THISTLE WIND PARTNERS

Ayre Offshore Wind Farm Offshore EIA Report

Volume 2, Chapter 14: Shipping and Navigation

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Glossary

Defined Term	Definition
Additional Mitigation	Also referred to as secondary mitigation which is defined by The Institute of Sustainability and Environmental Professionals (ISEP) (formerly Institute of Environmental Management and Assessment (IEMA) as: Actions that will require further activity in order to achieve the anticipated outcome. These may be imposed as part of the planning consent, or through inclusion in the EIA Report (sic).
Adverse Weather	Severe weather that creates potentially unsafe conditions for vessel transits.
Allision/Contact	Allision in shipping and navigation refers to the impact of a moving vessel with a stationary object, such as a Wind Turbine or OSP. It is distinct from a collision, which involves two moving vessels.
Anchorage	A designated area where ships lower their anchors to remain in position.
Applicant (the)	Ayre Offshore Wind Farm Limited (AOWFL).
Array Area	The Array Area is the area in which the Offshore Generation Assets will be located.
As Low as Reasonably Practicable (ALARP)	The principle that risk should be reduced as far as possible before further reduction is disproportionate to the costs of doing so.
Automatic Identification System (AIS)	A system by which vessels automatically broadcast their identity and key statistics including location, destination, length, speed and current status. Most commercial vessels and European Union fishing vessels over 15 metres (m) in length are required to carry AIS.
Ayre Offshore Wind Farm Limited (AOWFL)	A Special Purpose Vehicle (SPV) (legal entity) for the purpose of developing the Project. AOWFL are the Applicant for the Offshore Application.
Baseline	The status of the environment without the Proposed Development in place.
Clear Range Procedure	A term defined by the ministry of defence for operation of Military Practice Areas. This term means that 'exercises and firing only take place when the areas are considered to be clear of all shipping'.
Collision	Collision refers to the impact between two moving vessels, or a vessel and an object in motion. It differs from allision, which involves a moving vessel striking a stationary object.
Commitment	This term is used interchangeably with mitigation and enhancement measures. The purpose of commitments is to avoid, prevent, reduce or, if possible, offset significant adverse environmental effects. Primary and tertiary commitments are taken into account and embedded within the assessment set out in the Environmental Impact Assessment.
The Convention on the International Regulations for Preventing Collisions at Sea (COLREGS)	A composite of 'Collision Regulations', referring to The Convention on the International Regulations for Preventing Collisions at Sea.
Crown Estate Scotland (CES)	Public corporation accountable to Scottish Government, responsible for the management of land and property in Scotland owned by the monarch.

Defined Term	Definition
Cumulative Effects	The effects of the Proposed Development assessed together with effects from the Onshore Infrastructure forming the Project as well as one or more different projects on the same receptor/resource.
Displacement/ Deviation	An impact that occurs when a vessel is forced away from their typical route due to activities associated with the construction, operation and maintenance, and/or decommissioning of the Proposed Development due to the Offshore Infrastructure.
Draught	The maximum depth of any floating body.
Dynamic Cable	A section of suspended cable between the floating infrastructure and the seabed.
Effect	Term used to express the consequence of an impact i.e. the result of change or changes on specific environmental resources or receptors. The significance of an effect is determined by correlating the magnitude of the impact with the importance, or sensitivity of the receptor or resource in accordance with defined significance criteria.
Embedded Mitigation	Measures that are adopted as part of the Proposed Development and therefore assessed within the EIA. The proposed approach for the EIA for the Proposed Development is that Embedded Mitigation includes both primary mitigation and tertiary mitigation. These are defined by the ISEP as follows: Primary: Modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project, and do not require additional action to be taken. Tertiary: Actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects.
Environmental Impact Assessment (EIA)	Assessment of the potential likely significant effects of the Proposed Development on the physical, biological, and human environment during construction, Operations and Maintenance (O&M) and decommissioning.
Environmental Impact Assessment Regulations (EIA Regulations)	Terminology used in the Offshore EIA Report to refer to three sets of regulations: • The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017; • The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017; and • The Marine Works (Environmental Impact Assessment) Regulations 2007.
Exclusive Economic Zone (EEZ)	An area from the outer limit of the territorial sea up to 200 nm from the coastal baseline, over which a sovereign state has rights regarding marine resources.
Export Cable Corridor	The area seaward of Mean High Water Springs (MHWS), which connects the Array Area with the Landfall area within which the Offshore Export Cables will be installed.
Flag State	A Flag State is the state chosen by merchant ships to be registered in, so that the vessel is bound to carry the flag of that state and comply with that state's rules and regulations.

Defined Term	Definition
Formal Safety Assessment (FSA)	A structured and systematic process for assessing the risks and costs (if applicable) associated with shipping activity.
Grounding	Vessel makes contact with the seabed/shoreline or underwater assets.
High Voltage Alternating Current (HVAC)	A system of power transmission and distribution that utilises alternating current at voltages typically exceeding 1000 volts, as defined by the International Electrotechnical Commission (2015). HVAC systems are designed to efficiently deliver electricity over long distances with minimal losses, leveraging transformers to modify voltage levels.
Impact	A change caused by an action that occurs during a project's lifetime.
Inter-Array Cables (IAC)	Cables which link the Wind Turbines to each other and with the Offshore Substation Platforms (OSPs).
Inter-Related Effects	The potential effects of multiple impacts from the construction, O&M and decommissioning of the Project, affecting one receptor.
Interconnector Cables	Cables which will connect individual OSPs to each other to provide redundancy against cable failure elsewhere.
Intertidal Area	The area between Mean High Water Springs (MHWS) and Mean Low Water Springs (MLWS).
Landfall	The area in which the Offshore Export Cables make Landfall and is also the transitional area between the Offshore Transmission Assets and the Onshore Transmission Assets. Located in the intertidal area (see definition above) at Sinclair's Bay.
Marine (Scotland) Act 2010	Legislation that sets a framework to manage the competing demands made on marine resources within Scottish seas.
Marine Directorate (MD)	The Marine Directorate of the Scottish Government, formerly known as Marine Scotland. The planning and licensing authority for Scotland's seas and custodian of Scotland's National Marine Plan (NMP). The Marine Directorate - Licensing and Operations Team (MD-LOT) are specifically responsible for managing Section 36 Consent and Marine Licence Applications seaward of MHWS.
Marine Guidance Note (MGN)	A system of guidance notes issued by the Maritime and Coastguard Agency (MCA) which provide significant advice relating to the improvement of the safety of shipping and of life at sea, and to prevent or minimise pollution from shipping.
Marine Licence	A Marine Licence permits the undertaking of different activities in the marine environment, including construction, the deposition or removal of substances or objects, and dredging. The Marine (Scotland) Act 2010 requires Marine Licences to be obtained for licensable activities taking place within Scottish Territorial Seas. The Marine and Coastal Access Act (MCAA) 2009 requires a Marine Licence to be obtained for licensable marine activities within the Scottish offshore region (12 nm – 200 nm).
Master	The designated person in charge of a ship, its crew, passengers and cargo.
Maximum Design Scenario (MDS)	The scenario within the design envelope likely to result in the greatest impact on a particular topic receptor, and therefore the one that should be assessed for that topic receptor.

Defined Term	Definition
Mean High Water Springs (MHWS)	The average tidal height throughout the year of two successive high waters during those periods of 24 hours when the range of the tide is at its greatest.
Mitigation	Measures to avoid, prevent, reduce or control effects on the environment. See also definitions for Embedded Mitigation and Additional Mitigation.
Nautical Charts	A graphic representation of a sea area and adjacent coastal regions.
Offshore Application	Term used to refer to the applications associated with the Proposed Development. The Applicant will apply for: • A Section 36 Consent under the Electricity Act 1989; and • Marine Licence(s) under Marine Scotland Act 2010 and Marine and Coastal Access Act 2009.
Offshore Environmental Impact Assessment (EIA) Report (hereafter, 'Offshore EIA report')	Document prepared to report the findings of the EIA for the Proposed Development and produced in accordance with the EIA Regulations. Submitted to support the Offshore Application for the Proposed Development.
Offshore Export Cable	Subsea cables used to transmit electricity generated offshore by the Wind Turbines from the OSPs to shore. The Transition Joint Bay (TJB) is the location where the Offshore Export Cable terminates, and the onshore cabling begins.
Offshore Generation Assets	The infrastructure of the Proposed Development required to generate electricity comprising of the Wind Turbines, Wind Turbine foundations and associated infrastructure e.g. IACs.
Offshore Infrastructure	All of the Offshore Infrastructure associated with the Proposed Development that is located seaward of MHWS, comprising the Offshore Generation Assets and the Offshore Transmission Assets.
Offshore Scoping Report	The Report that presents the findings of the EIA scoping process undertaken for the Proposed Development with the purpose of obtaining a Scoping Opinion. The Report defines what is intended to be assessed and reported as part of the EIA.
Offshore Substation Platform(s) (OSPs)	OSPs comprise the support structure, topside and electrical components used for collecting and/or converting electricity generated by the Wind Turbines for transmission by the Offshore Export Cables.
Offshore Transmission Assets	The infrastructure of the Proposed Development required to transmit the generated electricity comprising of the OSPs, Offshore Export Cables and associated infrastructure up to MHWS.
Operation and Maintenance (O&M)	The phase of the Proposed Development following completion of construction. This phase of development includes routine inspections, repairs and replacement of infrastructure and equipment (including interconnector and IACs), scour protection replenishment or replacement, major component replacement, painting and/or other coating works, removal of marine growth, and replacement of access ladders.
Passage Plan	A detailed description of a vessel's voyage from start to finish, including the route and hazards likely to be encountered along the way.

Defined Term	Definition
Pathway	Describes the means or route by which a receptor (such as the coast) can be affected by an identified impact source (such as Wind Turbine foundations in the water column).
Pilot	Professional seafarers with detailed knowledge of a port and expertise in ship manoeuvring.
Port or Harbour	A maritime facility compromising of one or more wharves or loading areas where ships load and discharge cargo or passengers.
Practice and Exercise Area (PEXA)	Term used to describe an offshore area used by the military for practice and exercise drills, including submarine exercises and firing practice.
Project (the)	An overarching term for the Ayre Offshore Wind Farm comprising the offshore and onshore infrastructure required to generate and transmit electricity from the Array Area to the onshore Grid Connection Point. The Project includes the Offshore Generation Assets, the Offshore Transmission Assets and the Onshore Infrastructure.
Project Design Envelope (PDE)	A description of the range of possible elements that make up the design options for the Proposed Development under consideration when the exact engineering parameters are not yet known.
Proposed Development	Term used to define the Offshore Infrastructure associated with the Project seaward of MHWS for which consent is being sought. Further details of the parameters are included in Volume 1, Chapter 3: Project Description.
Rochdale Envelope (also known as Project Design Envelope)	Inter-changeable with PDE.
Routeing	The path taken by a vessel.
Safety Zones	An area extending a maximum of 500 m from the central point of a subsea installation in which other vessels are prohibited from entering, except in circumstances outlined within Section 96 of the Energy Act, 2004.
Scoping Opinion	A document produced by MD-LOT which is issued in response to submission and review of the scoping report. The scoping opinion is supported with feedback and advice from consultees, which details what is expected to be included in the Offshore EIA Report and what can be scoped out of the EIA process.
Scoping Workshop	A series of sessions preceding the finalisation of the Offshore Scoping Report to provide an opportunity for the Applicant to consult on the draft scope and for stakeholders to request additional information on key issues.
Scottish Offshore and Territorial Waters	These include territorial waters extending 12 nautical miles from the low water line along the coast, waters as defined in the Scottish Adjacent Waters Boundaries Order 1999, the Scottish Zone of the UK Exclusive Economic Zone, and waters included in the Scottish Offshore Marine Region.
Section 36 Consent	Scottish Ministers' consent under Section 36 of the Electricity Act 1989 required for the generating assets of the Proposed Development.
Significance	Effect factor that is determined by the magnitude of impact along with the sensitivity of the receptor.

Defined Term	Definition
Significant Wave Height	The average wave height from trough to crest of the highest one-third of waves.
Site Boundary	The boundary within which all elements of the Proposed Development will be located. The Site Boundary comprises the Array Area and Export Cable Corridor which ends at MHWS.
Snagging	Fishing Gear such as long lines, pots, or gill nets, or anchors coming fast on subsurface infrastructure such as cables.
Study Area	For each environmental topic, the baseline environment will be characterised, and the potential environmental impacts will be described within a topic-specific study area. Specific study areas are defined for each topic and are based on the maximum spatial extent across which potential impacts of the Project may be experienced by the relevant receptors (i.e. Zone of Influence).
Thistle Wind Partners (TWP)	The Joint Venture (JV) of DEME Concessions, Qair Marine, and Aspiravi International that have partnered to develop the Project.
Under Keel Clearance (UKC)	The vertical distance between the bottom of a ship and the seabed.
Vessel Traffic Services (VTS)	A marine traffic monitoring system established by port authorities to manage vessel movements and safety.
Wind Turbines	Structures comprising of a tubular tower, rotor blades, and a nacelle which houses the Wind Turbine generator.

Acronyms

Acronym	Definition
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
AOWFL	Ayre Offshore Wind Farm Limited
AtoN	Aids to Navigation
BWEA	British Wind Energy Association
CaP	Cable Plan
CBRA	Cable Burial Risk Assessment
CEA	Cumulative Effects Assessment
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CES	Crown Estate Scotland
CMS	Construction Method Statement
COLREGS	The Convention on the International Regulations for Preventing Collisions at Sea
CoS	Chamber of Shipping
CRP	Clear Range Procedure
CSIP	Cable Specification and Installation Plan
CTV	Crew Transfer Vessel
DfT	Department for Transport
DSLP	Development Specification and Layout Plan
DWT	Deadweight Tonnes
EEA	European Economic Area
EEZ	Exclusive Economic Zone
EGL	Eastern Green Link
EIA	Environmental Impact Assessment
EMF	Electromagnetic Field
EMODNet	European Marine Observation and Data Network
EMP	Environmental Management Plan
EMSA	European Maritime Safety Agency
EOWDC	European Offshore Wind Deployment Centre
ERCoP	Emergency Response Cooperation Plan
FLO	Fisheries Liaison Officer
FMMS	Fisheries Management and Mitigation Strategy
FSA	Formal Safety Assessment
GNSS	Global Navigation Satellite System
GPS	Global Positioning Systems
HAT	Highest Astronomical Tide
HAZID	Hazard Identification
HDD	Horizontal Directional Drilling

Acronym	Definition
HM	His Majesty's
HSE	Health and Safety Executive
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IAC	Inter-Array Cable
IALA	International Association of marine aids to navigation and Lighthouse Authorities
IHO	International Hydrographic Organisation
IMO	International Maritime Organisation
IOER	Integrated Offshore Emergency Response
IWRAP	The IALA Waterway Risk Assessment Program
LAT	Lowest Astronomical Tide
LMP	Lighting and Marking Plan
MAIB	Marine Accident Investigation Branch
MCA	Maritime & Coastguard Agency
MCAA	Marine and Coastal Access Act 2009
MDS	Maximum Design Scenario
MD	Marine Directorate
MGN	Marine Guidance Note
MHWS	Mean High Water Spring
MoD	Ministry of Defence
MPCP	Marine Pollution Contingency Plan
MSC	Marine Safety Committee
NFFO	National Federation of Fishermen's Organisations
NLB	Northern Lighthouse Board
NMP	National Marine Plan
NRA	Navigational Risk Assessment
NSTA	North Sea Transition Authority
NSVMP	Navigational Safety and Vessel Management Plan
NtM	Notice to Mariners
OFTO	Offshore Transmission Owner
OIC	Orkney Islands Council
OICHA	Orkney Island Council Harbour Authority
OMP	Operations and Maintenance Plan
OREI	Offshore Renewable Energy Installation
OSP	Offshore Substation Platform
OWF	Offshore Wind Farm
O&M	Operation and Maintenance
PDE	Project Design Envelope

Acronym	Definition
PEXA	Practice and Exercise Area
PIANC	Permanent International Association of Navigation Congresses
RNLI	Royal National Lifeboat Institution
RoPax	roll-on/roll-off passenger
RYA	Royal Yachting Association
SAR	Search and Rescue
SFF	Scottish Fishermen's Federation
SOLAS	International Convention for the Safety of Life at Sea
SPFA	Scottish Pelagic Fisherman's Association
SSE	Scottish and Southern Electricity
TCA	Trade and Cooperation Agreement
TJB	Transition Joint Bay
TWP	Thistle Wind Partners Limited
UK	United Kingdom
UKHO	United Kingdom Hydrographic Office
UNCLOS	United Nations Convention on the Law of the Sea
VHF	Very High Frequency
VTS	Vessel Traffic Services

Table of Units

Units	Definition
%	Percent
‘	Minute
£	GBP
°	Degree
°C	Degree Celsius
cm	Centimetre
GW	GigaWatt
kg	Kilogram
km	Kilometre
km^2	Square kilometre
kts	knots
m	Metre
m/s	Metre per second
m^2	Square Metre
mLAT	Metres above/below Lowest Astronomical Tide
mm	Millimetre
MW	MegaWatt
nm	Nautical mile

14 Shipping and Navigation

14.1 Introduction

14.1.1 This chapter of the Offshore Environmental Impact Assessment (EIA) Report, prepared by NASH Maritime, presents the assessment of the likely significant environmental effects on shipping and navigation, that may potentially occur as a result of the Proposed Development during the construction, Operations and Maintenance (O&M) and decommissioning phases.

