assemblage qualifying features of this SPA. d: Barrier to movement – razorbill, kittiwake and gannet from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. The potential for barrier effects on kittiwake and razorbill is limited to the non-breeding season because these species are identified as having the potential for connectivity during this period only. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the razorbill, kittiwake, gannet and seabird assemblage qualifying features of this SPA. e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species. f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the razorbill and seabird qualifying features of this SPA. (Potential for entanglement effects on razorbill is likely to be limited to the non-breeding season only). g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.43: Likely Significant Effect Matrix for Marine Ornithological Features of the Morecambe Bay and Duddon Estuary SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Lesser black-backed gull (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – lesser black-backed gull is considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – lesser black-backed gull may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects is limited to the non-breeding season because the potential for connectivity is limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the lesser black-backed gull qualifying feature of this SPA.

d: Barrier to movement – lesser black-backed gull is considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.44: Likely Significant Effect Matrix for Marine Ornithological Features of the Bowland Fells SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Lesser black-backed gull (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – lesser black-backed gull is considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – lesser black-backed gull may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects is limited to the non-breeding season because the potential for connectivity is limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the lesser black-backed gull qualifying feature of this SPA.

d: Barrier to movement – lesser black-backed gull is considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.45: Likely Significant Effect Matrix for Marine Ornithological Features of the Ribble and Alt Estuaries SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Lesser black-backed gull (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – lesser black-backed gull is considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – lesser black-backed gull may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects is limited to the non-breeding season because the potential for connectivity is limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the lesser black-backed gull qualifying feature of this SPA.

d: Barrier to movement – lesser black-backed gull is considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.46: Likely Significant Effect Matrix for Marine Ornithological Features of the North Norfolk Coast SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Sandwich tern (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – Sandwich tern from this SPA is considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – Sandwich tern may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects on this species is limited to the non-breeding season because the potential for connectivity is limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the Sandwich tern qualifying feature of this SPA.

d: Barrier to movement – Sandwich tern from this SPA is considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.47: Likely Significant Effect Matrix for Marine Ornithological Features of the Mingulay and Berneray SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Razorbill (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – razorbill from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. The potential effects of disturbance and displacement on razorbill are limited to the non-breeding season because the potential for connectivity is limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the razorbill and seabird assemblage qualifying features of this SPA.

c: Collision – razorbill and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

d: Barrier to movement – razorbill from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. The potential for barrier effects on razorbill is limited to the non-breeding season because the potential for connectivity is limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the razorbill and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the razorbill and seabird assemblage qualifying features of this SPA. (Potential for entanglement effects on razorbill is likely to be limited to the non-breeding season only). g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.48: Likely Significant Effect Matrix for Marine Ornithological Features of the Rathlin Island SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Fulmar (breeding)	×a	×a		×b	×b	×b		×c			×d		×e	×e	×e		×f		×g	×g	×g	×h	×h	×h
Razorbill (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		✓b	✓b	✓b		×c			✓d		✓e	✓e	✓e		✓f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – razorbill from this SPA may be affected by disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. The particularly large foraging range of fulmar means that any effects of disturbance within, or displacement from, the Broadshore Hub WFDAs are likely to be minimal. The potential effects of disturbance and displacement on razorbill are limited to the non-breeding season because the potential for connectivity is limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the razorbill and seabird assemblage qualifying features of this SPA.

c: Collision – razorbill and fulmar generally fly below the lower rotor swept height and are not considered vulnerable to collision effects. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

d: Barrier to movement – razorbill from this SPA may be affected by barrier effects from the Broadshore Hub WFDAs. The particularly large foraging range of fulmar means that the consequences of barrier effects resulting from the Broadshore Hub WFDAs are likely to be minimal on this species. The potential for barrier effects on razorbill is limited to the non-breeding season because the potential for connectivity is limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the razorbill and seabird assemblage qualifying features of this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species. The exception in this regard is fulmar, for which this effect pathway is unlikely to be important because of the particularly large foraging range of the species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. However, effects cannot be excluded for diving seabird species that may be foraging in the Broadshore Hub WFDAs area, therefore it is considered there is potential for LSE for the razorbill and seabird assemblage qualifying features of this SPA. (Potential for entanglement effects on razorbill is likely to be limited to the non-breeding season only). g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans. h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects. The exception in this regard is fulmar, for which no effect pathways to LSE are identified in relation to the Broadshore Hub WFDAs (so that there is no potential to contribute to in-combination effects).

Table 7.49: Likely Significant Effect Matrix for Marine Ornithological Features of the Skomer, Skokholm and Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Lesser black-backed gull (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h
Seabird assemblage (breeding)	×a	×a		×b	×b	×b		✓c			×d		✓e	✓e	✓e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

a: Direct habitat loss – as detailed in **Section 7.2.1**, direct habitat loss due to the Broadshore Hub WFDAs is unlikely to have effects on SPA breeding seabird populations due to the large foraging ranges used by seabirds and the extent of marine habitats available for other functions (e.g. roosting). Also, direct habitat loss during the construction period is a temporary and relatively short-term effect. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

b: Disturbance and displacement – lesser black-backed gull is considered to be relatively insensitive to disturbance and displacement from the Broadshore Hub WFDAs and its surrounds. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

c: Collision – lesser black-backed gull may be vulnerable to collisions within the Broadshore Hub WFDAs. The potential for collision effects is limited to the non-breeding season because the potential for connectivity is limited to this period. Therefore, it is considered that the potential for LSE in relation to this effect pathway cannot be excluded for the lesser black-backed gull and seabird assemblage qualifying features of this SPA.