14.1.2 The assessment presented is informed by the following technical chapters:

- Volume 2, Chapter 13: Commercial Fisheries;
- Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment;
- Volume 2, Chapter 15: Aviation and Radar;
- Volume 2, Chapter 16: Infrastructure and Other Users; and
- Volume 2, Chapter 18: Socioeconomics, Tourism and Recreation.

14.2 Shipping and Navigation Study Area

14.2.1 The Array Area of the Proposed Development is located approximately 22 km off the east coast of the Orkney mainland, with a total lease area of 200 km^2. Minimum and maximum water depths of the Array Area are -59 m and -91 m respectively, with an average water depth of -82 m. The Export Cable Corridor will include a maximum of four High Voltage Alternating Current (HVAC) Offshore Export Cables, each with a length of up to 90 km and will make Landfall at Sinclair's Bay, Caithness. The Offshore Export Cables will be brought onshore via four cable ducts constructed using Horizontal Directional Drilling (HDD).

14.2.2 The Shipping and Navigation Study Area (Figure 14.1), comprises the Array Area and a 10 nm (18.52 km) buffer, and the Export Cable Corridor and a 3 nm (5.56 km) buffer.

14.2.3 The Shipping and Navigation Study Area is consistent with industry best practice (Maritime & Coastguard Agency (MCA), 2021) as applied to previous offshore renewable shipping and navigation studies (Buchan Offshore Wind Limited 2023; Mainstream Renewable Power Limited, 2019; Scottish and Southern Electricity (SSE) Renewables, 2022; Mona Offshore Wind Limited, 2023; Morgan Offshore Wind Limited, 2023; Morecambe Offshore Wind Limited, 2023). The Shipping and Navigation Study Area provides further context to vessel traffic and routeing in proximity to the Proposed Development and allows for identification of key navigational features affecting vessel traffic.

14.3 Legislative and Policy Context

Legislation and Policy

14.3.1 The overarching policy and legislation applicable to the Proposed Development is presented in Volume 1, Chapter 2: Policy and Legislation. A summary of the legislative provisions relevant to shipping and navigation are provided in Table 14.1 below, with other relevant policy provisions set out in Table 14.2. These are summarised here with further detail presented in Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment.

Table 14.1: Summary of Legislation Relevant to Shipping and Navigation

Summary of relevant legislation	How and where considered in this Offshore EIA Report
United Nations Convention on the Law of the Sea (UNCLOS) (UN, 1982) **UNCLOS is an international agreement that establishes a legal framework for all marine and maritime activities.**	Article 60(7) states that *'Artificial islands, installations and structures and the Safety Zones around them may not be established where interference may be caused to the use of recognised sea lanes essential to international navigation.'* As per Article 22(4), *'The coastal state shall clearly indicate such sea lanes and traffic separation schemes on charts to which due publicity shall be given'*. Any traffic routeing schemes in the area have been considered in Section 5 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment.
Convention on the International Regulations for Preventing Collisions at Sea (COLREGS) (International Maritime Organisation (IMO), 1972/77) **A set of regulations which establish the conduct of vessels in any condition of visibility, and the correct actions to take when a vessel is in close quarters with another vessel.**	Rule 8 Part (a) states that *'Any action taken to avoid collision shall be taken in accordance with the Rules of the Part and shall, if the circumstances of the case admit, be positive, made in ample time and with due regard to the observance of good seamanship'*. Similarly, Rule 19 Part (b) states that *'Every vessel shall proceed at a safe speed adapted to the prevailing circumstances and conditions of restricted visibility. A power-driven vessel shall have her engines ready for immediate manoeuvre'*. Therefore, collision risks and avoidance provisions are considered and assessed in Section 8 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment.
International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974) **An international maritime treaty that concerns the safety of merchant ships.**	Regulation 33 states that *'The master of a ship at sea which is in a position to be able to provide assistance on receiving information from any source that persons are in distress at sea, is bound to proceed with all speed to their assistance'*. This is followed by Regulation 34, which states that *'Prior to proceeding to sea, the master shall ensure that the intended voyage has been planned using the*

Summary of relevant legislation	How and where considered in this Offshore EIA Report
	appropriate nautical charts and nautical publications for the area concerned'.

Table 14.2: Summary of Policy Relevant to Shipping and Navigation

Summary of relevant policy	How and where considered in this Offshore EIA Report
United Kingdom (UK) Marine Policy Statement, His Majesty's (HM) Government, 2011) **Paragraph 3.4.7 states that:** ***'Increased competition for marine resources may affect the sea space available for the safe navigation of ships. Marine plan authorities and decision makers should take into account and seek to minimise any adverse impacts on shipping activity, freedom of navigation and navigational safety and ensure that their decisions are in compliance with international maritime law. Marine Plan development and individual decisions should also take account of environmental, social and economic effects and be in compliance with international maritime law. Marine plan authorities will also need take account of the need to protect the efficiency and resilience of continuing port operations, as well as further port development.'***	Where relevant, the impacts to vessel traffic and routeing have been considered in Section 8 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment and within Sections 14.9, 14.10 and 14.12 of this chapter.
Scotland's National Marine Plan (NMP) (Scottish Government, 2015)	
Transport 1: ***'Navigational safety in relevant areas used by shipping now and in the future will be protected, adhering to the rights of innocent passage and freedom of navigation contained in UNCLOS....'***	Impacts to passenger and commercial vessel traffic, routeing (where relevant) during Proposed Development construction, O&M and decommissioning have been assessed in Section 14.10. Impacts to commercial fishing activity and routeing are considered in Section 14.10. Impacts to recreational vessels and routeing are considered in Section 14.10. Impacts on access to ports (where relevant) have been considered in Section 14.10. Embedded Mitigations are detailed in Section 14.9, with Additional Mitigation identified as needed under the Formal Safety Approach (FSA) in the relevant impact section of this chapter and Section 9 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment.
Transport 2: ***'Marine development and use should not be permitted where it will restrict access to, or future expansion of, major commercial ports or existing or proposed ports and harbours.'***	
Transport 3: ***"Ferry routes and maritime transport to island and remote mainland areas provide essential connections and should be safeguarded from inappropriate marine development. Developments will not be consented where they will unacceptably interfere with lifeline ferry services."***	
Transport 6: ***"Developers should ensure displacement of shipping is avoided where possible to mitigate against potential increased journey lengths (and associated fuel costs, emissions and impact on journey frequency)."***	

Summary of relevant policy	How and where considered in this Offshore EIA Report
	A future case traffic profile is considered in Section 14.6 and Section 7 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment.
Orkney Islands Regional Marine Plan (OIC, 2025)	
Sector Policy 3a: Safeguarding navigation, harbour infrastructure and operations. ***"i. Proposals for development and/or activities should avoid and/or appropriately mitigate significant adverse impacts on:*** ***a. navigational safety;*** ***b. existing, or planned (i.e. routes associated with developments currently within the statutory consenting system), shipping and/or ferry routes;*** ***c. Harbour Area operations;*** ***d. maritime access to and use of pier and harbour infrastructure, including marinas;*** ***e. harbours of refuge;*** ***f. designated ship-to-ship anchorages;*** ***g. anchor berths and other anchorages, as identified on the UK Hydrographic Office Charts, including the associated 1500m sensitive areas for safe vessel manoeuvring; and*** ***h. the Flotta Terminal Safeguarded Area*** ***ii. The assessment of potential impacts on factors identified in (i) above should take into account vessel movements and harbour-related operations in all weather and tidal conditions.*** ***iii. Development and/or activities that would have significant adverse effects on factors identified in (i) above, but which cannot be avoided or appropriately mitigated, should not be permitted.*** ***iv. Proposals for development and/or activities should avoid, or appropriately mitigate, significant adverse impacts on the efficient use of shipping and/or ferry routes, including consideration of impacts on fuel costs, emissions, journey duration and frequency.*** ***v. Proposals for development and/or activities should avoid, or appropriately mitigate, significant adverse impacts due to displacement of shipping and/or ferry traffic on other marine users and/or the environment."***	Navigational risk and navigational safety is considered in detail throughout Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. Where relevant, the impacts to vessel traffic and routeing (including adverse weather) have been considered in Section 8 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment and within Sections 14.9, 14.10 and 14.12 of this chapter. Impacts on access to ports (where relevant) have been considered in Section 14.10. Impact to anchorages, including Sinclair's Bay outside of the OIC's harbour areas, is considered in Sections 6, 8 and 9 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. Impacts to recreational vessels and routeing are considered in Section 14.10. Embedded Mitigations are detailed in Section 14.9, with Additional Mitigation identified as needed under the FSA in the relevant impact section of this chapter and Section 9 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment.
Sector Policy 3b: Commercial ports and national developments. ***"Marine development and/or activities should not be permitted where they would restrict access to, or future expansion of, commercial ports or existing or proposed ports and harbours that are identified as national developments in National Planning Framework."***	
Sector Policy 3c: Scapa Flow north and east safeguarded area. ***"The north and east coast of Scapa Flow, from Stromness to St Mary's, within an area 1,500m from the shore, is a***	

Summary of relevant policy	How and where considered in this Offshore EIA Report
strategically important area for potential future harbour development and/or activities in the longer term. The Orkney Harbour Authority should be consulted on proposed development and/or activities within this area to enable compatibility with current and future harbour development, activities and/or operations."	

Guidance

14.3.2 The principal guidance document for the Navigation Risk Assessment (NRA) (Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment) is the MCA's Marine Guidance Note (MGN) 654 (MCA, 2021). MGN 654 describes the potential shipping and navigation issues which should be considered by developers when proposing Offshore Renewable Energy Installations (OREIs). Annex 1 of the MGN (MCA, 2021) provides a detailed methodology for assessing the marine navigational safety risks of OREIs which has informed the assessment methodology.

14.3.3 The International Maritime Organisation's (IMO) FSA process has been applied within Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. The guidelines for FSA were approved in 2002 and were most recently amended in 2018 by MSC-MEPC.2/Circ.12/Rev.2 (IMO, 2018). The FSA is a structured and systematic methodology, aimed at enhancing maritime safety, including protection of life, health, the marine environment and property, by using risk analysis and, if appropriate, cost-benefit assessment. The IMO FSA guidance defines a hazard as *'a potential to threaten human life, health, property or the environment'*, the realisation of which results in an incident or accident. The potential for a hazard to be realised (i.e. likelihood) can be combined with an estimated or known consequence of outcome and this combination is termed 'risk'.

14.3.4 MGN 372 Amendment 1 Safety of Navigation: Guidance to Mariners Operating in Vicinity of UK OREIs (MCA, 2022) provides guidance to support passage planning near OREIs off the UK coast. This guidance has been used to inform the risk assessment regarding safe passing distances and the adequacy of corridors for navigation passed or through the proposed development areas.

14.3.5 The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) G1162 The Marking of Offshore Man-Made Structures (IALA, 2021) provides guidance on the lighting and marking arrangements for Offshore Wind Farms (OWFs). This guidance has been considered as the accepted standard for UK OWF and informs the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment). IALA G1185 Enhancing the Safety and Efficiency of Navigation Around OREIs (IALA, 2024) provides an updated summary of IALA's good practices for managing navigation safety and planning in the vicinity of OREIs, specifically on the topics of navigational safety, incident response and maritime spatial planning. IALA G1121 Navigational Safety Within Marine Spatial Planning (IALA, 2017) outlines how navigational safety considerations should be integrated into marine spatial planning to ensure safe and efficient maritime operations.

14.3.6 The Royal Yachting Association (RYA) Position of Offshore Renewable Energy Developments: Wind Energy (RYA, 2019a) describes the key impacts of OWFs on recreational activities supporting to inform the assessment of impact in Section 14.10.

14.3.7 Permanent International Association of Navigation Congresses (PIANC) WG161 Interaction Between OWFs and Maritime Navigation (PIANC, 2018) provides guidelines and recommendations on impacts on mitigations for shipping routes near OWFs, supporting to inform the assessment of impact 2 in Section 14.10.

14.3.8 Nautical Institute (2013) The Shipping Industry and Marine Spatial Planning provides guidance on benefits and risks of marine spatial planning for shipping and navigation supporting to inform the assessment of impacts in Section 14.10.

14.3.9 G+ Integrated Offshore Emergency Response (IOER) (2019) Good practice guidelines for offshore renewable energy developments provides guidance on emergency response for OWFs supporting to inform the assessment of impact six in Section 14.10.

14.3.10 Health and Safety Executive (HSE) and MCA (2017). Regulatory expectations on moorings for floating wind and marine devices provides guidance on foundations and mooring arrangements for floating wind and marine devices supporting to inform the assessment of impact 1 in Section 14.10.

14.3.11 The Sectoral Marine Plan for Offshore Wind Energy (Scottish Government, 2020) provides the strategic framework for offshore wind development in Scottish waters, identifying suitable options and setting the wider policy and spatial planning context. While the Plan does not prescribe technical standards for navigation safety, it establishes the basis for considering both cumulative and project-specific impacts on navigation. This Plan therefore acknowledges that as part of the policy context, recognising the need to address cumulative navigational risk covered in Section 14.12 alongside site-specific assessment.

14.4 Consultation

14.4.1 The approach to consultation for the Proposed Development is set out in Volume 1, Chapter 5: Consultation and Engagement. A summary of the issues raised during consultation activities undertaken to date specific to shipping and navigation is presented in Table 14.3, together with how these issues have been considered in the production of this assessment. Further detail is presented within Volume 1, Chapter 5: Consultation and Engagement, Volume 3, Technical Appendix 5.1: Consultation Logs and Volume 3, Technical Appendix 5.2: Pre-Application Consultation Report.

14.4.2 Consultation letters were sent to relevant shipping and navigational stakeholders to provide information on the Proposed Development and request input into the NRA process. In addition to the letters, dedicated consultation meetings were held with the MCA, Northern Lighthouse Board (NLB), Chamber of Shipping (CoS) and RYA Scotland. Stakeholders were provided the opportunity to attend a Hazard Identification (HAZID) Workshop which was attended by the MCA, NLB, CoS, RYA, Scottish Fisherman's Federation (SFF) and NorthLink ferries.

Table 14.3: Summary of Key Consultation Issues Raised During Consultation Activities Undertaken for the Proposed Development Relevant to Shipping and Navigation

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
Scoping Workshop			
06 March 2024	CoS Scoping Workshop	CoS questioned the rationale behind the 30 nm (55.6 km) screening area for other developments in the cumulative assessment and noted they often see 50 nm (92.6 km) instead, making note of the large number of proposed developments in the wider area.	A 50 nm (92.6 km) buffer was utilised for the cumulative assessment presented in Section 14.12.
	RYA Scoping Workshop	Suggested that Orkney Marinas and Pentland Firth Yacht Club are included in the consultation list. RYA advised that not all recreational vessels carry Automatic Identification System (AIS) and the AIS data alone would under-represent recreational vessel activity. RYA noted that the vessel traffic survey summer period was towards the end of the peak recreational season in that area.	Both were included in the consultation process for the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment) and this EIA Chapter. Surveys have been undertaken including visual sightings and radar during summer 2023 and winter 2023. An additional summer survey was undertaken in summer 2025 to ensure that MGN 654 is complied with. Recreational activity has also been informed using the RYA Coastal Atlas.
	Orkney Islands Council (OIC) Scoping Workshop	It was noted that wet storage areas may be needed if floating turbines are to be used and for more information on where the deployment will be was requested. Interest was noted in relation to impacts being adequately assessed across all relevant receptors, including S&N.	The final design of the Proposed Development (e.g. WTGs, foundations, moorings), construction methods, and base locations are yet to be confirmed. Once defined, any inshore anchorage and/or wet storage activities are expected to be assessed by the relevant port or facility operator, where required, under existing licence conditions.
Scoping Opinion			
09 July 2024	OIC Consultation Letter Response	OIC requested that the Scapa Flow Harbour Area/Scapa Flow Oil Port and Hatston (in addition to Kirkwall) should be identified as a local port/harbour. OIC noted that reference should be made to the Orkney County Council Act 1974 as it includes the provisions for the establishment and operation of the Orkney Harbor Authority and Orkney Harbours Areas. OIC noted that the stakeholders identified at paragraph 14.7.4 of the Offshore EIA Scoping Report should include Pentland Ferries.	Local ports and harbours (including Scapa Flow oil terminals and Hatston) are identified in Section 5.2 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. It is also recognised that noted that the Orkney County Council Act 1974 contains the provisions for empowering the Orkney Harbor Authority across all areas of jurisdiction within the Orkney Harbours Areas, as noted within the same section of the NRA. Pentland Ferries were invited to take part in consultation and to the HAZID workshop (as per Section 3.3 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment), but declined, stating that 'the area of consideration does not affect Pentland Ferries' normal passenger service.
	NLB Consultation Letter Response	NLB requested that consideration is given within the EIA to the potential impact that a wreck (either that of a vessel or Wind Turbine) could have upon navigation, both within the Array Area and the immediate vicinity.	A vessel wrecking on moorings is considered within the 'reasonable worst case' scenario of a Wind Turbine allision scenario which is considered within Section 9 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment.
15 July 2024	UK CoS Consultation Letter Response	CoS recommended that the project fully considers the unique risk factors of floating offshore wind projects, as detailed in the NASH Maritime report for ORE Catapult. CoS noted that movement of unusual structures, e.g. towing of rigs should also be specifically considered. CoS noted that a 50 nm (92.6 km) area should be examined for the cumulative impact assessment. CoS commented that loss of Wind Turbine stations/breakout from towage and impact on wet storage/marshalling areas should be scoped into the assessment	The cumulative impact assessment has been undertaken for a 50 nm (92.6 km) buffer of the Proposed Development. Wind Turbine breakout is considered as a hazard within the NRA (Section 8.11 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment). The impact of towing operations is considered in Section 8.10 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. The final design of the Proposed Development (e.g. WTGs, foundations, moorings), construction methods, and base locations are yet to be confirmed. Once defined, any inshore anchorage and/or wet storage activities are expected to be assessed by the relevant port or facility operator, where required, under existing licence conditions.
26 July 2024	MCA Consultation Letter Response	The MCA emphasised the need to consider routing deviations, particularly in adverse weather, and the cumulative effects on shipping routes.	Routing impacts in both a Project-alone scenario and a cumulative scenario have been considered in Section 8.3 and Section 8.14 of Volume 3, Technical Appendix 14.1: Navigation Risk Assessment, respectively. Adverse weather routeing is presented in Paragraph 6.2.7 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
		MCA noted that the implications of the site size and location on Search and Rescue (SAR) resources and Emergency Response Cooperation Plan (ERCoP) should be considered. MCA highlighted that attention should be paid to cabling routes and, where appropriate, burial depth for which a Burial Protection Index study should be completed.	The impact of the Proposed Development on SAR has been considered in Section 8.7 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. Impacts related to the Offshore Export Cable are considered in the following sections of Volume 3, Appendix 14.1: Navigation Risk Assessment: Section 8.6, Section 8.8, Section 8.9, and Section 8.13. Potential hazards within the Export Cable Corridor are presented in Section 14.10.
01 August 2024	RYA Scotland Consultation Letter Response	RYA Scotland noted that the failure or loss of Aids to Navigation (AtoNs) could pose an additional risk and should be considered.	Failure of AtoNs is considered as a potential contributor to an allision event in Section 8.5 of Volume 3, Technical Appendix 14.1: Navigation Risk Assessment.
16 August 2024	SFF (on behalf of the Anglo Scottish Fishermen's Association, Fife Fishermen's Association. Fishing Vessel Agents and Owners Association, Mallaig & North West Fishermen's Association, Orkney Fisheries Association, Scottish Pelagic Fishermen's Association, the Scottish White Fish Producer's Association and Shetland Fishermen's Association). Consultation Letter Response	SFF proposed that 'wet storage' should also be scoped into the assessment due to the potential shipping and navigation issues this could raise. SFF noted that the survey periods used would fail to encompass the majority of the pelagic sectors fishing activities and therefore their transit routes have not been considered. Therefore, we would advise the Applicant to utilise fishing data from fishermen to gain a realistic track of fishing vessels activities at the study area. SFF highlighted their opposition to using concrete mattresses and rock bags as cable protection in open water since they create severe snagging hazards for bottom trawl fishing vessels and static gears. SFF's noted that the preferred Wind Turbine floating foundation option is Tension Leg Platform (TLP) (with Vertical Tendon vs Tilted Tendon mooring systems), since they have lesser spatial footprint on the seabed and reduces the potential snagging hazard. SFF emphasised their preference for higher capacity Wind Turbines to be used with a larger minimum spacing of 1.5 km, to minimise allision likelihood.	Impact on risk of snagging is considered in Section 8.2 and Section 8.13 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. Impact on risk of allision is considered in Section 8.5 and allision hazards are discussed in Section 9 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. The final design of the Proposed Development (e.g. Wind Turbines, foundations, moorings), construction methods, and base locations are yet to be confirmed. Once defined, any inshore anchorage and/or wet storage activities are expected to be assessed by the relevant port or facility operator, where required, under existing licence conditions. Following on from the scoping comment, SFF had also provided fishing plotter images indicating tracks of fishing activity for all fishing vessels. This has been used in consideration throughout the NRA; however, is confidential and has not been included in this Offshore EIA Report. Further information on commercial fisheries is discussed in Volume 2, Chapter 13: Commercial Fisheries.
EIA Consultation			
14 April 2024	MCA and NLB meeting	Purpose to discuss the Array Area layout variables and lines of orientation requirements. Presented information on four layout options and discussed requirements and concerns related to Wind Turbine spacing, line of orientation, spacing between inner turbines and perimeter turbines, SAR lanes, and the gap between the north and south potions of the Arra Area.	The Array Area layout and the consideration of the factors discussed with the MCA and NLB have been taken into account in the determination of the layouts assessed in this shipping and navigation impact assessment and Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. Also, as noted in that section, a Wind Turbine layout plan is to be consulted on with MCA and NLB prior to construction and the layout used in this NRA includes all spare Wind Turbine locations.
03 January 2025	MCA EIA Consultation Letter Response	The main concentrations of traffic are to the south and west of the Proposed Development. There is a concentration of traffic toward the east side of the Array Area that has been identified as mostly oil and gas related vessels. The busiest traffic routes crossing the Export Cable Corridor are also well defined and any construction or other activities taking place in these areas will need particular focus going forward. A Cumulative Effects Assessment (CEA) is to be carried out. Proximity to other OWFs is to be fully considered including effects on traffic routing.	Routing impacts of the Proposed Development have been considered in Section 8.3 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. The cumulative impact assessment has been undertaken for a 50 nm (92.6 km) buffer of the Proposed Development. The final design of the Proposed Development (e.g. WTGs, foundations, moorings), construction methods, and base locations are yet to be confirmed. Once defined, any inshore anchorage and/or wet storage activities are expected to be assessed by the relevant port or facility operator, where required, under existing licence conditions. Noted.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
		Any wet storage solutions should be discussed in consultation with relevant maritime stakeholders including the MCA and NLB. Also expect the NRA to be updated to include the proposals for any wet storage once they are known. Content with approach to the NRA, as stated in Offshore EIA Scoping Opinion. MCA will make full comment on the EIA shipping and navigation chapter and the NRA once this has been submitted to Marine Directorate.	
	NLB EIA Consultation Letter Response	No adverse impact on NLB vessels or helicopters is anticipated at any phase of the project. NLB do not foresee that the development will pose any particular hazards to navigation outside of those identified within the Scoping Report. One concern that the NLB does wish to raise again would be the irregular shape of the Site Boundary, and the potential for isolated Wind Turbines. NLB wish to reiterate the requirement for regular layout designs and no isolated Wind Turbines. Noted that mitigations identified within the Scoping Report include engaging with NLB for the development of post-consent documents.	Noted. Development of and adherence to a Lighting and Marking Plan (LMP) (outline shown in Volume 4, Appendix: 31 Outline Lighting and Marking Plan) and Development Specification and Layout Plan (DSLP) is embedded in the Proposed Development (Table 9.6 of Volume 3, Appendix 14.1: Shipping and Navigation Risk Assessment). The LMP will confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting. The DSLP will set out the final design and layout parameters associated with the Proposed Development required under the offshore consent conditions. It is embedded in the Proposed Development that the Wind Turbine layout plan will be consulted on with MCA and NLB prior to construction. Noted.
10 January 2025	Orkney Islands Council Harbour Authority (OICHA) EIA Consultation Letter Response	The Proposed Development is within the Ballast Water Exchange area for vessels wishing to discharge ballast water in Scapa Flow. The policy was approved by OIC as the Statutory Harbour Authority for Scapa Flow in 2013 and is attached with the latest amendments. Our comment is that it should be noted and that our policy will need amending. Although Sinclair's Bay/Wick is outside of the Statutory Harbour Area it is often used by vessels sheltering from weather. However, it is not known whether these vessels anchor or not so would suggest that this is investigated in more depth. Also, in the event of particular weather conditions, vessel types and sizes we may use this area as a boarding location for Scapa Flow Pilots. Would suggest that this is noted, with further investigation into anchored vessels/vessels sheltering from weather in this area.	Orkney Harbours is operated as part of the OIC. No reply was received directly from the OIC. The policy relating to the Ballast Water Exchange area, approved by OIC is noted and is understood to require amendment reflecting the Project. Anchoring activity is presented and considered in Section 6.2 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. The use of this area as a pilot boarding location under some weather conditions is also noted within Section 6.2 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. Further consultation with OICHA was sought; however, no reply to the request was received.
	RYA Scotland EIA Consultation Letter Response	The AIS tracks show that some recreational vessels pass through the site although their destinations are unclear. Any navigational safety issues can be resolved by the normal Embedded Mitigations. It is assumed, and material to our response, that the usual UK wind farm rules will be applied, permitting recreational vessels to transit through the wind farm with the usual safe distances from each installation (500 m during construction and maintenance, 50 m thereafter during operation). Having to divert round the Array Area, particularly in adverse conditions, could be potentially dangerous for recreational boaters. There should be no issues for recreational vessels in relation to the Landfall site although there are anchorages at Ackergill and Keiss on the south and north side of Sinclair's Bay respectively. No RYA affiliated clubs use Sinclair's Bay although it is used for surfing. Emphasised the importance of exploring wet storage options at this stage because this is a critical aspect if floating devices are to be deployed. It is assumed that OIC as the Statutory Harbour Authority for Scapa Flow will	The impact of the Proposed Development on recreational vessels has been considered in Section 8.13 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. Risk controls have been considered alongside the promulgation of information which help mitigate the risks to recreational vessels. The Applicant will apply for use of Safety Zones of up to 500 m during construction, major repairs, and decommissioning phases. Noted. The anchoring activity is considered in Section 6.2 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. The final design of the Proposed Development (e.g. WTGs, foundations, moorings), construction methods, and base locations are yet to be confirmed. Once defined, any inshore anchorage and/or wet storage activities are expected to be assessed by the relevant port or facility operator, where required, under existing licence conditions.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
		have been consulted as to whether they would permit wet storage in principle. There are rather few other options and it should be easy to scope out places which would not be used for wet storage. This is not something that should wait till the post-consent stage, particularly as wet storage has the potential to impact on groups, such as members of the tourism and recreation sector, who would not have expected to be impacted by the Project.	
14 January 2025	MCA Individual Consultation Meeting	The MCA noted that with respect to towage requirements, they intend to publish a new MGN on towage of floating Offshore Infrastructure which is still currently under review. It was indicated that as part of this, the MCA would expect a review of which assets are in place post-consent. Then the MCA would review the SAR checklist. Wind Turbines will need to be monitored and fitted with alarms for notification if they broke free. The MCA can't comment on tug requirements so emergency towage plans would need to be developed post-consent, likely within the ERCoP.	Embedded Mitigations, including an ERCoP, are listed in Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment**.**
	MCA Individual Consultation Meeting	A separate meeting on the 14 Jan 2025 was held to discuss the validity of the vessel traffic surveys undertaken in respect to MGN 654. The EIA application submission date for Ayre is Q4 2025 (~December). Vessel traffic surveys were undertaken in both summer (15-29 Jul 2023) and winter (6-21 Dec 2023). Based on this, the winter data would be within the 24 months validity period, but the summer survey would be approximately five months out of date. It was noted that the MCA would need to have good reasoning to justify extensions of validity. It was also noted that if the EIA submission were to be delayed, the summer data would be even more out of date. Therefore, it was agreed that an additional top-up summer vessel traffic survey would be required for the Ayre Offshore Wind Farm to ensure data remained valid.	An additional survey was undertaken and results shown in Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. The additional survey addendum presented within the NRA compares the findings of the summer 2023 and summer 2025 surveys and concludes that the results of the NRA as undertaken are valid and that no changes to the assessment following on from the survey are required.
15 January 2025	RYA Scotland Individual Consultation Meeting	It was commented that there were more recreational vessel tracks recorded on AIS over the 12 months than expected. It was suggested that some must be coming from continental Europe based on the tracks, but that clearly most were based around Rattray Head. It was also commented that they do not feel that more data was required and that the data obtained would be indicative of recreational vessel activity. RYA Scotland noted that their colleagues at the Cruising Association feel it is important that transit rights through an OWF Array Area are maintained. It was noted that RYA Scotland are aware of past incidents of buoys breaking loose and causing incidents with small craft. Breakaway buoys should be considered and ideally a security message would be issued for buoys if they were to break loose. It was suggested the NRA could highlight the potential risk introduced by buoys and the mitigations for this.	Noted. The impact of the Proposed Development on recreational vessels has been considered in Section 8.13 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. Consultation with the MCA has been undertaken and the expectation is that smaller vessels such as fishing and recreational vessels would be allowed to transit through the Array Area as per other UK OWFs. This issue is going to form part of the emergency response plan and AOWFL will look into the design and ensure this is adequately mitigated.

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
16 January 2025	NLB Individual Consultation Meeting	The NLB asked, with regards to ferry operators, if the Applicant has consulted with NorthLink Ferries. They added that NorthLink Ferries are a major stakeholder and will be affected by a number of planned developments. The NLB queried whether tug and service vessels had been considered in the context of future Wind Turbine towage to other nearby wind farms, noting that Orkney is likely to be the floating hub for the wind farm developers. It was also suggested that decommissioning activities for oil and gas are considered, as this may include Offshore Infrastructure being towed back to port. The Proposed Development is very central to where people might want to transit to reach Scapa Flow. NLB know from other projects, everything is built onshore and then towed and moored. They asked if anything else is planned to take place within the Array Area other than mooring the Wind Turbines. More long term (post-consent), the NLB will need to know what the developers planned procedures are for loss of AtoN, particularly a peripheral Wind Turbine AtoN. The NLB need plans in place and procedures to mitigate this risk. AtoNs are the main NLB interest.	Feedback was requested from NorthLink Ferries and they were issued the same stakeholder consultation letter as NLB and other stakeholders. NorthLink Ferries had no concerns in response to the consultation letter. Moreover, the Captain from NorthLink Ferries commented during the HAZID workshop that the Proposed Development is not expected to be an issue for NorthLink Ferries but noted that there may be a minor increase in meeting vessels at the corners of the Proposed Development. Consideration of future projects is described in Section 8.14 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment and impacts on cumulative effects on vessel routing in Section 8.14 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. Vessel collision and allision modelling considered increases in some types of traffic, including tug and service vessel category for increased third party vessel activity (Section 8.4 and 8.5 of the NRA). Consideration of impact of towage operations is considered in Section 8.10 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. Embedded Mitigations are in place with further refining subject to additional consultation with required authorities. This includes the LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan) and construction method statement, and that specifics can be contain within these plans when developed. It is assumed that refinement of these specifics will take place post-consent. These details will be carried through into the outline LMP (Volume 4, Appendix 31: Outline Lighting and Marking Plan)) which will be finalised and approved in consultation with the NLB.
	Wick Harbour Authority EIA Consultation Letter Response	Nothing of concern was identified in the letter. It was noted that the study heavily depends on AIS tracking for vessel movements, however, especially inshore, there will be many smaller vessels, both leisure and commercial that are not fitted with AIS and may therefore not be included in the data.	Noted. Vessel traffic surveys were undertaken to supplement the AIS data and are considered in Section 6.1 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment.
24 January 2025	UK CoS Individual Consultation Meeting	With respect to the site layouts, the easternmost Wind Turbine within the north section of layout 1 would be discouraged. If this option is chosen the CoS would like to see adjustment to the Site Boundary. No concern with the other two layout options. CoS are in agreement with how the additional risk controls have been considered. It was noted there may be a need to review additional risk controls with the NLB in case of traffic being pushed inshore, although this was noted to be unlikely. The CoS wanted to ensure the Applicant have reached out to the relevant ports and harbours in regard to the Offshore Export Cable Landfall.	A Wind Turbine layout plan will be consulted on with MCA and NLB prior to construction (Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment). It is recommended that a risk assessment review is conducted once engineering design principals relating to the moorings/layout of the site, O&M base of operations is finalised to ensure the assumptions and conclusions of this NRA remain valid. • As per Section 3.3 of Volume 3, Appendix 14.1: Navigation Risk Assessment, the following ports and harbours were invited for consultation: • OICHA; • Scrabster Harbour; and • Wick Harbour Authority.
07 March 2025	MCA HAZID Workshop	MCA suggested that guard vessels could be used as an Additional Mitigation for breakout, depending how quickly notification of breakout would be released and promulgated. MCA agreed that virtual AIS could be used when discussing the location of sunken or break free Wind Turbines.	The use of guard vessels and position monitoring/virtual AIS have been considered in Section 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment, and will be considered further in post-consent plans, as detailed in Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment**.**
	NLB HAZID Workshop	NLB raised concern around wreck response, including the sinking of a Wind Turbine. NLB noted that other projects have used fishing vessels as guard vessels, issuing regular broadcasts if a buoy loses station and suggested that this is considered within the AtoN Plan or a similar post-consent plan.	The risk of an allision of any vessel with a sunken Wind Turbine is considered within the NRA (Section 8.5 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment). The use of guard vessels, cable marker board and the Project control centre have been considered in Section 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment, and will be considered further in post-consent plans, as detailed in Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment**.**