d: Barrier to movement – lesser black-backed gull is considered to be relatively insensitive to barrier effects from the Broadshore Hub WFDAs. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

e: Changes in prey availability – as detailed in **Section 7.2.1** above, the potential for LSE cannot be excluded in relation to indirect effects resulting from effects on the availability or abundance of prey species.

f: Entanglement – as detailed in **Section 7.2.1**, entanglement due to the Broadshore Hub WFDAs is unlikely to have effects on the majority of breeding seabird populations due to the design parameters, minimal evidence of fish aggregation around floating infrastructure, and embedded mitigation to avoid entanglement with fishing devices. Therefore, it is considered that there is no potential for LSE in relation to this effect pathway for this SPA.

g: Accidental pollution – as detailed in **Section 7.2.1**, accidental pollution not considered as an impact pathway because this will be subject to other regulatory control through both legislation and the requirements for contingency plans.

h: In-combination effects – other plans or projects which have the potential to cause effects on the qualifying features of this SPA may combine with potential effects associated with the Broadshore Hub WFDAs, so that the potential for LSE cannot be excluded in relation to in-combination effects.

Table 7.50: Likely Significant Effect Matrix for Marine Ornithological Features of the Moray Firth SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Red-throated diver (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Slavonian grebe (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Greater scaup (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Eider (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Long-tailed duck (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Common scoter (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Velvet scoter (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Common goldeneye (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Red-breasted merganser (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.51: Likely Significant Effect Matrix for Marine Ornithological Features of the Loch of Strathbeg SPA

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
(Svalbard) barnacle goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Greylag goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Whooper swan (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Eurasian teal (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Common goldeneye (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Waterfowl assemblage (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.52: Likely Significant Effect Matrix for Marine Ornithological Features of the Moray and Nairn Coast SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Bar-tailed godwit (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Greylag goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Redshank (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Dunlin (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Oystercatcher (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Red-breasted merganser (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Eurasian wigeon (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Waterfowl assemblage (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.53: Likely Significant Effect Matrix for Marine Ornithological Features of the Dornoch Firth and Loch Fleet SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Bar-tailed godwit (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Greylag goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Curlew (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Dunlin (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Oystercatcher (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Redshank (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Greater scaup (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Eurasian teal (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Eurasian wigeon (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Waterfowl assemblage (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Notes: As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.																								

Table 7.54: Likely Significant Effect Matrix for Marine Ornithological Features of the Cromarty Firth SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Bar-tailed godwit (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Greylag goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Whooper swan (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Curlew (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Dunlin (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Knot (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Oystercatcher (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Redshank (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Greater scaup (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Pintail (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Red-breasted merganser (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Eurasian wigeon (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Waterfowl assemblage (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.55: Likely Significant Effect Matrix for Marine Ornithological Features of the Inner Moray Firth SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Bar-tailed godwit (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Greylag goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Cormorant (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Curlew (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Oystercatcher (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Redshank (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Common goldeneye (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Goosander (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Greater scaup (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Red-breasted merganser (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Eurasian teal (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Eurasian wigeon (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Waterfowl assemblage (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.56: Likely Significant Effect Matrix for Marine Ornithological Features of the Montrose Basin SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Greylag goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Redshank (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Oystercatcher (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Eider (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Wigeon (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Knot (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Dunlin (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Shelduck (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Waterfowl assemblage (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.57: Likely Significant Effect Matrix for Marine Ornithological Features of the Firth of Tay and Eden Estuary SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Bar-tailed godwit (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Greylag goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Redshank (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Black-tailed godwit islandica (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Common scoter (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Cormorant (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Dunlin (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Eider (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Common goldeneye (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h

Goosander (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Grey plover (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Long-tailed duck (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Oystercatcher (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Red-breasted merganser (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Sanderling (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Shelduck (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Velvet scoter (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h
Waterfowl assemblage (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	✓h	✓h	✓h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.58: Likely Significant Effect Matrix for Marine Ornithological Features of the Firth of Forth SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Bar-tailed godwit (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Golden plover (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Knot (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Red-throated diver (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Redshank (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Shelduck (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Slavonian grebe (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Turnstone (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Scaup (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Great crested grebe (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Cormorant (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Curlew (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Eider (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Long-tailed duck (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Common scoter (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Velvet scoter (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Common goldeneye (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Red-breasted merganser (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Oystercatcher (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Ringed plover (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Grey plover (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Dunlin (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Mallard (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Lapwing (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Wigeon (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Waterfowl assemblage (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.59: Likely Significant Effect Matrix for Marine Ornithological Features of the Loch Spynie SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Greylag goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.60: Likely Significant Effect Matrix for Marine Ornithological Features of the Loch of Kinnordy SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Greylag goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.61: Likely Significant Effect Matrix for Marine Ornithological Features of the Loch of Lintrathen SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Greylag goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.62: Likely Significant Effect Matrix for Marine Ornithological Features of the Cameron Reservoir SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.63: Likely Significant Effect Matrix for Marine Ornithological Features of the Loch Leven SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Shoveler (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Whooper swan (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Cormorant (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Gadwall (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Common goldeneye (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Pochard (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Teal (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Tufted duck (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Waterfowl assemblage (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Notes: As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.																								