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in this Chapter
		NLB identified a cable marker board might be required for marking of the Landfall of the cable in Sinclair's Bay. NLB mentioned the project control centre could issue announcements in a breakout scenario.	
	RYA Scotland HAZID Workshop	RYA Scotland suggested that virtual AIS signal could improve visibility and location identification in the event of a sunken Wind Turbine.	The use of position monitoring/virtual AIS has been considered in Section 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment, and will be considered further in post-consent plans, as detailed in Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment**.**
	SFF HAZID Workshop	The SFF noted that the use of guard vessels should be considered to mitigate breakout of buoyage as well as Wind Turbines. SFF noted that with a catenary mooring system, the fishermen would not know where the lines were, which could cause numerous accidents, particularly with demersal fishing. SFF emphasised points raised in previous consultation (see 16 Aug 2024), including their opposition to using concrete mattresses and rock bags as cable protection, their preference for TLP to be used as the Wind Turbine floating foundation, and for higher capacity Wind Turbines to be used with a larger minimum spacing of 1.5km.	Impact on risk of snagging is considered in Section 14.10 and 14.12. Impact on risk of allision is considered in Section 8.4 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment and allision hazards are discussed in the NRA (Section 9 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment). The use of guard vessels has been considered in Section 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment**,** and will be considered further in post-consent plans, as detailed in Table 9.6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment**.** The final design of the Proposed Development (e.g. WTGs, foundations, moorings), construction methods, and base locations are yet to be confirmed. Once defined, any inshore anchorage and/or wet storage activities are expected to be assessed by the relevant port or facility operator, where required, under existing licence conditions. Impact on Demersal and Pelagic fishing activity will be assessed in Volume 2, Chapter 13: Commercial Fisheries.

14.5 Data Sources

14.5.1 Baseline data to inform the shipping and navigation assessment was collected using the following methods.

Desktop Study

14.5.2 Information on shipping and navigation within the Shipping and Navigation Study Area was collected through a detailed desktop review of existing studies and datasets which are summarised in Table 14.4.

14.5.3 Both a literature review of the reports and numerical modelling using the datasets were used to characterise the baseline. Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment includes full details of the analysis undertaken to develop the shipping and navigation baseline.

Table 14.4: Summary of Key Data Sources

Title	Source	Extent	Year	Author
High fidelity AIS data for September 2023 to August 2024	MadeSmart Group (2024)	Entirety of the Shipping and Navigation Study Area	2024	MadeSmart Group
Vessel route density by vessel category	European Marine Observation and Data Network (EMODNet) (EMODNet, 2022)	Entirety of Shipping and Navigation Study Area	2022	EMODnet
Vessel density of recreational boating activity	RYA Coastal Atlas, 2023 (RYA, 2019b)	Entirety of Shipping and Navigation Study Area	2023	RYA
Shipping Statistics	Department for Transport (DfT)	UK and local ports	2000-2023	DfT
Locations and details of maritime accidents reported to the Marine Accident Investigation Branch (MAIB).	MAIB (Obtained through freedom of information request) (MAIB, 2024)	Entirety of Shipping and Navigation Study Area	2008 to 2022	MAIB
Locations and details of maritime accidents reported to the Royal National Lifeboat Institution (RNLI).	RNLI Incident Data (RNLI, 2024)	Entirety of Shipping and Navigation Study Area	2008 to 2023	RNLI
Locations and details of DfT SAR Helicopter Taskings	DfT, 2024.	Entirety of Shipping and Navigation Study Area	2024	DfT
Marine Aggregate Dredging Licenses	The Crown Estate	Entirety of Shipping and	2024	The Crown Estate

Title	Source	Extent	Year	Author
		Navigation Study Area		
OWF sites and Offshore Transmission Owners (OFTOs) in planning, construction and operational phases	Crown Estate Scotland (CES) (CES, 2024a)	Entirety of Shipping and Navigation Study Area	2024	CES
Tidal agreements in planning, construction and operational phases	CES (CES, 2024b)	Entirety of Shipping and Navigation Study Area	2024	CES
Oil and Gas fields, wells, pipeline infrastructure and surface infrastructure	North Sea Transition Authority (NSTA) (2024)	Entirety of Shipping and Navigation Study Area	2023	NSTA
UK Disposal Sites	Centre for Environment, Fisheries and Aquaculture Science (Cefas) (Cefas, 2024)	Entirety of Shipping and Navigation Study Area	2023	Cefas
UK harbour areas and military and exercises areas	Digitised from Admiralty Charts (Admiralty, 2024a)	Entirety of Shipping and Navigation Study Area	2023	UK Hydrographic Office (UKHO)
MetOcean Data	Copernicus Marine Data Store	Central location using the extents of the Export Cable Corridor and Array Area: (58°46.86'N, 2°24.86'W	2023	Copernicus Marine Data Store
NorthLink Ferries Carrying Statistics	NorthLink Ferries (NorthLink Ferries, 2024)	NorthLink Ferry Routes	2018-2024	NorthLink Ferries
Orkney Harbours Annual Performance Reports (Orkney Harbours, 2022, 2023)	Orkney Islands Council	Orkney	2021 - 2023	OICHA

Site-Specific Surveys

14.5.4 Two seasonally representative, 14 day site-specific surveys covering the Array Area plus 10 nm (18.52 km) were undertaken in 2023, as agreed with the MCA, in line with standard industry practise, and in accordance with MGN 654. In addition, an additional survey was undertaken in July 2025. The additional

survey was undertaken to comply with MGN 654 guidance which states that for site-specific data to be valid for use, it must be no older than 24 months old at time of submission. It was agreed in consultation with the MCA that this additional survey should be undertaken. A summary of the surveys is outlined in Table 14.5.

Table 14.5: Summary of Site-Specific Survey Data

Title	Extent of Survey	Overview of Survey	Survey Contractor	Date
14 day Summer 2023 vessel traffic survey	Array Area + 10 nm	Vessel traffic survey capturing all vessel types and therefore comprising AIS, radar and visual observations.	Kinnaird Marine	15 July 2023 (00:30) to 29 July 2023 (00:30)
14 day Winter 2023 vessel traffic survey	Array Area + 10 nm	Vessel traffic survey capturing all vessel types and therefore comprising AIS, radar and visual observations.	Kinnaird Marine	06 December 2023 (03:30) to 21 December 2023 (12:30)
Additional survey: 14 day Summer 2025 vessel traffic survey	Array Area + 10 nm	Vessel traffic survey capturing all vessel types and therefore comprising AIS, radar and visual observations.	Kinnaird Marine	01 July 2025 (05:21) to 15 July 2025 (08:06)

14.6 Baseline Environment

Overview of Baseline Environment

14.6.1 The following sections provide a summary of the shipping and navigation baseline environment. Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment, includes full details of the analysis undertaken to develop the shipping and navigation baseline and information on current shipping patterns.

14.6.2 This section provides a summary of the key findings from the assessment of the baseline environment in the NRA and therefore both documents should be read in parallel. This section is intended to provide an overview of the baseline environment relevant to shipping and navigation and does not provide any additional information over that presented in the NRA.

Description of the Marine Environment

14.6.3 Key navigational features in proximity to the Proposed Development and relevant to the management of vessels and safety of navigation are described in this section. Further details on navigational features can be found in Section 5 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. There are no IMO routeing/reporting measures or recommended channels in the Shipping and Navigation Study Area.

14.6.4 The closest ports/harbours are Whitehall, Kirkwall, Scapa Bay and St Margaret's Hope. These are all located on Orkney to the west of the Shipping and

Navigation Study Area. Notably, the port of Wick is within the Shipping and Navigation Study Area, 4 nm (7.4 km) south of where the Export Cable Corridor reaches Landfall.

14.6.5 The closest operational offshore renewable project to the Shipping and Navigation Study Area is the Moray East OWF located 9 nm (16.7 km) south-east.

14.6.6 The Site Boundary is within two UK Military Practice and Exercise Areas (PEXA). These sites are D809 North and D809 Central, both of which are Firing Practice Areas and are managed by the Ministry of Defence (MoD) as designated areas for military training activities. These areas are operated in accordance with a Clear Range Procedure (CRP) where exercises and firing only take place when the area is considered to be clear of all shipping.

14.6.7 Part of the SHEFA-2 communications cable runs through the Shipping and Navigation Study Area, 0.7 nm (1.3 km) north-west of the Array Area. Another part of the same SHEFA-2 network runs through the Export Cable Corridor 16.1 nm (30 km) south-west of the Array Area.

14.6.8 Although route selection remains ongoing, the Spittal to Peterhead High Voltage Direct Current (HVDC) cable will be laid through or in close proximity to the Export Cable Corridor. The Shetland HVDC runs near the Export Cable Corridor and through the Array Area. The Caithness-Moray Link makes Landfall in Caithness south of the Export Cable Corridor and inside the Shipping and Navigation Study Area.

Vessel Traffic

Vessel Traffic Survey

14.6.9 Two MGN 654 compliant vessel traffic surveys were undertaken in 2023. Due to the MGN 654 guidance on the acceptable validity period of the data being within 24 months of submission, it was agreed in consultation with the MCA that a further survey during the summer of 2025 would be undertaken to ensure recency of this seasonal data. Vessel traffic surveys that were undertaken are summarised in Table 14.6. A more detailed analysis of the survey results is presented in Section 6.1 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment.

14.6.10 Recreational vessels were only recorded during the summer surveys (2023 and 2025). Fishing vessel activity (both transiting and fishing) was observed in all surveys with the greatest number in the summer 2023 survey although no fishing vessel activity was observed within the Array Area during this survey. The winter 2023 and summer 2025 survey observed similar levels of fishing activity with both being lower than the summer 2023 survey. The greatest fishing vessel activity within the Array Area was observed during the winter 2023 survey. . Relatively few recreational and fishing vessels were recorded by radar who didn't have AIS fitted (zero in both 2023 and 2025 summer surveys and two in the winter survey). As found in the NRA (Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment), the vessel traffic surveys identified similar vessel activity as shown in the AIS data and comparable across each of the survey campaigns showing little non-AIS vessel activity and limited seasonal variation.

Table 14.6: Vessel Traffic Survey Details

Attribute	Summer 2023	Winter 2023	Summer 2025
Vessel	 *Karelle* 27.85 m fishing vessel		
Dates	15-Jul-23 (00:30) to 29-Jul-23 (00:30)	06-Dec-23 (03:30) to 21-Dec-23 (12:30)	01-July-25 (05:21) to 15-July-25 (08:06)
Downtime	No Downtime	08-Dec-23 09:00 to 09-Dec-23 17:00	No Downtime
Survey Area	Array Area + 10 nm		
Total Vessels Recorded (Survey Area)	271 (19.4/day)	212 (15.1/day)	241 (17.2/day)
Total Vessels Recorded (Array Area)	51 (3.6/day)	39 (2.8/day)	47 (3.4/day)
Cargo	Survey Area: 70 (5/day) Array Area: 4 (0.3/day)	Survey Area: 47 (3.4/day) Array Area: 9 (0.6/day)	Survey Area: 82 (5.9/day) Array Area: 8 (0.6/day)
Cruise	Survey Area: 38 (2.7/day) Array Area: 8 (0.6/day)	Survey Area: 0 (0/day) Array Area: 0 (0/day)	Survey Area: 18 (1.3/day) Array Area: 0 (0/day)
Ferry	Survey Area: 22 (1.6/day) Array Area: 0 (0/day)	Survey Area: 17 (1.2/day) Array Area: 0 (0/day)	Survey Area: 22 (1.6/day) Array Area: 0 (0/day)
Fishing	Survey Area: 51 (3.6/day) Array Area: 0 (0/day)	Survey Area: 35 (2.5/day) Array Area: 11 (0.8/day)	Survey Area: 32 (2.3/day) Array Area: 9 (0.6/day)
Recreational	Survey Area: 17 (1.2/day) Array Area: 8 (0.6/day)	Survey Area: 0 (0/day) Array Area: 0 (0/day)	Survey Area: 31 (2.2/day) Array Area: 7 (0.5/day)
Tanker	Survey Area: 16 (1.1/day) Array Area: 2 (0.1/day)	Survey Area: 26 (1.9/day) Array Area: 1 (0.1/day)	Survey Area: 14 (1/day) Array Area: 5 (0.4/day)
Tug and Service	Survey Area: 57 (4.1/day) Array Area: 29 (2.1/day)	Survey Area: 87 (6.2/day) Array Area: 18 (1.3/day)	Survey Area: 42 (3/day) Array Area: 18 (1.3/day)

Future Baseline Scenario

14.6.11 The EIA Regulations require that 'a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort, on

the basis of the availability of environmental information and scientific knowledge' is included within the Offshore EIA Report.

14.6.12 If the Proposed Development does not come forward, an assessment of the 'without development' future baseline conditions has also been carried out and is described within this section.

Commercial Traffic

14.6.13 Analysis of the future case traffic profile has been undertaken within the Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment. Overall, port traffic is forecast to remain relatively flat in the short-term (within a decade) but grow in the long term (10 years +), with tonnage 39% higher in 2050 compared to 2016 (DfT, 2019). This equates to approximately a 15% increase in national freight tonnage by 2035. The long-term growth in port traffic is driven by increases in unitised freight traffic, which compensates for decreases in other freight in the short-term.

14.6.14 An overall gradual decline in annual freight since the early 2010s is evident in the DfT data for local ports closer in proximity to the Proposed Development and which may have a bearing on local vessel traffic. The port of Wick saw a sharp peak in 2013, but resumed its steady decline in 2014. It is assumed commercial freight traffic may remain steady or see a slight increase as per UK-wide projections.

14.6.15 Based on historical trends at the Scapa Flow Oil Port, it is anticipated the number of vessels will decrease; however, for the purposes of this assessment it is assumed that future traffic will remain steady.

Passenger Traffic

14.6.16 A large amount of passenger vessel traffic through the Shipping and Navigation Study Area is operated by NorthLink Ferries. Therefore, the historic trend of annual NorthLink ferry passenger carryings can be considered to provide insight into the potential future passenger traffic through the area (NorthLink Ferries, 2024). The data show a gradual increase in total passengers between 2013 and 2019. The number of passengers reduced sharply in 2020 as a result of the COVID-19 pandemic, but recovered to previous levels after the lifting of COVID-19 related restrictions, reaching just 2% below pre-pandemic levels in 2022, and exceeding pre-pandemic levels by 16% in 2023 and 19% in 2024.

14.6.17 However, the increase in the total number of NorthLink ferry passengers is largely driven by passengers travelling on the Stromness to Scrabster route, which operates over 20 nm (37 km) outside the Shipping and Navigation Study Area. The routes which operate within the Shipping and Navigation Study Area (Aberdeen to Kirkwall and Kirkwall to Lerwick) had a smaller but more consistent number of passengers between 2013 and 2019 with a small increase seen within the last few years post-pandemic. Given this trend, it is anticipated that the number of passengers using the two primary ferry routes within the Shipping and Navigation Study Area will remain relatively flat in the short-term with potential growth in the long term.

14.6.18 Cruise vessels also account for a significant amount of the passenger vessel activity within the Shipping and Navigation Study Area. Cruise vessels regularly call at Kirkwall and have increased in number over recent years from 156 calls in 2022 to 232 calls in 2024. The data available from the OIC (Orkney Harbours, 2022) indicates that expected future cruise vessel activity will continue to increase.

Fishing

14.6.19 It is anticipated that fishing activity is unlikely to change over the next five years, with both UK and non-UK vessels continuing to be active in the region as per the Trade and Cooperation Agreement (TCA) agreed to by the UK upon exit from the European Union (EU) and applicable from January 2021. Nevertheless, as this transition period is confirmed until June 2026, in the event that there is a reduction in non-UK fishing activity due to restrictions, it is anticipated that this will be balanced by an increase in UK fleet capacity. In May 2025, the recent EU-UK deal permitted EU fishing in UK waters keeping the current status quo giving EU boats continued access to UK waters until 2038.

14.6.20 It is noted that fisheries patterns can change based on a range of factors, including market demand and prices, abundance of stock and sustainability. However, given that the main fishing activities that take place in proximity to the Shipping and Navigation Study Area are well-established, particularly the scallop fishery, it is therefore envisaged that fishing activity levels will remain constant. More detail on expected future changes according to different fishing types can be found in Volume 2, Chapter 13: Commercial Fisheries.

Recreational

14.6.21 The RYA Water Sports Participation Survey put to members of the public, conducted in 2019 (RYA, 2019c) found that the proportion of adults participating in boating activities has fluctuated between 6% and 8% between 2002 and 2018. Between 2008 and 2018, the proportion participating in yacht cruising, motor boating and power boating have remained consistent at 0.8%, 1.1% and 0.7% respectively. More recent data published in the 2021 Water Sports Participation Survey is greatly influenced by COVID-19 with a considerable variation between 2020 and 2022 due to national/local lockdowns (RYA, 2022).

14.6.22 Therefore, it is unlikely that there will be an appreciable change in the number of recreational users due to macro trends.

14.6.23 Additionally, the Array Area is located approximately 12 nm (22.2 km) offshore so little recreational activity is expected.

Increases in Traffic Associated with the Project

14.6.24 The Project will require some additional vessel movements to perform maintenance and inspection activities (see Section 14.7). The O&M base for the Proposed Development has not yet been determined but it is anticipated that the number of daily maintenance vessel movements in the Array Area would be relatively low, with up to 643 expected total return transits/year (54/month, < 2/day). More major maintenance such as mooring line replacement or Wind

Turbine tow back to port might be expected to occur approximately once every five years.

Decommissioning Activities

14.6.25 Decommissioning of oil and gas in the wider North Sea region is ongoing, which coupled with redevelopments of adjacent fields, could result in sporadic increases in oil and gas vessel activity navigating the Shipping and Navigation Study Area during active decommissioning phases.

Data Limitations and Assumptions

14.6.26 AIS is not necessarily required on all recreational or fishing vessels, dependent on size. Therefore, AIS analysis alone would underestimate the extent of these activities. The vessel traffic surveys using visual and radar observations have been combined with secondary sources (such as the RYA Coastal Atlas) and consultation to complete the picture of small craft vessel movements.

14.6.27 The incident data is unlikely to capture all incidents, with underreporting of minor incidents likely. However, the combination of RNLI and MAIB has been used to collate the most complete dataset possible. Not all information, particularly position, is captured in every incident report, but there were no data deficiencies that presented concern. Unreported minor incidents are highly unlikely to affect the results of this assessment. Extensive research and consultation provide confidence that all incidents that may have an effect on the outcomes of this assessment have been included.

14.6.28 Relevant nautical publications, such as Admiralty Charts, are updated periodically and therefore the information shown may not reflect the real-time features within the region with total accuracy. Additionally, not all navigational features may be charted. Consultation with local operators, including NorthLink Ferries, RYA Scotland and Scottish Pelagic Fisherman's Association (Section 14.4), has been used to verify the baseline.

14.7 Key Parameters for Assessment

Maximum Design Scenario

14.7.1 The Maximum Design Scenario (MDS) identified in Table 14.7 are those parameters expected to have the potential to result in the greatest effect on an identified receptor or receptor group. Any other development scenario within the Project Design Envelope (PDE), will result in the same, or less, level of environmental effect. The scenario has been selected from the details provided in Volume 1, Chapter 3: Project Description.

Table 14.7: MDS Considered for Each Potential Impact as Part of the Assessment of Effects on Shipping and Navigation

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O	D		
Impact of floating mooring and cable systems and interactions with vessels at risk of snagging	✓	✓	✓	**Construction phase** MDS taken to be the 15 MW floating design scenario with catenary moorings and floating (dynamic) Inter-Array Cables (IACs). <u>Structures and moorings</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary • Up to 67 floating Wind Turbines • Mooring type catenary or semi-taut • Up to 6 catenary mooring lines per Wind Turbine foundation • Length of each mooring per line 850 m • Maximum mooring line radius 800 m • Maximum mooring touchdown distance from geometric centre 750 m • Maximum excursion limit of foundation on sea surface 31.5 m <u>Cables</u> • Up to 185 km IACs (dynamic) with maximum length of cable on the seabed 173 km • Maximum of three interconnector cables, up to 60 km total length (static) <u>Programme/durations</u> • Construction phase to last up to 5 years **O&M phase** <u>Structures and moorings</u> • Project infrastructure in place as listed in Construction <u>Cables</u> • Project infrastructure in place as listed in Construction <u>Programme/durations</u> • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval. • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies. • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	<u>Structures and moorings</u> Worst case maximum number of semi-submersible floating Wind Turbines with maximum radius catenary mooring and maximum number of mooring lines per foundation. <u>Cables</u> Maximum length and extent of cables relevant to this impact. <u>Programme/durations</u> Longest duration of works for worst case. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Deviation of commercial vessels	✓	✓	✓	**Construction phase** MDS taken to be the 15 MW fixed design scenario. <u>Project vessels</u> • Construction vessels Array Area: up to 25 vessels on site and up to 1,826 return trips (total over entire phase) • Construction vessels Offshore Export Cable: up to 16 vessels on site and up to 642 return trips (total over entire phase) <u>Structures</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary • Up to 67 Wind Turbines • Maximum Wind Turbine rotor diameter up to 236 m • Minimum spacing between Wind Turbines of 1,086 m • Maximum number of HVAC Offshore Substation Platforms (OSP) 2 (fixed) assumed to be located on the Array Area perimeter (position not defined) <u>Cables</u>	<u>Project vessels</u> Worst case maximum anticipated number of project vessels and movements. <u>Structures</u> Worst case maximum number of structures at the outermost extents of the Array Area. <u>Cables</u>

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O	D		
				• Maximum cable protection height 2 m for all static cables • Maximum of three interconnector cables, up to 60 km total length (static) • Up to 4 HVAC Offshore Export Cable, up to 90 km length per cable • Maximum 16 HVAC Offshore Export Cable crossings • Cable protection for up to 180 km (50%) of the full Offshore Export Cable route <u>Programme/durations</u> • Construction phase to last up to 5 years **O&M phase** <u>Project vessels</u> • O&M vessels Array Area: up to 9 vessels on site and up to 568 return trips (per year) • O&M vessels Offshore Export Cable: up to 2 vessels on site and up to 19 return trips (per year) <u>Structures and moorings</u> • Project infrastructure in place as listed in Construction <u>Programme/durations</u> • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval. • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies. • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	Maximum length and extent of cables relevant to this impact. <u>Programme/durations</u> Longest duration of works for worst case. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Increased collision risk	✓	✓	✓	**Construction phase** • MDS taken to be the 15 MW floating or fixed design scenario. <u>Project vessels</u> • Construction vessels Array Area: up to 30 vessels on site and up to 2,181 return trips (total over entire phase) • Construction vessels Offshore Export Cable: up to 16 vessels on site and up to 642 return trips (total over entire phase) <u>Structures and moorings</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary • Up to 67 Wind Turbines • Maximum Wind Turbine rotor diameter up to 236 m • Minimum spacing between Wind Turbines of 1,086 m • Maximum number of HVAC OSPs 2 (fixed) assumed to be located on the Array Area perimeter (position not defined) <u>Programme/durations</u> • Construction phase to last up to 5 years **O&M phase** <u>Project vessels</u> • O&M vessels Array Area: up to 10 vessels on site and up to 643 return trips (per year) • O&M vessels Offshore Export Cable: up to 2 vessels on site and up to 19 return trips (per year) <u>Programme/durations</u> • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval.	<u>Project vessels</u> Worst case maximum anticipated number of project vessels and movements. <u>Structures and moorings</u> Worst case maximum number of structures at the outermost extents of the Array Area potentially obscuring small vessels. <u>Programme/durations</u> Longest duration of works for worst case. **Decommissioning phase**

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O	D		
				• The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies. • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Increased contact/allision risk	✓	✓	✓	**Construction phase** MDS taken to be the 15 MW fixed design scenario. <u>Structures</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary • Up to 67 Wind Turbines • Minimum spacing between Wind Turbines of 1,086 m • Maximum number of HVAC OSPs 2 (fixed) assumed to be located on the Array Area perimeter (position not defined) • OSP topsides up to 80 m length and 60 m width • Up to 8 legs per OSP jacket foundation <u>Programme/durations</u> • Construction phase to last up to 5 years **O&M phase** <u>Structures and moorings</u> • Project infrastructure in place as listed in Construction <u>Programme/durations</u> • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval. • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies. • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	<u>Structures</u> Worst case maximum number of structures at the outermost extents of the Array Area, closest to diverted traffic. <u>Programme/durations</u> Longest duration of works for worst case. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Increased grounding risk	✓	✓	✓	**Construction phase** MDS taken to be the 15 MW floating or fixed design scenario. <u>Structures and moorings</u> • Up to 20 Subsea Collectors on seabed • Subsea Collectors up to 20 m length, 20 m width and 6.25 m above seabed. <u>Cables</u> • Up to 185 km IACs (dynamic) with maximum length of cable on the seabed 173 km • Maximum 8 inter-array cable crossings • Maximum 3 interconnector cables, up to 60 km total length (static) • Maximum 3 interconnector cable crossings • Up to 4 HVAC Offshore Export Cables, up to 90 km length per cable • Maximum 16 HVAC Offshore Export Cable crossings • Maximum height of all cable crossings 2.5 m • Cable protection for up to 180 km (50%) of the full Offshore Export Cable route • Maximum cable protection height 2 m for all static cables <u>Programme/durations</u> • Construction phase to last up to 5 years	<u>Structures and moorings</u> Worst case maximum number of Subsea Collectors. <u>Cables</u> Maximum length and extent of cables relevant to this impact. Worst case maximum height of cable protection and maximum number of crossings. <u>Programme/durations</u> Longest duration of works for worst case.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O	D		
				O&M phase Cables • Project infrastructure in place as listed in Construction Programme/durations • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval. • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies. • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	**Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Impact to SAR capability	✓	✓	✓	**Construction phase** MDS taken to be the 15 MW floating design scenario. Project vessels • Construction vessels Array Area: up to 30 vessels on site and up to 2,181 return trips (total over entire phase) • Construction vessels Offshore Export Cable: up to 16 vessels on site and up to 642 return trips (total over entire phase) Structures and moorings • Maximum extent of Array Area infrastructure to remain within Array Area boundary • Up to 67 floating Wind Turbines • Mooring type catenary or semi-taut • Up to 6 catenary mooring lines per Wind Turbine foundation • Length of each mooring per line 850 m • Minimum spacing between Wind Turbines of 1,086 m • Maximum Wind Turbine rotor diameter up to 236 m • Maximum foundation dimensions at water surface 130 m x 115 m • Maximum excursion limit of foundation on sea surface 31.5 m • Maximum number of HVAC OSPs 2 (fixed) assumed to be located on the Array Area perimeter (position not defined) • OSP topsides up to 80 m length and 60 m width • Up to 20 Subsea Collectors on seabed Programme/durations • Construction phase to last up to 5 years **O&M phase** Project vessels • O&M vessels Array Area: up to 10 vessels on site and up to 643 return trips (per year) • O&M vessels Offshore Export Cable: up to 2 vessels on site and up to 19 return trips (per year) Structures and moorings: • Project infrastructure in place as listed in Construction Programme/durations • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval. • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies.	Project vessels Worst case maximum anticipated number of project vessels and movements. Structures and moorings Worst case maximum number of structures, mooring infrastructure and lowest minimum spacing. Programme/durations Longest duration of works for worst case. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O	D		
				• The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	
Interference with Radar, communications and positioning systems	✓	✓	✓	**Construction phase** MDS taken to be the 15 MW fixed or floating design scenario. <u>Structures and moorings</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary • Up to 67 Wind Turbines • Minimum spacing between Wind Turbines of 1,086 m • Maximum number of HVAC OSPs 2 (fixed) assumed to be located on the Array Area perimeter (position not defined) • OSP topsides up to 80m length and 60 m width <u>Cables</u> • Up to 185 km IACs (dynamic) with maximum 12 km cable in the water column. • Maximum 3 interconnector cables, up to 60 km total length (static). • Up to 4 HVAC Offshore Export Cables, up to 90 km length per cable <u>Programme/durations</u> • Construction phase to last up to 5 years **O&M phase** <u>Structures and moorings:</u> • Project infrastructure in place as listed in Construction <u>Cables</u> • Project infrastructure in place as listed in Construction <u>Programme/durations</u> • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval. • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies. • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	<u>Structures and moorings</u> Worst case maximum number of Wind Turbines and OSPs. <u>Cables</u> Maximum length and extent of cables relevant to this impact. <u>Programme/durations</u> Longest duration of works for worst case. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Reduction in Under Keel Clearance (UKC) due to subsurface Offshore Infrastructure	✓	✓	✓	**Construction phase** MDS taken to be the 15 MW floating design scenario. <u>Structures and moorings</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary • Up to 67 floating Wind Turbines • Up to 6 mooring lines (and anchors) per Wind Turbine foundation • Up to 20 Subsea Collectors on seabed • Subsea Collectors up to 20 m length, 20 m width and 6.25 m above seabed. <u>Cables</u> • Up to 185 km IACs (dynamic) with maximum length of cable on seabed 173 km • Maximum 8 inter-array cable crossings • Maximum 3 interconnector cables, up to 60 km total length (static) • Maximum 3 interconnector cable crossings	<u>Structures and moorings</u> Worst case maximum number of structures and subsea infrastructure. <u>Cables</u> Maximum length and extent of cables relevant to this impact. Worst case maximum height of cable protection and maximum number of crossings.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O	D		
				• Up to 4 HVAC Offshore Export Cables, up to 90km length per cable • Maximum 16 HVAC Offshore Export Cable crossings • Maximum height of all cable crossings 2.5 m • Cable protection for up to 180 km (50%) of the full Offshore Export Cable route • Maximum cable protection height 2 m for all static cables Programme/durations • Construction phase to last up to 5 years **O&M phase** Cables • Project infrastructure in place as listed in Construction Programme/durations • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval. • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies. • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	Programme/durations Longest duration of works for worst case. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Towage operations	✓	✓	✓	**Construction phase** MDS taken to be the 15 MW floating design scenario. Project vessels • Construction vessels Array Area: up to 30 vessels on site and up to 2,181 return trips (total over entire phase) • Construction vessels Offshore Export Cable: up to 16 vessels on site and up to 642 return trips (total over entire phase) Structures and moorings • Up to 67 floating Wind Turbines • 1 Wind Turbine towed at one time Anticipated speed of towage 2 knots Programme/durations • Construction phase to last up to 5 years **O&M phase** Project vessels • O&M vessels Array Area: up to 10 vessels on site and up to 643 return trips (per year) • O&M vessels Offshore Export Cable: up to 2 vessels on site and up to 19 return trips (per year) Structures and moorings: • Project infrastructure in place as listed in Construction Programme/durations • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval. • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies.	Project vessels Worst case maximum anticipated number of project vessels and movements. Structures and moorings Worst case maximum number of Wind Turbines and slowest towage speed (longest towage duration). Programme/durations Longest duration of works for worst case. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O	D		
				• The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	
Breakout or loss of station of a floating Wind Turbine	✓	✓	✓	**Construction phase** MDS taken to be the 15 MW floating design scenario. <u>Structures and moorings</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary • Up to 67 floating Wind Turbines • Minimum spacing between Wind Turbines of 1,086 m • Up to six moorings per floater <u>Programme/durations</u> • Construction phase to last up to 5 years **O&M phase** <u>Structures and moorings:</u> • Project infrastructure in place as listed in Construction <u>Programme/durations</u> • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval. • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies. • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	<u>Structures and moorings</u> Worst case maximum number of semi-submersible floating Wind Turbines. <u>Programme/durations</u> Longest duration of works for worst case. **Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Impact on port/harbours and nearshore operations	✓	✓	✓	**Construction phase** MDS taken to be the 15 MW floating design. <u>Project vessels</u> • Construction vessels Array Area: up to 30 vessels on site and up to 2,181 return trips (total over entire phase) • Construction vessels Offshore Export Cable: up to 16 vessels on site and up to 642 return trips (total over entire phase) <u>Structures and moorings</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary • Up to 67 Wind Turbines • Maximum number of HVAC OSPs 2 (fixed) assumed to be located on the Array Area perimeter (position not defined) • Up to 20 Subsea Collectors on seabed <u>Cables</u> • Up to 4 HVAC Offshore Export Cables, up to 90 km length per cable • Maximum 16 HVAC Offshore Export Cable crossings • Maximum height of all cable crossings 2.5 m • Cable protection for up to 180 km (50%) of the full Offshore Export Cable route • Maximum cable protection height 2 m for all static cables <u>Programme/durations</u> • Construction phase to last up to 5 years **O&M phase** <u>Project vessels</u>	<u>Project vessels</u> Worst case maximum anticipated number of project vessels and movements. <u>Structures and moorings</u> Worst case maximum number of structures. <u>Cables</u> Maximum length and extent of cables relevant to this impact. <u>Programme/durations</u> Longest duration of works for worst case.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O	D		
				• O&M vessels Array Area: up to 10 vessels on site and up to 643 return trips (per year) • O&M vessels Offshore Export Cable: up to 2 vessels on site and up to 19 return trips (per year) <u>Structures and moorings:</u> • Project infrastructure in place as listed in Construction <u>Cables</u> • Project infrastructure in place as listed in Construction <u>Programme/durations</u> • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval. • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies. • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	**Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.
Impact on small vessel activity (fishing/recreational)	✓	✓	✓	**Construction phase** MDS taken to be the 15 MW floating design scenario. <u>Project vessels</u> • Construction vessels Array Area: up to 30 vessels on site and up to 2,181 return trips (total over entire phase) • Construction vessels Offshore Export Cable: up to 16 vessels on site and up to 642 return trips (total over entire phase) <u>Structures and moorings</u> • Maximum extent of Array Area infrastructure to remain within Array Area boundary • Up to 67 floating Wind Turbines • Maximum Wind Turbine rotor diameter up to 236 m • Minimum lower blade tip height above LAT 30 m • Minimum spacing between Wind Turbines of 1,086 m • Up to 6 mooring lines per Wind Turbine foundation • Length of each mooring per line 850 m • Maximum foundation dimensions at water surface 130 m x 115 m • Maximum excursion limit of foundation on sea surface 31.5 m • Maximum number of HVAC OSPs 2 (fixed) assumed to be located on the Array Area perimeter (position not defined) • OSP topsides up to 80 m length and 60m width • Up to 20 Subsea Collectors on seabed <u>Cables</u> • Up to 185 km IACs (dynamic) with maximum length of cable seabed 173 km • Maximum 8 inter-array cable crossings • Maximum 3 interconnector cables, up to 60km total length (static) • Maximum 3 interconnector cable crossings • Up to 4 HVAC Offshore Export Cables, up to 90 km length per cable • Maximum 16 HVAC Offshore Export Cable crossings • Maximum height of all cable crossings 2.5 m • Cable protection for up to 180 km (50%) of the full Offshore Export Cable route • Maximum cable protection height 2 m for all static cables <u>Programme/durations</u> • Construction phase to last up to 5 years	<u>Project vessels</u> Worst case maximum anticipated number of project vessels and movements. <u>Structures and moorings</u> Worst case maximum number and size of structures, mooring infrastructure and possible horizontal excursion of turbine. <u>Cables</u> Maximum length and extent of cables relevant to this impact. Worst case maximum height of cable protection and maximum number of crossings. <u>Programme/durations</u> Longest duration of works for worst case.