Table 7.64: Likely Significant Effect Matrix for Marine Ornithological Features of the Fala Flow SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.65: Likely Significant Effect Matrix for Marine Ornithological Features of the Greenlaw Moor SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.66: Likely Significant Effect Matrix for Marine Ornithological Features of the Gladhouse Reservoir SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

Table 7.67: Likely Significant Effect Matrix for Marine Ornithological Features of the Din Moss – Hoselaw Loch SPA and Ramsar site

European Site Qualifying Feature	Direct Habitat Loss			Disturbance/ Displacement			Collision			Barrier to Movement			Changes in Prey Availability			Entanglement			Accidental Pollution			In-combination Effects		
	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D	C	O&M	D
Pink-footed goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h
Greylag goose (non-breeding)	×a	×a		×b	×b	×b		✓c			✓d		×e	×e	×e		×f		×g	×g	×g	×h	✓h	×h

Notes:

As detailed in **Section 7.2.1**, for the migratory non-seabird SPAs (and Ramsar sites), collisions (c) and barrier to movement (d) (both of which are restricted to the operation and maintenance period) are the only effect pathways for which the potential for LSE cannot be excluded. As a consequence of the conclusions for these two effect pathways, it is also the case that the potential for LSE as a result of in-combination effects with other plans and projects (h) cannot be excluded. For all other effect pathways, it is considered that there is no potential for LSE.

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8 Summary of Stage 1: Habitat Regulations Assessment Screening

361. A summary of the European sites and relevant qualifying features for which potential LSEs have been identified and screened in for further assessment in the RIAA is provided in **Table 8.1** below.

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Table 8.1: Summary of European Sites and Relevant Qualifying Features for which Potential LSEs have Been Identified and Screened in for Further Assessment in the RIAA (✓ = Potential for LSE during Project Phase, C = Construction, O&M = Operation and Maintenance, D = Decommissioning)

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
Marine Mammals						
Moray Firth SAC	93	Bottlenose dolphin	Underwater Noise (All Potential Sources)	✓	✓	✓
			Collision Risk with Vessels	✓	✓	✓
			Secondary entanglement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Isle of May SAC	218	Grey seal	Underwater Noise (All Potential Sources)	✓	✓	✓
			Collision Risk with Vessels	✓	✓	✓
			Secondary entanglement		✓	
			Disturbance at seal haul-out sites	✓	✓	✓
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Faray and Holm of Faray SAC	115	Grey seal	Underwater Noise (All Potential Sources)	✓	✓	✓
			Collision Risk with Vessels	✓	✓	✓
			Secondary entanglement		✓	
			Disturbance at seal haul-out sites	✓	✓	✓
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Berwickshire and North Northumberland Coast SAC	241	Grey seal	Underwater Noise (All Potential Sources)	✓	✓	✓
			Collision Risk with Vessels	✓	✓	✓
			Secondary entanglement		✓	
			Disturbance at seal haul-out sites	✓	✓	✓
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Dornoch Firth and Morrich More SAC	120	Harbour seal	Underwater Noise (All Potential Sources)	✓	✓	✓
			Collision Risk with Vessels	✓	✓	✓
			Secondary entanglement		✓	
			Disturbance at seal haul-out sites	✓	✓	✓
			Changes in prey availability	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			In-combination effects	✓	✓	✓
Breeding Seabird Colony Sites						
Troup, Pennan and Lion's Heads SPA	50.6	Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Guillemot (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Razorbill (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Herring gull (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Herring gull • Razorbill	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Buchan Ness to Collieston Coast SPA	70.0	Guillemot (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Herring gull (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Kittiwake • Herring gull • Guillemot • Fulmar	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
East Caithness Cliffs SPA	70.5	Guillemot (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Razorbill (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Herring gull (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Great black-backed gull (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Great black-backed gull • Fulmar	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
North Caithness Cliffs SPA	75.8	Guillemot (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement	✓	✓	✓
			Changes in prey availability		✓	
			In-combination effects	✓	✓	✓
		Razorbill (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Puffin (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Fulmar • Kittiwake • Razorbill • Puffin	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement	✓	✓	✓
			Changes in prey availability		✓	
			Entanglement		✓	
			In-combination effects	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
Copinsay SPA	79.4	Guillemot (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement	✓	✓	✓
			Changes in prey availability		✓	
			In-combination effects	✓	✓	✓
		Great black-backed gull (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Guillemot • Kittiwake • Great black-backed gull • Fulmar	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement	✓	✓	✓
			Changes in prey availability		✓	
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Ythan Estuary, Sands of Forvie and Meikle Loch SPA and Ythan Estuary and Meikle Loch Ramsar site	78.1	Sandwich tern (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eider (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Lapwing (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	
			Barrier to movement		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Auskerry SPA	91.7	Arctic tern (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Hoy SPA	98.3	Great skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Arctic skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Guillemot (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Puffin (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement	✓	✓	✓
			Changes in prey availability		✓	
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Puffin • Kittiwake • Arctic skua	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement	✓	✓	✓
			Changes in prey availability		✓	
			Entanglement		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		• Fulmar • Guillemot	In-combination effects	✓	✓	✓