Potential Impact	Phase			Maximum Design Scenario	Justification
	C	O	D		
				O&M phase Project vessels • O&M vessels Array Area: up to 10 vessels on site and up to 643 return trips (per year) • O&M vessels Offshore Export Cable: up to 2 vessels on site and up to 19 return trips (per year) Structures and moorings: • Project infrastructure in place as listed in Construction Cables • Project infrastructure in place as listed in Construction Programme/durations • Operational lifetime up to 30 years **Decommissioning phase** • Decommissioning Programme to be submitted to MD-LOT for consultation and approval. • The Decommissioning Programme will be updated during the Project's lifespan to take account of changing best practice and new technologies. • The approach for decommissioning is yet to be determined, however, for the purposes of this MDS total removal of all infrastructure including buried cables and cable protection has been assumed, and as such the environmental impact of decommissioning will be the same if not lower than construction.	**Decommissioning phase** The MDS for decommissioning will be no greater than that set out for the construction phase of the Proposed Development.

* Project Phase refers to construction (C), O&M (O) and decommissioning (D).

Impacts Scoped Out of the Assessment

14.7.2 The Scoping Workshop (see Table 14.3) was used to facilitate stakeholder engagement on topics to be scoped out of the assessment.

14.7.3 On the basis of the baseline environment and the Project Description outlined in Volume 1, Chapter 3: Project Description, no impacts were proposed to be scoped out at the Scoping stage.

14.7.4 The Proposed Development received a Scoping Opinion from Marine Directorate, which, alongside the understanding of MDSs and environmental baseline conditions, and further consultation with stakeholders, has informed the potential impacts that are to be scoped out from further assessment in EIA. None of the potential impacts identified in the Offshore EIA Scoping Report were scoped out of this shipping and navigation assessment.

14.8 Methodology for Assessment of Effects

Overview

14.8.1 The shipping and navigation assessment of effects has followed the methodology set out in Volume 1, Chapter 4: EIA Methodology. In addition, guidance, policy and legislation relevant to shipping and navigation as detailed in Section 14.3 has been considered in the assessment of effects.

14.8.2 Volume 3, Technical Appendix 14.1: Navigation Risk Assessment has been referred to, where applicable, and where the NRA assessed impacts to be As Low as Reasonably Practicable (ALARP) this has been used throughout to justify the impact assessment.

14.8.3 Following the HAZID workshop undertaken as part of the NRA, Additional Mitigation measures were adopted through inclusion into existing Embedded Mitigation measures. The NRA found that, after the application of the Embedded Mitigation, the Proposed Development does not pose an unacceptable risk to navigational safety. Therefore, it was determined that the 22 hazards scored as Medium Risk can be considered as ALARP and therefore the risk deemed Tolerable.

Criteria for Assessment

14.8.4 When determining the significance of effects, a process is used which involves defining the magnitude of the potential impacts and the sensitivity of the receptors. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors. The terms used to define magnitude and sensitivity are based on those which are described in further detail in Volume 1, Chapter 4: EIA Methodology.

14.8.5 The criteria for defining magnitude in this chapter are outlined in Table 14.8. Each assessment considered the spatial extent, duration, frequency and reversibility of impact when determining magnitude which are outlined within the magnitude section of each impact assessment (e.g. a duration of hours or days would be considered for most receptors to be of short-term duration, which is likely to result in a low magnitude of impact).

Table 14.8: Definition of Terms relating to Magnitude of Impact

Magnitude of Impact	Definition
High	Frequent hazard occurrence, multiple times during the Proposed Development lifecycle (100% chance in a year).
	Non-hazard (commercial) impacts continuous throughout the Proposed Development duration (approximately daily).
Medium	Reasonably probable that hazard may occur once during the Proposed Development lifecycle (10%-100% chance in a year).
	Non-hazard (commercial) impacts would occur periodically under certain conditions throughout the Proposed Development duration (multiple times per year).
Low	Unlikely that hazard occurs during the Proposed Development lifecycle but has occurred at other OWFs (1%-10% chance in a year).
	Non-hazard (commercial) impacts would occur infrequently during uncommon conditions throughout the Proposed Development duration (approximately once per year).
Negligible	Extremely unlikely that hazard occurs at the Proposed Development and has rarely occurred within industry (less than 1% chance in a year).
	Non-hazard (commercial) impacts could occur during rare conditions throughout the Proposed Development duration (less than once per year).

14.8.6 The criteria for defining sensitivity in this chapter are outlined in Table 14.9**.**

Table 14.9: Definition of Terms Relating to the Sensitivity of the Receptor

Sensitivity of Receptor	Definition
Very High	Multiple loss of life; Loss of vessel (> £10 million); Major pollution (Tier 3 as per national contingency plan (MCA, 2017)); or Permanent interruption to operators/marine users.
High	Single fatality/multiple serious injuries; Serious damage to vessel (< £10 million); Serious pollution (Tier 2 as per MCA, 2017); or Long-term interruption to operators/marine users (~1 year).
Medium	Serious injuries; Damage to vessel (< £1 million); Moderate pollution (Tier 2 as per MCA, 2017); or Short-term interruption to operators/marine users (~1 month).
Low	Multiple minor injuries; Minor damage (< £100k) to vessel; Minor pollution (Tier 1 as per MCA, 2017); or Temporary interruption to operators/marine users (~1 day).
Negligible	Minor injury; Minor damage (< £10k); Minor spill / no perceptible impact; or Temporary interruption to operators/marine users (~1 hour).

14.8.7 The magnitude of the impact and the sensitivity of the receptor are combined when determining the significance of the effect upon shipping and navigation

receptors. The particular method employed for this assessment is presented in Table 14.10 and Table 14.11.

14.8.8 Where a range is suggested for the significance of effect, for example, minor to moderate, it is possible that this may span the significance threshold. The technical specialist's professional judgement will be applied to determine which outcome defines the most likely effect, which takes in to account the sensitivity of the receptor and the magnitude of impact. Where professional judgement is applied to quantify final significance from a range, the assessment will set out the factors that result in the final assessment of significance. These factors may include the likelihood that an effect will occur, data certainty and relevant information about the wider environmental context.

14.8.9 The EIA Regulations require the identification and reporting of significant environmental effects. For the purposes of this assessment:

- a level of moderate or more will be considered a 'significant' effect in terms of the EIA Regulations; and
- a level of minor or less will be considered 'not significant' in terms of the EIA Regulations.

Table 14.10: Matrix Used for the Assessment of the Significance of the Effect

Sensitivity of Receptor	Magnitude of Impact			
	Negligible	**Low**	**Medium**	**High**
Negligible	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	Negligible or Minor	Minor	Moderate	Moderate or Major
High	Minor	Minor or Moderate	Moderate or Major	Major
Very High	Minor	Moderate or Major	Major	Major

Table 14.11: Definition of Significance

Impact	Justification
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation, or within the margin of forecasting error.
Minor	These beneficial or adverse effects are generally, but not exclusively, raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the Proposed Development.
Moderate	These beneficial or adverse effects have the potential to be important and may influence the decision-making process. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse or beneficial effect on a particular resource or receptor.

Impact	Justification
Major	These beneficial or adverse effects are very important and are likely to be material in the decision-making process. These effects are generally, but not exclusively, associated with sites or features of international, national, or regional importance. However, a major change in a site or feature of local importance may also enter this category.

14.8.10 Table 14.12 also shows the alignment between the EIA significance and the terminology used within the formal risk assessment methodology adopted in Volume 3, Technical Appendix 14.1: Navigation Risk Assessment – such as the alignment of risk, risk tolerability, and the ALARP principle.

Table 14.12: Alignment of Significance with NRA Hazard Rating

NRA Risk	NRA Tolerability	NRA Description	EIA Significance
Negligible	Broadly acceptable	Generally regarded as not significant and adequately mitigated. Additional risk reduction should be implemented if reasonable, practicable and proportionate.	Negligible Effect is not significant
Low			Minor Effect is not significant
Medium	Tolerable if ALARP	Generally regarded as within a zone where the risk may be tolerable in consideration of the Proposed Development. Requirement to properly assess risks, regularly review and implement risk controls to maintain risks to within ALARP where possible.	Minor: If ALARP then not significant. OR Moderate: If not ALARP then significant.
High	Unacceptable	Generally regarded as significant and unacceptable for Proposed Development to proceed without further review.	Major Effect is significant
Extreme			Major Effect is significant

14.9 Embedded Mitigation

14.9.1 As part of the Proposed Development design process, a number of Embedded Mitigation have been proposed to reduce the potential for impacts on shipping and navigation (see Table 14.3). They are considered at every stage of the Proposed Development through design and best practice and, as there is a commitment to implementing these measures, these have been considered in the assessment presented in Section 14.10 (i.e. the determination of magnitude and therefore significance assumes implementation of these measures). These Embedded Mitigation are considered standard industry practice for this type of development.

Table 14.13: Embedded Mitigation Adopted as Part of the Proposed Development

ID*	Embedded Mitigation Adopted as Part of the Proposed Development	Justification
1	Development of, and adherence to, a Cable Specification and Installation Plan (CSIP) post-consent.	Decreases the risk of grounding or snagging of anchors and fishing gear.
2	Use of anti-corrosion protective coatings and Scour Protection will be used where there is potential for scour to develop around the Offshore Infrastructure, and it is appropriate to do so.	Decreases the risk of grounding or snagging of gear.
4	Development of, and adherence to, a Cable Burial Risk Assessment (CBRA) and the Cable Burial Assessment (CBA). Implementation, management and monitoring of cable protection, via burial or external protection where adequate burial depth is not feasible, will be undertaken as informed by these assessments. Results of these assessments, and commitments to post construction monitoring, will be provided in the Cable Plan (CaP).	Decreases the risk of grounding or snagging of gear.
5	Development of and adherence to an Environmental Management Plan (EMP), including a Marine Pollution Contingency Plan (MPCP) and a Biosecurity Plan with commitments to environmental monitoring and actions to minimise Invasive Non-Native Species (INNS).	Decreases the risk of pollution as a result of a Wind Turbine breakout, an allision with Offshore Infrastructure and/or a collision.
7	Development of, and adherence to a Construction Method Statement (CMS) along with a Code of Construction Practice (CoCP).	Decreases the risk of collision, grounding an allision during the construction phase.
8	All relevant Health and Safety Executive (HSE) procedures will be followed.	Decreases the risk of collision.
9	Development of and adherence to a combined Navigational Safety and Vessel Management Plan (NSVMP), describing Project vessels' requirements, passages, monitoring and controls.	Decreases the risk of collision.
11	Appointment of a Fisheries Liaison Officer (FLO). The FLO will support ongoing liaison and ensure clear communication between the Applicant and commercial fishers.	All direct impacts of the Project related to commercial fishers.
12	Advance warning and accurate location details of operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners (NtMs) and Kingfisher Bulletins.	All direct impacts of the Proposed Development mitigated.
13	Development of, and adherence to, a Lighting and Marking Plan (LMP). The LMP will confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting.	Decreases the risk of allision/contact with Offshore Infrastructure.
16	Application for, and use of, Safety Zones of up to 500 m during construction, major maintenance, and decommissioning phases. Advisory safe passing distances of up to 500 m will also be applied for mobile installation vessels.	Decreases the risk of allision with Offshore Infrastructure or collision with construction vessels.

ID*	Embedded Mitigation Adopted as Part of the Proposed Development	Justification
17	Any objects dropped on the seabed during works associated with the Proposed Development will be reported in line with MD-LOT procedures and objects will be recovered where they pose a hazard to other marine users and where recovery is possible.	Decreases the risk of allision/contact and collision. Risk of fishing gear snagging.
18	All vessels working on the Proposed Development will meet the required certification standards and carriage requirements, along with following international marine regulations.	Decreases the risk of allision/contact with Offshore Infrastructure or collision with vessels.
20	Suitable Aids to Navigation (AtoN) lighting and marking of the Proposed Development including construction buoyage and the use of a Cable Marker Board shall be implemented complying with International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) Recommendations G1162 (IALA, 2021), to be finalised and approved in consultation with the Maritime and Coastguard Agency (MCA) and Northern Lighthouse Board (NLB) through a LMP.	Decreases the risk of allision/contact with Offshore Infrastructure.
21	Wind Turbine design to have a minimum lower blade tip height of 30 m above Lowest Astronomical Tide (LAT)Mean High Water Springs (MHWS), and a minimum rotor diameter, accounting for pitch and roll as per Marine Guidance Note (MGN) 654.	Decreases the risk of allision/contact with Offshore Infrastructure.
22	Development of, and adherence to, an Emergency Response Cooperation Plan (ERCoP) in consultation with the Maritime & Coastguard Agency (MCA).	Decreases the risk of impact to SAR capabilities; and risk of Wind Turbine breakout.
23	Development and adherence to an Operation & Maintenance Programme (OMP).	Decreases the risk of collision.
24	Development of, and adherence to, a Development Specification and Layout Plan (DSLP). The development of the DSLP includes consultation with the relevant authorities for approval, including the MCA and Northern Lighthouse Board (NLB).	Decreases the risk of allision/contact with Offshore Infrastructure.
35	Drafting and implementation of a decommissioning programme, prepared in accordance with requirements of the Energy Act 2004, which will set out the extent of infrastructure to be removed as well as the methods and processes which will be used.	Decreases the risk of collision.
37	Adherence with HSE/MCA guidance 'Regulatory expectations on moorings for floating wind and marine devices' as appropriate (HSE/MCA, 2017).	Decreases the risk of grounding or snagging of gear.
44	The Proposed Development will be marked on admiralty Charts including an appropriate chart note.	All direct impacts of the Project mitigated.