Calf of Eday SPA	113.5	Guillemot (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Great black-backed gull (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Great black-backed gull • Guillemot • Fulmar • Kittiwake	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Rousay SPA	116.6	Arctic skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Guillemot (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Kittiwake • Arctic skua • Guillemot • Fulmar	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Marwick Head SPA	125.2	Guillemot (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: ○ Kittiwake	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Fair Isle SPA	132.4	Great skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Arctic skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase C	O&M	D
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Guillemot (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Razorbill	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Puffin (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Puffin • Razorbill • Kittiwake • Arctic skua • Great skua • Gannet • Fulmar	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
	135.9	Arctic skua	Collision		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
Papa Westray (North Hill and Holm) SPA			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
West Westray SPA	126.6	Guillemot (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Razorbill (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Razorbill • Kittiwake • Fulmar	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Fowlsheugh SPA	131.8	Razorbill (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		Seabird assemblage (breeding) including the components: • Fulmar • Kittiwake • Razorbill	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Sumburgh Head SPA	172.9	Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Kittiwake • Fulmar	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Sule Skerry and Sule Stack SPA	170.8	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Puffin (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • European storm petrel • Gannet • Puffin	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
Cape Wrath SPA	173.8	Puffin (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Kittiwake • Puffin • Fulmar	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Foula SPA	199.6	Great skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Arctic skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Puffin (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
			Disturbance and displacement	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		Seabird assemblage (breeding) including the components: • Kittiwake • Arctic skua • Fulmar	Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Noss SPA	206.2	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Puffin (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Great skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			Barrier to movement		✓	
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Fulmar • Kittiwake • Puffin	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Papa Stour SPA	224.7	Arctic tern (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			In-combination effects	✓	✓	✓
Handa SPA	191.4	Great skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Great skua • Kittiwake • Fulmar	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Forth Islands SPA	215.6	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Lesser black-backed gull (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Puffin (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		Razorbill (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Razorbill • Kittiwake	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Imperial Dock Lock SPA	250.7	Common tern (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
St Abb's Head to Fast Castle SPA	242.9	Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Kittiwake	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Ronas Hill – North Roe and Tingon SPA	246.7	Great skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
North Rona and Sula Sgeir SPA	244.8	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase C	O&M	D
		Puffin (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Kittiwake • Puffin	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Fetlar SPA	254.1	Great skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Arctic skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Arctic skua • Fulmar	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Farne Islands SPA	274.6	Arctic tern (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Sandwich tern (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Kittiwake • Fulmar* * = advised by Natural England within Berwick Bank Offshore Wind Farm Scoping Opinion	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Hermaness, Saxa Vord and Valla Field SPA	273.7	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: Fulmar	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Coquet Island SPA	309.3	Arctic tern (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Common tern (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Sandwich tern (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
			Collision		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		Seabird assemblage (breeding) including the components: • Fulmar	Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
St Kilda SPA	386.7	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Great skua (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Fulmar	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Flamborough and Filey Coast SPA	438.8	Gannet (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Kittiwake (breeding)	Disturbance and displacement	✓	✓	✓
			Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Razorbill (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
			Disturbance and displacement	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		Seabird assemblage (breeding) including the components: • Fulmar	Collision		✓	
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Morecambe Bay and Duddon Estuary SPA	430.8	Lesser black-backed gull (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Bowland Fells SPA	453.4	Lesser black-backed gull (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Ribble and Alt Estuaries SPA	489.9	Lesser black-backed gull (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
North Norfolk Coast SPA	591.8	Sandwich tern (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Mingulay and Berneray SPA	368.8	Razorbill (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Fulmar	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Rathlin Island SPA	408.8	Razorbill (breeding)	Disturbance and displacement	✓	✓	✓
			Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
			Disturbance and displacement	✓	✓	✓