ID*	Embedded Mitigation Adopted as Part of the Proposed Development	Justification
45	Compliance of project vessels with international marine regulations as adopted by the Flag State, including International Regulations for Preventing Collisions at Sea (COLREGS) (IMO, 1972) and International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974).	Decreases the risk of allision with Offshore Infrastructure or collision with vessels.
52	Where appropriate, guard vessels will also be used to ensure adherence with Safety Zones or advisory passing distances to mitigate any impact which poses risk to surface navigation during construction, O&M and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards. The use of guard vessels in the event of a floating Wind Turbine breakout or sinking will be adopted as part of the functionality of this mitigation measure in consultation with the MCA and NLB.	Decreases the risk of collision and risk of allision/contact with Offshore Infrastructure.
53	MGN 654 Annex 4 (MCA, 2021a) requires that hydrographic surveys will fulfil the requirements of the IHO Order 1a standard, with the final data supplied as a digital full density data set, and survey report to the MCA Hydrography Manager and the UKHO.	Decreases the risk of grounding or snagging of cables/gear.

*see Volume 3, Technical Appendix 4.6: Schedule of Mitigation and Commitments

14.10 Assessment of Significance

14.10.1 Table 14.7 summarises the potential effects arising from the construction, O&M and decommissioning phases of the Proposed Development, as well as the MDS against which each impact has been assessed. An assessment of the likely significance of the effects of the Proposed Development on the shipping and navigation receptors caused by each identified impact is given below.

IMPACT 1 – IMPACT OF FLOATING MOORING AND CABLE SYSTEMS AND INTERACTIONS WITH VESELS AT RISK OF SNAGGING

14.10.2 Floating offshore Wind Turbines are typically moored to the seabed through a spread of subsurface mooring cables and chains. These moorings can pose a risk to navigating vessels through snagging of anchors or fishing gear.

14.10.3 The Proposed Development description (Volume 1, Chapter 3: Project Description) notes that the exact floating Wind Turbine and corresponding mooring configuration has not been determined at the time of writing this Offshore EIA Report. Therefore, the worst case has been assumed as the total number of mooring lines that would result from the 15 MW floating design scenario with catenary moorings and floating (dynamic) IACs.

14.10.4 A second hazard within this impact relates to the potential impact of dynamic IAC systems. These present a snagging risk to vessel anchors or fishing gear.

14.10.5 This impact has been considered for the construction, O&M and decommissioning phases.

Construction Phase

Magnitude of Impact

14.10.6 With regard to cables, the presence of partially protected or wet stored cables during installation may increase anchor and fishing gear snagging risk. Snagging risks are considered greatest from fishing vessels when gear is deployed, particularly mobile gear types. The vessel traffic analysis undertaken as part of Volume 3, Technical Appendix 14.1: Navigation Risk Assessment has shown that the Shipping and Navigation Study Area is used by transiting vessels, and fishing activity is also present in proximity to the Array Area. Further information on fishing activities is located in Volume 2, Chapter 13: Commercial Fisheries.

14.10.7 With regard to moorings, whilst the specific layout of the moorings is not known at this stage, it is expected that as distance from the Wind Turbine increases, the moorings become exponentially closer to the seabed. Therefore, the impact would be experienced where vessels navigate within close proximity to the Wind Turbines. Given that the worst case mooring spread of 800 m is less than the 1 nm (1.91 km) recommended deep draft vessel passing distance from an OWF, it is considered that the risk of a deep draught vessel contacting the moorings is remote and would be likely to contact the Wind Turbine in the same event.

14.10.8 Moreover, during construction, Safety Zones would be established of an appropriate configuration and extent to prevent fishing in particularly close proximity to the infrastructure and mitigate for potential snagging hazards, as per Table 14.13. In addition, promulgation of information via NtMs and the Kingfisher bulletin will increase awareness of construction activities, and attempts will be made to reach an agreement for the fisheries gear clearance to further help mitigate snagging hazards during construction. Overall, on the basis of the worst case mooring assumptions, and the Embedded Mitigation, including Safety Zones and promulgation of information, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.10.9 In the event that a vessel were to snag a cable, the most likely outcome is loss of gear and minor damage to the cable and/or vessel. A more severe outcome is the potential loss of the fishing vessel and fatalities, however this is considered very unlikely given the Embedded Mitigation in place (Table 14.13), notably the site marking and charting, Safety Zones during construction phase and the provision of an ERCoP.

14.10.10 The sensitivity of the receptor has therefore been assessed as high.

Significance of the Effect

14.10.11 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be high. The effect will therefore be of minor or moderate adverse significance, which may be significant in EIA terms if the NRA determined the risk to be unacceptable.

14.10.12 Within the NRA, seven hazards were assessed that scored the risk of snagging across all three project phases: Construction, O&M and Decommissioning. One snagging hazard 'Snagging: Fishing Vessel' in the Array Area was determined as

the highest scoring hazard with a score of 8.4 which ranked as a Medium Risk (tolerable if ALARP). The risk of a fishing vessel snagging was deemed to be managed through a CBRA for cable burial, appropriate site marking and charting, provision of an ERCoP and lines of orientation within the site layout. A second hazard 'Snagging: Tug & Service' in the Export Cable Corridor was scored as 6.1 and was also considered Medium Risk but can be managed through the CBRA and periodic hydrographic surveys. The remaining 5 relevant hazards were scored as Low Risk. With these mitigations, the hazards were considered to be ALARP, and therefore aligns with the **Minor** significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.13 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

14.10.14 Floating offshore Wind Turbines are typically moored to the seabed through a spread of subsurface mooring cables and chains. These moorings, or transmission cabling, can pose a risk to navigating vessels through snagging of anchors or fishing gear.

14.10.15 The Proposed Development description (Volume 1, Chapter 3: Project Description) notes that the exact mooring type has not been determined at the time of the EIA. Therefore, the worst case spread of 800 m radius moorings from each Wind Turbine has been assumed.

14.10.16 A second hazard relates to the impact of cable systems. Cabling (within the Array Area) would comprise IACs. These can pose a risk to navigating vessels by presenting a snagging risk to vessel anchors or fishing gear.

Magnitude of Impact

14.10.17 Generally, the magnitude of impact is expected to remain relatively similar to that during the construction phase of the Proposed Development. However, throughout the O&M phase of the Proposed Development, vessel Masters should be more familiar with the location of cables, which would be charted, further reducing the likelihood of a snagging incident. Similarly to construction, any maintenance works required would be communicated with the fishing community in accordance with the Embedded Mitigation outlined in Table 14.13.

14.10.18 Overall, on the basis of the worst case mooring assumptions, draught analysis, and embedded risk controls, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.10.19 Were a vessel to snag a cable, the most likely outcome is loss of gear and/or minor damage to the cable and/or vessel. A more severe outcome is the loss of the vessel and potential fatalities however, this is considered very unlikely given the Embedded Mitigation in place (Table 14.13), notably the site marking and charting, the provision of an ERCoP and additional O&M vessels operating in the area providing faster response. The sensitivity of the receptor has been

assessed as high, given the possibility for potential fatalities in a worst case scenario.

Significance of the Effect

14.10.20 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be high. The effect will therefore be of minor or moderate adverse significance, which may be significant in EIA terms if the NRA determined the risk to be unacceptable.

14.10.21 Within the NRA, seven hazards were assessed that scored the risk of snagging across all three project phases: Construction, O&M and Decommissioning. One snagging hazard 'Snagging: Fishing Vessel' in the Array Area was determined as the highest scoring hazard with a score of 8.4 which ranked as a Medium Risk (tolerable if ALARP). The risk of a fishing vessel snagging was deemed to be managed through a CBRA for cable burial, appropriate site marking and charting, provision of an ERCoP and lines of orientation within the site layout. A second hazard 'Snagging: Tug & Service' in the Export Cable Corridor was scored as 6.1 and was also considered Medium Risk but can be managed through the CBRA and periodic hydrographic surveys. The remaining 5 relevant hazards were scored as Low Risk. With these mitigations, the hazards were considered to be ALARP, and therefore aligns with the **Minor** significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.22 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.23 As with during construction, considering the risk associated with fishing gear and vessel anchor snagging, the magnitude/frequency of occurrence has been assessed as low. This is owed to the vessel traffic profile and activity being similar for decommissioning as during construction.

Sensitivity of the Receptor

14.10.24 As with during construction, the sensitivity of receptor has been assessed as high to account for the most likely outcome of loss of gear and/or minor damage to the cable and/or vessel, and a more severe outcome of the potential loss of the fishing vessel and fatalities; however, this is considered very unlikely given the Embedded Mitigation in place (Table 14.13).

Significance of the Effect

14.10.25 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be high. The effect will therefore be of minor or moderate adverse significance, which may be significant in EIA terms if the NRA determined the risk to be unacceptable.

14.10.26 Within the NRA, seven hazards were assessed that scored the risk of snagging across all three project phases: Construction, O&M and Decommissioning. One snagging hazard 'Snagging: Fishing Vessel' in the Array Area was determined as

the highest scoring hazard with a score of 8.4 which ranked as a Medium Risk (tolerable if ALARP). The risk of a fishing vessel snagging was deemed to be managed through a CBRA for cable burial, appropriate site marking and charting, provision of an ERCoP and lines of orientation within the site layout. A second hazard 'Snagging: Tug & Service' in the Export Cable Corridor was scored as 6.1 and was also considered Medium Risk but can be managed through the CBRA and periodic hydrographic surveys. The remaining 5 relevant hazards were scored as Low Risk. With these mitigations, the hazards were considered to be ALARP, and therefore aligns with the **Minor** significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.27 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 2 – DEVIATION OF COMMERCIAL VESSELS

14.10.28 Existing commercial vessel and passenger ferry traffic could be displaced during construction due to the presence of buoyed construction areas, active Safety Zones, construction vessels and partially completed or pre-commissioned structures. Detailed construction schedules and areas would be defined post-consent, but it is assumed that construction areas could extend 500 m beyond the Site Boundary. Displacement would be greatest when the Proposed Development is fully constructed (maximum footprint) which is assessed in the O&M impacts.

14.10.29 The obstruction and subsequent re-routeing presented by the Proposed Development during construction or once in operation, has the potential to result in increased journey time and distances. Impacts on routeing may in turn lead to increased collision risks (see Impact 3).

Construction Phase

Magnitude of Impact

14.10.30 The four commercial vessel routes that intersect the Array Area and may be displaced as a result of construction are of low traffic density, each with less than 550 transits per year, and therefore the frequency of the commercial deviations is expected to be relatively low.

14.10.31 Adverse weather routeing options may be reduced as a result of the Proposed Development construction. However, analysis of the vessel transits recorded during named storms between September 2023 and August 2024 showed that with the exception of a reduction in vessel traffic numbers (particularly small craft), no appreciable differences in vessel routeing were identified.

14.10.32 Moreover, in order to manage displacement impacts throughout the construction phase, the requirement to ensure third party vessels are aware of construction activities and display information on charts is embedded (Table 14.13).

14.10.33 Overall, the magnitude/frequency of occurrence has been assessed as medium, with typical route deviations experienced on a greater than annual basis, albeit to the few vessels present.

Sensitivity of the Receptor

14.10.34 Commercial vessel routes that may be displaced due to construction on transit are likely on long-distance transits, heading to/from international ports. It is therefore possible that these vessels could make a small adjustment to their route at an earlier point in their transit in order to deviate around the construction areas, with minimal impact on the overall journey distance.

14.10.35 Similarly, minimal changes to adverse weather routeing would be required as a result of the Proposed Development, with very small increases in the overall journey distance and time. Furthermore, there is substantial sea room to deviate around the obstructions.

14.10.36 There is adequate surrounding sea room to allow any minor deviations to typical and adverse weather routes to be undertaken safely.

14.10.37 As a result, the sensitivity of the receptor has been assessed as negligible.

Significance of the Effect

14.10.38 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as negligible, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, given that typical route deviations may be experienced on greater than annual basis.

Additional Mitigation and Residual Effect

14.10.39 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.40 The full build out of the Array Area means that deviations may be required that are similar to during the construction phase. Therefore, the overall magnitude of impact is considered similar, as the number of affected transits will most likely be the same. Therefore, given the similar level of impact to typical and adverse weather routing, and the same Embedded Mitigation including ensuring third party vessels are aware of any maintenance activities in advance, displaying information on charts and the presence of AtoNs, the magnitude/frequency of occurrence has been assessed as medium in alignment with during construction.

Sensitivity of the Receptor

14.10.41 Commercial and service vessels are likely to reroute to avoid the Array Area and any maintenance vessel activity in much the same way as they would to avoid the partially constructed Proposed Development and construction vessel activity during the construction phase of the Proposed Development. Therefore, these vessels could make a small adjustment to their route at an earlier point in their transit in order to deviate around the construction areas, with minimal impact on the overall journey distance.

14.10.42 The available sea room is sufficient to allow any minor deviations to typical and adverse weather routes to be undertaken safely.

14.10.43 As a result, taking the deviations and duration of impact into account, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.10.44 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as low, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.45 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

14.10.46 Since the methods used to remove structures and subsea cables are expected to be similar to those used to install them, the risk pathway for this impact is expected to be similar in nature to the equivalent construction phase impact on vessel routing.

Magnitude of Impact

14.10.47 As with during construction, typical route deviations are anticipated to be experienced more than once per year by the few vessels present. As a result, the magnitude/frequency of occurrence has been assessed as medium. This is owed to the vessel traffic profile and activity being similar during decommissioning as during construction.

Sensitivity of the Receptor

14.10.48 As with the construction phase, there is adequate surrounding sea room to allow any minor deviations to typical and adverse weather routes to be undertaken safely. As a result, the sensitivity of the receptor has been assessed as negligible.

Significance of the Effect

14.10.49 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as negligible, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, given that typical route deviations may be experienced on greater than annual basis.

Additional Mitigation and Residual Effect

14.10.50 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 3 – INCREASED COLLISION RISK

14.10.51 The construction, O&M or decommissioning of an OWF in an otherwise navigable area can constrain shipping routes and result in pinch points or areas of high

vessel traffic density, with the potential to increase the number of encounters or potential collision situations.

14.10.52 The addition of project vessels associated with all phases of the Proposed Development may also increase potential encounter and collision scenarios. These vessels may cross-cut established routes to access the Array Area. The worst case total additional movements during construction of the Array Area are up to 2,181 return vessel movements, with a maximum of 30 vessels. The worst case total additional movements during construction of the Offshore Export Cables are up to 642 return vessel movements, with a maximum of 16 vessels.

14.10.53 Blind spots may result from Wind Turbines or the presence of large construction vessels blocking or hindering the view of other navigating vessels which could increase the risk of collision by reducing the capability for early and effective collision avoidance. The presence of a new obstruction may also result in reduced space for a vessel to take action to avoid collision or reduce the options available to do so.

14.10.54 Modelling was undertaken to establish the likelihood of a vessel collision occurring. The methodology is outlined in Volume 3, Technical Technical Appendix 14.1: Navigation Risk Assessment. It is noted that modelling assumes maximum build out of the Proposed Development. It is therefore expected that, during the construction phase, these return periods would be lower with collision risk considered less likely up to and following the point of full build out.

14.10.55 It is noted that all vessels are assumed to be navigating with the appropriate equipment, lighting arrangements and in compliance with the COLREGs. In particular, Rule 5 requires vessels to maintain a proper lookout, Rule 7 requires vessels to determine if a risk of collision exists, and both Rule 8 and Section II describes the action to be taken to avoid a collision

Construction Phase

Magnitude of Impact

14.10.56 Modelling results are detailed in Volume 3, Technical Appendix 14.1: Navigation Risk Assessment and indicate that the frequency of collision events is low around the Array Area, with the highest collision likelihoods being cargo vessels. The modelled likelihood of a collision is greatest on routes with higher vessel traffic density.

14.10.57 Given the minimum spacing of 1,086 m between Wind Turbines and the types of vessel traffic passing adjacent to the Proposed Development, a significant increase in risk to visual navigation and collision avoidance is not anticipated. The risks of collision associated with project vessels emerging from the Array Area would be managed through the NSVMP (outline shown in Volume 4, Appendix 29: Outline Navigational Safety and Vessel Management Plan) to be developed post-consent which would define aspects of vessel management during the construction phase to set out the measures required to mitigate marine traffic and transport-related effects resulting from the construction of the Proposed Development.