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		Seabird assemblage (breeding) including the components: • Fulmar	Barrier to movement		✓	
			Changes in prey availability	✓	✓	✓
			Entanglement		✓	
			In-combination effects	✓	✓	✓
Skomer, Skokholm and Seas off Pembrokeshire/Sgomer, Sgogwm a Moroedd Penfro SPA	737.6	Lesser black-backed gull (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Seabird assemblage (breeding) including the components: • Lesser black-backed gull	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
Marine SPAs						
Moray Firth SPA	62.6	Red-throated diver (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Slavonian grebe (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Greater scaup (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eider (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Long-tailed duck (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Common scoter (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Velvet scoter (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		Common goldeneye (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Red-breasted merganser (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Migratory Non-Seabird Sites (Estuarine)						
Loch of Strathbeg SPA and Ramsar site[4]	52.6	[Svalbard] barnacle goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Whooper swan (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding) including the components: • Eurasian teal • Common goldeneye	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Ythan Estuary, Sands of Forvie and Meikle Loch SPA, Ythan Estuary and Meikle Loch Ramsar site	78.1	Sandwich tern (breeding)	Collision		✓	
			Changes in prey availability	✓	✓	✓
			In-combination effects	✓	✓	✓
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eider (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		Lapwing (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding) including the components: • Eider • Lapwing • Redshank	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Moray and Nairn Coast SPA and Ramsar site	86.8	Bar-tailed godwit (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Dunlin (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Oystercatcher (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Red-breasted merganser (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eurasian wigeon (non-breeding)	Collision		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			Barrier to movement		✓	
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding) including the components: • Dunlin • Oystercatcher • Red-breasted merganser • Eurasian wigeon	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Dornoch Firth and Loch Fleet SPA and Ramsar site	114.4	Bar-tailed godwit (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Curlew (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Dunlin (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Knot (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Oystercatcher (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Greater scaup (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eurasian teal (non-breeding)	Collision		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase C	Project Phase O&M	Project Phase D
			Barrier to movement		✓	
			In-combination effects		✓	
		Eurasian wigeon (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding) including the components: • Curlew • Dunlin • Oystercatcher • Redshank • Greater scaup • Eurasian teal	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Cromarty Firth SPA and Ramsar site	131.5	Bar-tailed godwit (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Whooper swan (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Curlew (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Dunlin (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Knot (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Oystercatcher (non-breeding)	Collision		✓	
			Barrier to movement		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Greater scaup (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pintail (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Red-breasted merganser (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eurasian wigeon (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding) including the components: • Curlew • Dunlin • Knot • Oystercatcher • Northern pintail • Red-breasted merganser • Redshank • Greater scaup • Eurasian wigeon	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Inner Moray Firth SPA and Ramsar site	134.9	Bar-tailed godwit (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		Cormorant (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Curlew (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Oystercatcher (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Common goldeneye (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Goosander (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Greater scaup (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Red-breasted merganser (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eurasian teal (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eurasian wigeon (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding) including the components:	Collision		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		• Cormorant • Curlew • Common goldeneye • Goosander • Oystercatcher • Greater scaup • Eurasian teal • Eurasian wigeon	Barrier to movement		✓	
			In-combination effects		✓	
Montrose Basin SPA and Ramsar site	158.9	Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Oystercatcher (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eider (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Wigeon (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Knot (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Dunlin (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Shelduck (non-breeding)	Collision		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			Barrier to movement		✓	
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding) including the components: • Oystercatcher • Eider • Wigeon • Knot • Dunlin • Shelduck	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Firth of Tay and Eden Estuary SPA and Ramsar site	188.5	Bar-tailed godwit (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Black-tailed godwit islandica (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Common scoter (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Cormorant (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Dunlin (non-breeding)	Collision		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			Barrier to movement		✓	
			In-combination effects		✓	
		Eider (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Common goldeneye (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Goosander (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Grey plover (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Long-tailed duck (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Oystercatcher (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Red-breasted merganser (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Sanderling (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Shelduck (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Velvet scoter (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		Waterfowl assemblage (non-breeding) including the components: • Black-tailed godwit islandica • Common scoter • Cormorant • Dunlin • Eider • Common goldeneye • Goosander • Grey plover • Long-tailed duck • Oystercatcher • Red-breasted merganser • Sanderling • Shelduck • Velvet scoter	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Firth of Forth SPA and Ramsar site	209.2	Bar-tailed godwit (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Golden plover (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Knot (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Red-throated diver (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Redshank (non-breeding)	Collision		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			Barrier to movement		✓	
			In-combination effects		✓	
		Shelduck (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Slavonian grebe (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Turnstone (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Scaup (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Great crested grebe (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Cormorant (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Curlew (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Eider (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Long-tailed duck (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Common scoter (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Velvet scoter (non-breeding)	Collision		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
			Barrier to movement		✓	
			In-combination effects		✓	
		Common goldeneye (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Red-breasted merganser (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Oystercatcher (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Ringed plover (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Grey plover (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Dunlin (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Mallard (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Lapwing (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Wigeon (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		Waterfowl assemblage (non-breeding) including the components: • Scaup • Great crested grebe • Cormorant • Curlew • Eider • Long-tailed duck • Common scoter • Velvet scoter • Common goldeneye • Red-breasted merganser • Oystercatcher • Ringed plover • Grey plover • Dunlin • Mallard • Lapwing • Wigeon	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Migratory Non-Seabird Sites (Inland Waterbodies)						
Loch Spynie SPA and Ramsar site	94.8	Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Loch of Kinnordy SPA and Ramsar site	174.6	Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Loch of Lintrathen SPA and Ramsar site	177.2	Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
Cameron Reservoir SPA and Ramsar site	211.7	Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Loch Leven SPA and Ramsar site	230.0	Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Shoveler (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Whooper swan (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Cormorant (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Gadwall (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Common goldeneye (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pochard (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Teal (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Tufted duck (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Waterfowl assemblage (non-breeding) including the components:	Collision		✓	
			Barrier to movement		✓	

European Site	Closest Distance to WFDAs (km)	Relevant Qualifying Features	Impact	Project Phase		
				C	O&M	D
		• Cormorant • Gadwall • Common goldeneye • Pochard • Teal • Tufted duck	In-combination effects		✓	
Fala Flow SPA and Ramsar site	262.8	Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Greenlaw Moor SPA and Ramsar site	266.8	Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Gladhouse Reservoir SPA and Ramsar site	271.1	Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
Din Moss – Hoselaw Loch SPA and Ramsar site	283.2	Greylag goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	
		Pink-footed goose (non-breeding)	Collision		✓	
			Barrier to movement		✓	
			In-combination effects		✓	

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Broadshore Hub

Broadshore OFFSHORE WIND

Sinclair OFFSHORE WIND

Scaraben OFFSHORE WIND

Appendix 1: Figures

BlueFloat ENERGY

Renantis

PARTNERSHIP

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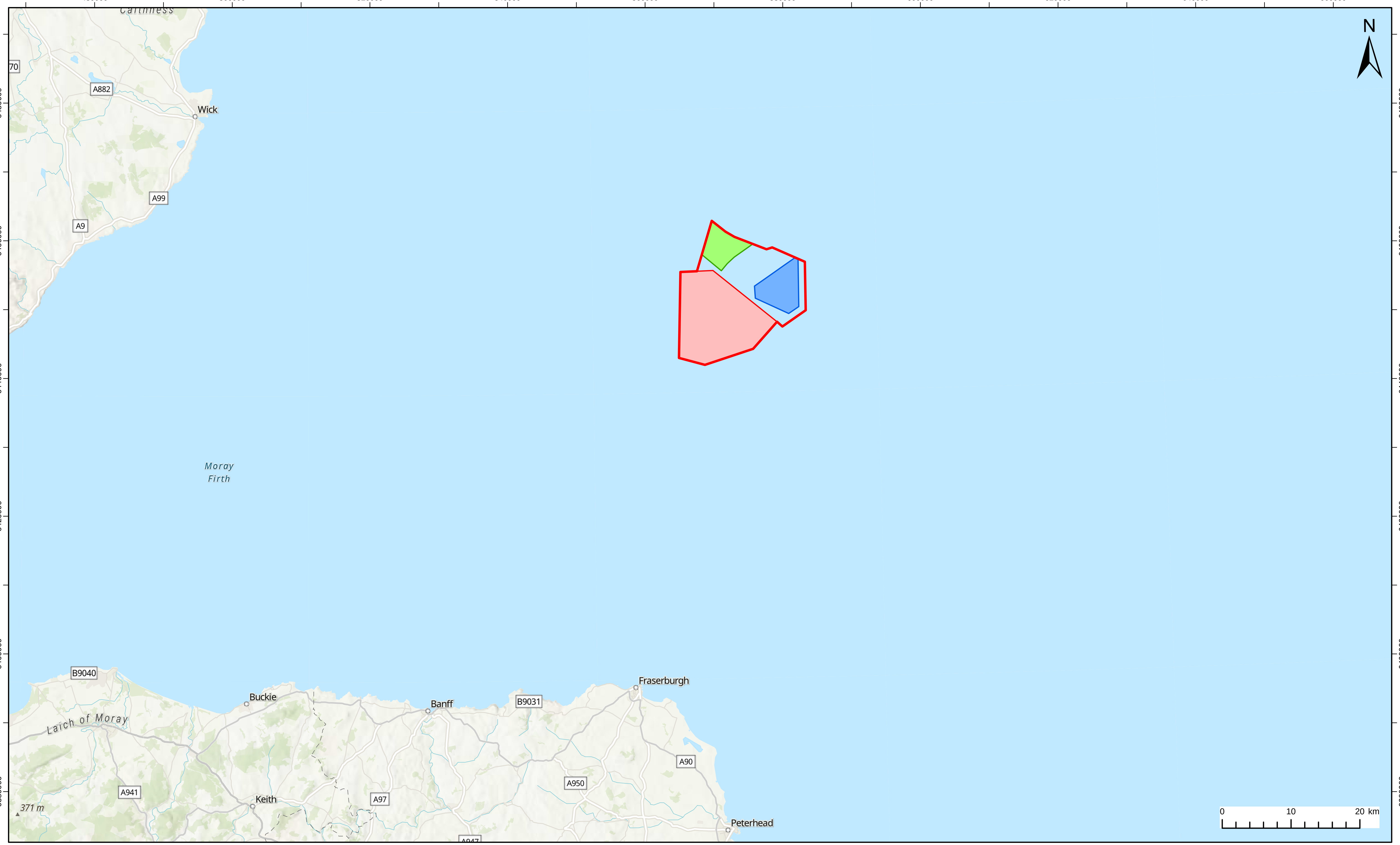

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Broadshore Hub

Legend:

- Broadshore Hub WFDAs Screening Boundary
- Broadshore WFDA Boundary
- Sinclair WFDA Boundary
- Scaraben WFDA Boundary

Rev 1	18/12/2023	Final	GC	HF	JM
REV	DATE	STATUS	DRW	CHK	APR

Coordinate System: WGS 1984 UTM Zone 30N

Source: Esri, CGIAR, N Robinson, NCEAS, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, FAO, METI/NASA, USGS

Scale @ A3

1:500,000

Figure Title:

Broadshore Hub WFDAs Screening Boundary

Project:

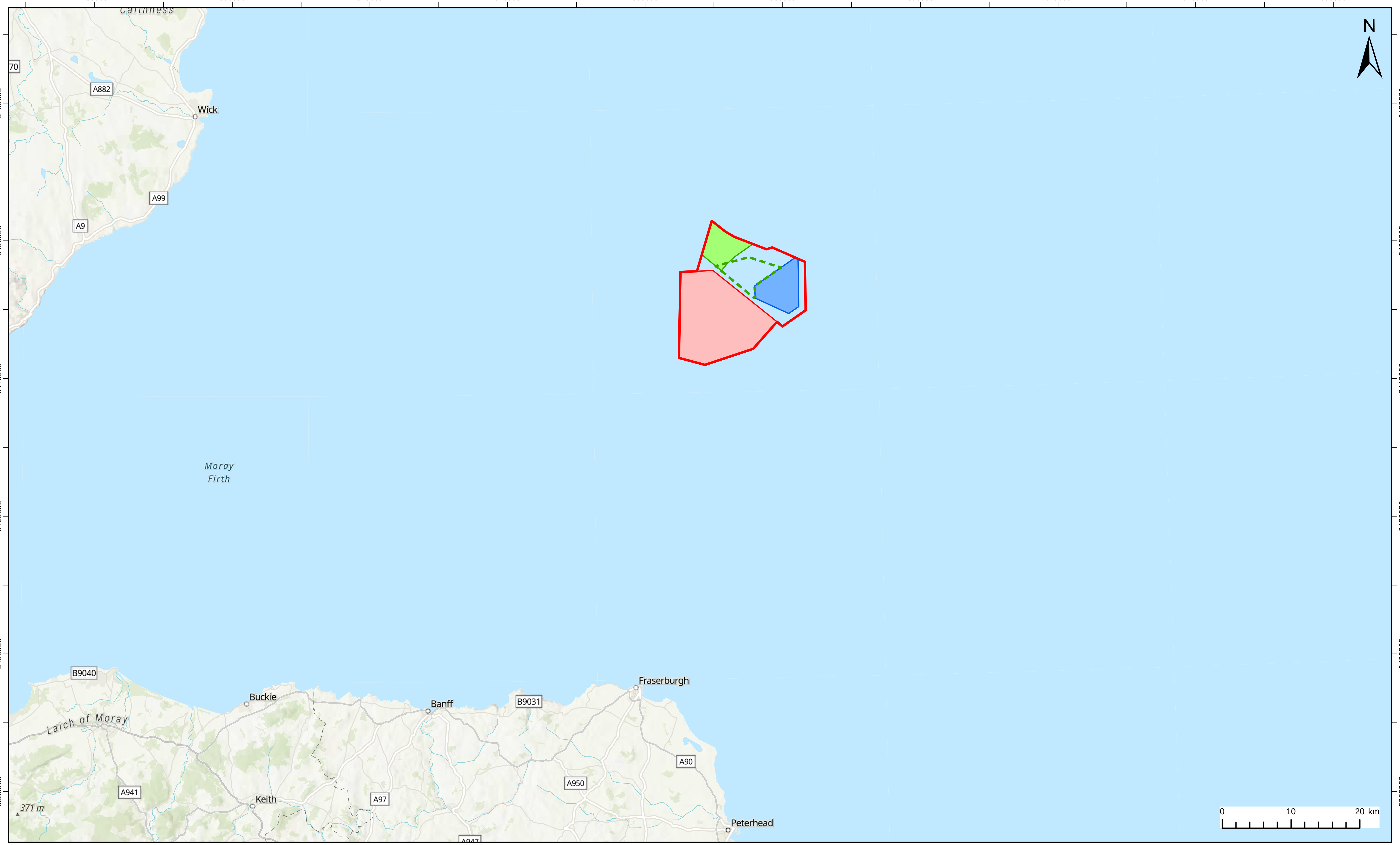
Broadshore Hub WFDAs

Report:

HRA Screening Report

Drawing No.: RHDHV_HUB_CST_FGR_0031

Figure 1.1



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Enhancing Society Together

Broadshore Hub

Legend:
- Broadshore Hub WFDAs Screening Boundary
- Broadshore WFDA Boundary
- Scaraben WFDA Boundary
- Sinclair WFDA Boundary
- Proposed Alternative Sinclair WFDA Boundary

Rev 1	18/12/2023	Final	GC	HF	JM
REV	DATE	STATUS	DRW	CHK	APR

Coordinate System: WGS 1984 UTM Zone 30N

Source: Esri, CGIAR, N Robinson, NCEAS, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Esri UK, Esri, HERE, Garmin, Foursquare, FAO, METI/NASA, USGS

Scale @ A3
1:500,000

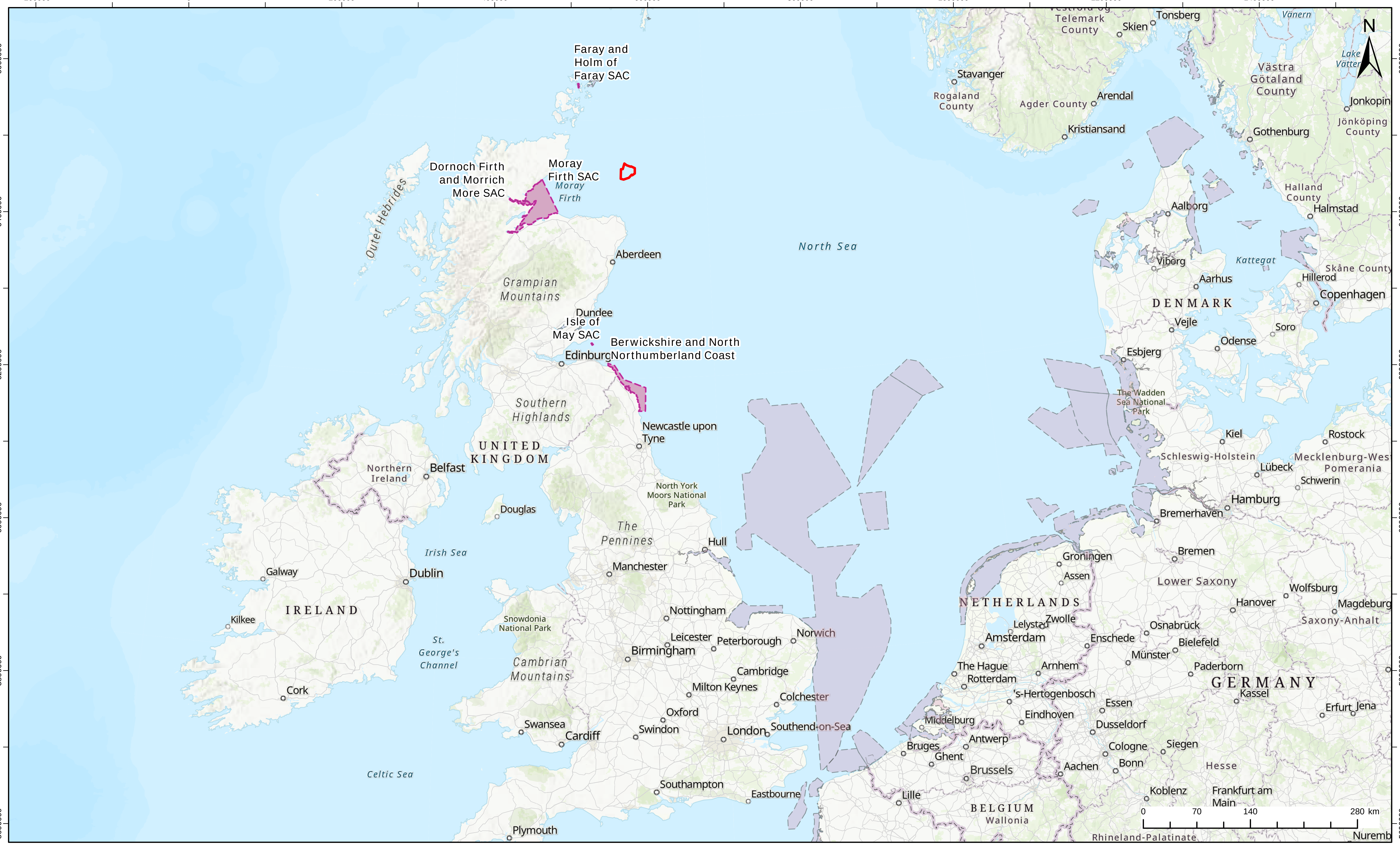
Figure Title: Proposed Alternative Sinclair WFDA Boundary

Project: Broadshore Hub WFDAs

Report: HRA Screening Report

Drawing No.: RHDHV_HUB_CST_FGR_0032

Figure 1.2



Broadshore Hub

Legend:

- Broadshore Hub WFDA Screening Boundary
- Designated Sites Screened In
- Designated Sites Screened Out

REV	DATE	STATUS	DRW	CHK	APR
Rev 1	18/12/2023	Final	GC	HF	JM

Coordinate System: WGS 1984 UTM Zone 30N

Source: JNCC, European Environment AgencyEsri, FAO, NOAA, USGS, Esri UK, Esri, HERE, Garmin, FAO, NOAA, USGS, Esri, USGS

Scale @ A3 1:4,500,000

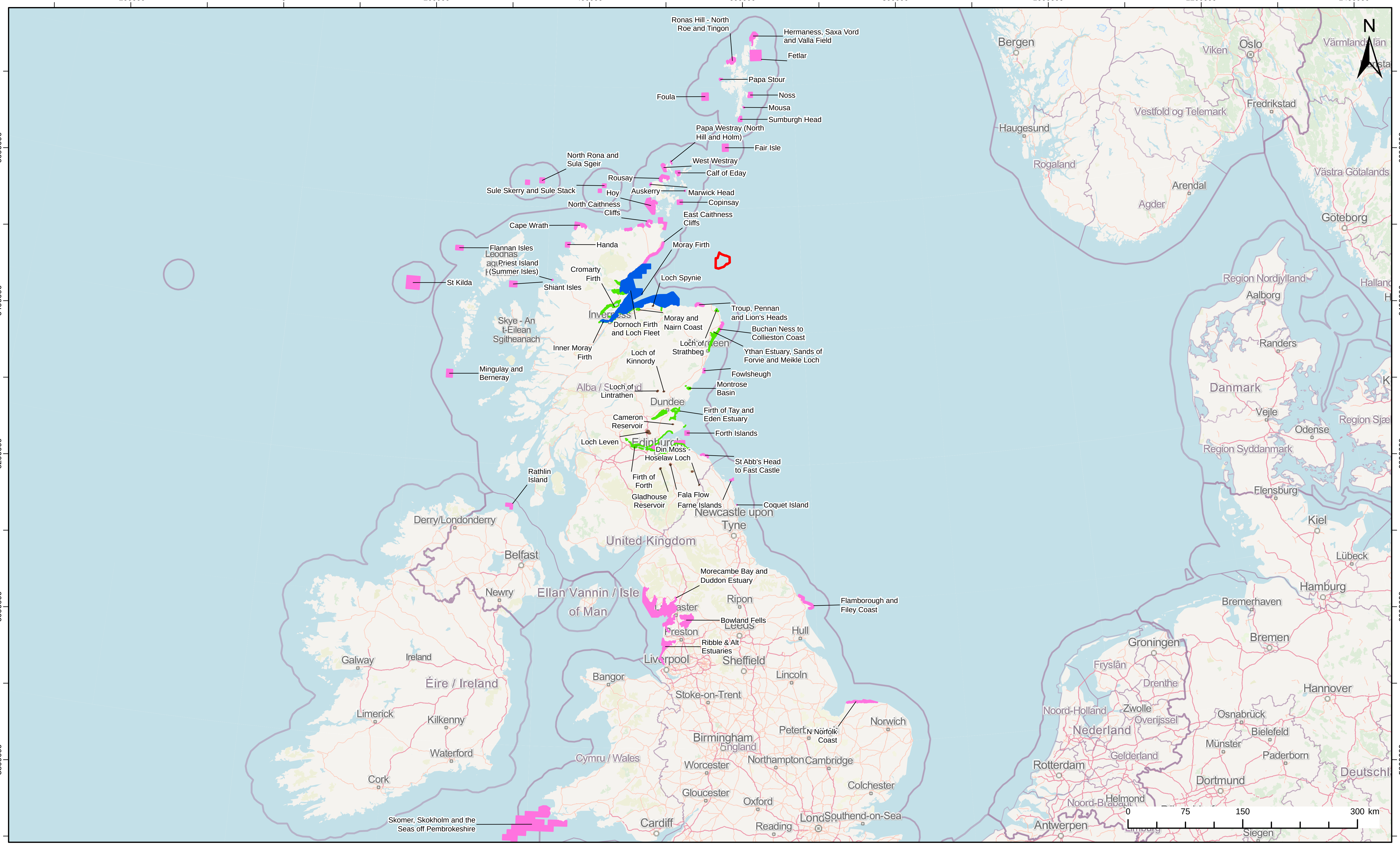
Figure Title: Designated Sites Where Marine Mammals are a Qualifying Feature (or Feature of Interest) Screened into the HRA for Further Assessment

Project: Broadshore Hub WFDAs

Report: HRA Screening Report

Drawing No.: RHDHV_HUB_CST_FGR_0018

Figure 6.1



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Broadshore Hub

Legend:

- Broadshore Hub WFDAs Screening Boundary
- Breeding Seabird Colony Sites
- Migratory Non-Seabird Sites (Estuarine)
- Migratory Non-Seabird Sites (Inland Waterbodies)
- Marine SPAs

Rev 1	18/12/2023	Final	GC	HF	JM
REV	DATE	STATUS	DRW	CHK	APR

Coordinate System: WGS 1984 UTM Zone 30N

Source: Esri, FAO, NOAA, USGS, Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Scale @ A3 1:4,500,000

Figure Title:
Location of Special Protection Areas (SPAs) Designated for Ornithological Features Taken Forward for Determination of LSE

Project: Broadshore Hub WFDAs

Report: HRA Screening Report

Drawing No.: RHDHV_HUB_CST_FGR_0019

Figure 7.1