14.10.58 Recreational and other small craft collision risk is considered low due to the low levels of these vessel types in the Array Area. Moreover, some of these vessels could still choose to transit through the Array Area during the O&M phase. This could present challenges identifying the vessels through radar and targets could be visually less distinct amongst the Wind Turbines. For small craft, (such as fishing boats or yachts) transiting at approximately 6 kts, from emergence from the Array Area, it would take ~10 minutes for it to meet a vessel travelling perpendicular to the Array Area, assuming that most prudent mariners will transit more than 1 nm (1.9 km) from the boundary of the OWF. This 10-minute window where small craft would be visible after emerging from the Array Area would provide opportunity to avoid a collision. The vessel traffic surveys also identified very few recreational vessels in proximity to the Proposed Development due to the distance offshore and, therefore, the increase in risk of collision would be minimal.

14.10.59 Construction vessel movements may interact with existing traffic, for example, when crossing shipping routes, increasing encounter potential and therefore collision risk. Risk controls are embedded (Table 14.13) to deconflict project vessel movements with other passing traffic. Coordinated passage plans for project vessels would also be developed to minimise the potential impact on other traffic.

14.10.60 This assessment considers all stages of the construction process, including its maximum footprint at full build out during the final stage of construction. Based on the analysis, although the modelled increase in total collision frequency is 17.6% larger compared to the base case, the total frequency with the Proposed Development *in situ,* or at its final stage of construction, is modelled as one collision event every 1,520 years, which is very low considering the lifetime of the Project.

14.10.61 Overall, considering the collision risk modelling and the Embedded Mitigations, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.10.62 Several international studies have explored the consequences of vessel-to-vessel collisions. The European Maritime Safety Agency (EMSA) (2015) collision risk model developed for their FSA based on historical incidents estimated that 33% of struck roll-on/roll-off passenger (RoPax) vessels would result in water ingress, of these, 14% would result in sinking (resulting in a joint probability of 4.6% for a struck RoPax to sink). The Marine Safety Committee (MSC) 85-17-2 FSA gives probabilities of 16% of collisions resulting in a serious casualty. Of these serious casualties, 50% of struck vessels would flood, 22% of those flooded vessels would sink, and out of those that sink, there is an even chance of undergoing gradual sinking or rapid capsize. Therefore, the probability of either of the latter occurring is 0.8%. In summary there is a 0.8% chance of a collision resulting in the worst-case scenario of a rapid capsize.

14.10.63 None of the recorded navigational incidents across the UK sector associated with UK OWFs between 2010 and 2019 resulted in loss of life, and analysis of MAIB data suggests that, overall, approximately 1% of collisions would result in

loss of life. As such, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.64 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

14.10.65 Within the NRA, 24 hazards were assessed that scored the risk of collision across all three project phases: Construction, O&M and Decommissioning. The three top collision hazards were identified to have an overall risk score between 6.8 and 7.9 and involved large commercial vessels, passenger vessels, recreational craft and fishing vessels. Although collision hazards present a high risk to people and business, the likelihood of it occurring is considered very low given the available sea room around the Proposed Development and the Embedded Mitigations such as the promulgation of information, and appropriate site marking and charting. The hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.66 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.67 Collision modelling results are detailed in Volume 3, Technical Appendix 14.1: Navigation Risk Assessment and indicate that the frequency of collision events are low around the Array Area, with the highest collision likelihood being a cargo vessel collision, at one in every 4,195 years. The modelled likelihood of a collision is greatest on routes with higher vessel traffic density.

14.10.68 Based on the analysis, although the modelled increase in total collision frequency is 17.6% larger compared to the base case, the total frequency with the Proposed Development *in situ* is modelled as one collision event every 1,520 years, which is very low considering the Project lifetime.

14.10.69 Overall, considering the collision risk modelling, and the increased familiarity with the Proposed Development during operation compared to during construction, the magnitude of impact has been assessed as negligible.

Sensitivity of the Receptor

14.10.70 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the severity of an incident would be the same for the O&M phase as during both the construction phase. Therefore, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.71 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as medium, the overall effect significance could be assessed

as minor or negligible. the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms, as opposed to negligible, given the severity of a worst case collision scenario.

14.10.72 Within the NRA, 24 hazards were assessed that scored the risk of collision across all three project phases: Construction, O&M and Decommissioning. The three top collision hazards were identified to have an overall risk score between 6.8 and 7.9 and involved large commercial vessels, passenger vessels, recreational craft and fishing vessels. Although collision hazards present a high risk to people and business, the likelihood of it occurring is considered very low given the available sea room around the Proposed Development and the Embedded Mitigations such as the promulgation of information, and appropriate site marking and charting. The hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA .

Additional Mitigation and Residual Effect

14.10.73 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.74 Considering the collision risk modelling and the Embedded Mitigations, the magnitude/frequency of occurrence has been assessed as low

Sensitivity of the Receptor

14.10.75 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor would be the same for the decommissioning phase as during both the construction phase. Therefore, the sensitivity of the receptor has been assessed as medium. The potential consequence of vessel collisions is considered the same as for during construction and, therefore, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.76 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

14.10.77 Within the NRA, 24 hazards were assessed that scored the risk of collision across all three project phases: Construction, O&M and Decommissioning. The three top collision hazards were identified to have an overall risk score between 6.8 and 7.9 and involved large commercial vessels, passenger vessels, recreational craft and fishing vessels. Although collision hazards present a high risk to people and business, the likelihood of it occurring is considered very low given the available sea room around the Proposed Development and the Embedded Mitigations such as the promulgation of information, and appropriate site marking and charting. The hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.78 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 4 – INCREASED ALLISION RISK

14.10.79 The construction of any wind farm in otherwise navigable waters increases allision likelihood. During construction, O&M and decommissioning, a vessel is most likely to contact a wind farm structure as a result of human error or mechanical failure, which could be exacerbated by other factors such as a failure of an AtoN or adverse weather conditions, for example. The presence of new infrastructure, or partially constructed infrastructure, in the construction phase, can increase the risk that a vessel may be involved in an allision with it. Potential allision events could also arise from buoyage/markings associated with the Proposed Development.

14.10.80 Impacts were modelled to establish the likelihood of an allision. The methodology for allision modelling is outlined in Volume 3, Technical Appendix 14.1: Navigation Risk Assessment. Allision impacts are considered to be greatest during the O&M phase when full build out is achieved, and modelling was conducted on this basis. The full results of the modelling are therefore presented in the O&M phase assessment.

Construction Phase

Magnitude of Impact

14.10.81 Analysis of historic allision incidents at existing OWFs have primarily involved project vessels at low speed. Project vessels, although more likely to allide with a Wind Turbine due to their working in close proximity, are also more likely to have crew who are experienced in safely transiting OWF areas.

14.10.82 Allision modelling conducted for Volume 3, Technical Appendix 14.1: Navigation Risk Assessment shows that the highest modelled allision frequencies for the Array Area are for fishing vessels, at one in 314 years. The total allision probability of one in 150 years is still considered a low likelihood given the Project lifetime.

14.10.83 Given the considerable distance of the Array Area from the shore, most recreational craft travel further nearshore, closer to Landfall and are unlikely to contact a Wind Turbine during construction, or associated temporary buoyage.

14.10.84 It is noted that, during the construction phase, vessels would be less familiar with a new obstruction. To mitigate this, communication of construction activities and progress would be required and is embedded in the mitigations.

14.10.85 Overall, the magnitude of impact is assessed as low, based on the modelling undertaken.

Sensitivity of the Receptor

14.10.86 Multiple factors (vessel speed, angle and the engineering of the floating foundation or platform and vessel characteristics) influence the sensitivity of the receptor should an allision occur.

14.10.87 Where previous incidents have occurred at existing OWFs, they have primarily involved project vessels at low speed and occur due to equipment failure. The most likely outcome is, therefore, minor damage and/or minor injuries. However, it is feasible that a worst case allision involving a larger vessel might result in Wind Turbine collapse, holing and eventual flooding of a vessel and potential loss of life, though this is considered unlikely given the Embedded Mitigation in place.

14.10.88 Various studies have sought to quantify sensitivity of the receptor (Biehl and Lehmann (2006), VINDPILOT (2008), Dai *et al.* (2013), Moulas *et al.* (2017) and Presencia and Shafiee (2017)). These studies indicate that:

- Ship allisions, even at low speeds, can cause significant damage to Wind Turbines including deformation and buckling.
- Some studies of in-field project construction vessels (up to 4,000 GT), with allisions at high speeds, did not result in Wind Turbine collapse.
- Modelling of allisions with large commercial ships could result in holing of the vessels hull and cargo release.
- Larger vessels (30,000 Deadweight Tonnes (DWT)) alliding with a Wind Turbine might typically result in the tower collapsing away from the vessel.

14.10.89 Some studies however suggested that large commercial ships could result in the tower collapsing towards the vessel, with the damage likely to penetrate the deck.

14.10.90 With the Embedded Mitigations including the LMP (outline shown in (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan) the Array Area would be well marked and there is sufficient sea room to safely pass around the site. However, were one of these vessels to allide with a Wind Turbine, given the available sea room, a glancing blow with minor damage is considered the most likely outcome.

14.10.91 Overall, the sensitivity of receptor has been assessed as medium to reflect both the most likely and reasonable worst case scenario.

Significance of the Effect

14.10.92 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

14.10.93 Within the NRA, eight hazards were assessed that scored the risk of allision across all three project phases: Construction O&M and Decommissioning. The three 'Medium Risk' allision hazards were identified to have an overall risk score between 6.4 and 7.7 and involved OWF service and construction vessels, recreational craft and fishing vessels. Whilst the most likely consequences are minor, allisions could occur more frequently while conducting manoeuvres around the OWF infrastructure. Given the embedded mitigations including appropriate site marking and charting, AtoNs and Wind Turbine spacing, to ensure the vessels can maintain a safe distance from the structures, the hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.94 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.95 Allision modelling conducted for Volume 3, Technical Appendix 14.1: Navigation Risk Assessment shows that the highest modelled allision frequencies for the Array Area are for fishing vessels, at one in 314 years. The total allision probability of one in 150 years is still considered a low likelihood given the Project lifetime.

14.10.96 There is potential for fishing vessels to continue transiting within the Array Area post-construction. As such, there is potential for a fishing vessel to be involved in an allision with surface infrastructure. However, in the event a fishing vessel does choose to transit through the Array Area, the spacing between Wind Turbines is considered to be sufficient for safe navigation of small craft, including fishing vessels and recreational vessels.

14.10.97 Moreover, during the O&M phase, regular transiting vessels would be more familiar with avoiding a new obstruction following the construction phase. Communication of maintenance activities and progress would be required and forms part of the Embedded Mitigations.

14.10.98 Overall, while the full number of Wind Turbines increases the likelihood of allision compared to the construction phase, the longer duration will also increase the vessel masters' familiarity with the structures. Therefore, the magnitude of occurrence is assessed to be low,.

Sensitivity of the Receptor

14.10.99 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the severity of an incident would be the same for the O&M phase as during both the construction phase. Therefore, the sensitivity of the receptor has been assessed as medium, reflecting both a most likely and worst case scenario.

Significance of the Effect

14.10.100 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor** which is not significant in EIA terms.

14.10.101 Within the NRA, eight hazards were assessed that scored the risk of allision across all three project phases: Construction O&M and Decommissioning. The three 'Medium Risk' allision hazards were identified to have an overall risk score between 6.4 and 7.7 and involved OWF service and construction vessels, recreational craft and fishing vessels. Whilst the most likely consequences are minor, allisions could occur more frequently while conducting manoeuvres around the OWF infrastructure. Given the embedded mitigations including appropriate site marking and charting, AtoNs and Wind Turbine spacing, to

ensure the vessels can maintain a safe distance from the structures, the hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.102 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.103 The magnitude of impact is considered to be the same as for construction, and therefore has been assessed as low. This is owed to the vessel traffic profile and activity being similar for decommissioning as during construction.

Sensitivity of the Receptor

14.10.104 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the severity of an incident would be the same for the decommissioning phase as during both the construction and O&M phase. Therefore, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.105 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

14.10.106 Within the NRA, eight hazards were assessed that scored the risk of allision across all three project phases: Construction O&M and Decommissioning. The three 'Medium Risk' allision hazards were identified to have an overall risk score between 6.4 and 7.7 and involved OWF service and construction vessels, recreational craft and fishing vessels. Whilst the most likely consequences are minor, allisions could occur more frequently while conducting manoeuvres around the OWF infrastructure. Given the embedded mitigations including appropriate site marking and charting, AtoNs and Wind Turbine spacing, to ensure the vessels can maintain a safe distance from the structures, the hazards were therefore considered to be ALARP which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.107 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 5 – INCREASED GROUNDING RISK

14.10.108 Although cable burial mitigates the risk of snagging or grounding post-construction, and the CBRA ensures these risks are adequately addressed for the types of gear used along the Export Cable Corridor, in some areas, cable burial may not be possible, and they must be protected by other means, such as standard rock berm/concrete mattresses. The installation of Offshore Export Cables closer to Landfall may lead to a potential increase in the risk of grounding by either causing vessels to deviate closer to shore, where water

depths are shallower, or reducing the water depth and UKC of vessels such that larger draught vessels may be more likely to ground on a cable itself.

14.10.109 Given the depths of the water in and around the Array Area, any route deviations required around the Array Area will not increase the risk of grounding.

14.10.110 The MGN 654 requires that any protection should not reduce the depth of water (referenced to Chart Datum) by more than 5% without being able to suitably demonstrate to the MCA that any identified risks are satisfactory mitigated.

Construction Phase

Magnitude of Impact

14.10.111 The maximum height of Offshore Export Cable protection within the MDS is 2 m and would therefore reduce the water depth by 5% in any regions where the depth of waters is less than 40 m. The 50 m water depth contour is 2.6 nm (4.8 km) from the coastline, therefore only this section of the Offshore Export Cables will be affected by the 5% water depth reduction. However, water depths on the Scottish coast deepen to -20 m within 1 nm (1.9 km) from the coast. Very few vessels navigate within the 20 m contour. Therefore, it is unlikely that cable protection would impact the risk to these vessels; however, a CBRA would be used to assess such impact once a detailed engineering study was undertaken to determine appropriate protection and mitigation.

14.10.112 Furthermore, as shown in Volume 3, Technical Appendix 14.1: Navigation Risk Assessment, most deep draught commercial ships navigated over approximately 5 nm (9.3 km) offshore. Therefore, even though the worst case cable protection is up to 2 m, the depths are sufficient in the areas where larger ships transit such that there would be no discernible impact on the UKC and therefore grounding of commercial ships.

14.10.113 It is possible that works associated with the Offshore Export Cables could displace vessels and cause them to navigate closer to the shore and increase the risk of them running aground. However, the Offshore Export Cables are proposed in an area largely free of navigation constraints and there is appropriate sea room for vessels to navigate around the construction vessels. Embedded Mitigation, including guard vessels, use of NtMs to promulgate information in advance of construction activities, and a Cable Plan will be used to minimise the impacts to vessel navigation during cable installation near to Landfall, and minimise the risk of them transiting closer to shore and grounding on the seabed or the cable.

14.10.114 As a result, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.10.115 In the unlikely event of a grounding, the most likely outcome is minor injuries and minor adverse publicity. However, while unlikely, the worst case consequence could involve loss of small craft, with a single fatality.

14.10.116 Should a vessel ground on the cable protection or on the seabed as a result of deviations required as a result of the Proposed Development, the ERCoP will include provision of appropriate towage services that should be able to mitigate

the consequence of the incident, by ensuring the vessel could be towed away from the cable protection if required.

14.10.117 As a result, the sensitivity of the receptor has been assessed as low, on the basis that the most likely outcome is minor injuries and locations where small vessel grounding is possible would be near to the shoreline

Significance of the Effect

14.10.118 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

14.10.119 Within the NRA, four hazards were assessed that scored the risk of grounding across all three project phases: Construction O&M and Decommissioning. All four hazards were considered 'Low Risk' and therefore no Additional Mitigation was required which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.120 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.121 During the O&M phase, once cable burial is complete, the Offshore Export Cable will not cause any vessels to divert closer to Landfall. It is possible that, in some areas where burial is not possible and the cable is protected, some large draught vessels may divert course slightly to avoid shallower ground, or that during maintenance activities, some vessels may need to deviate around the maintenance vessel. In which case, there is considerable sea room and water depths either side of the Export Cable Corridor to enable these deviations without increasing the risk of grounding.

14.10.122 Furthermore, large project vessels will be working near Landfall much less frequently during the O&M phase compared to the construction phase, further minimising the likelihood of a grounding event.

14.10.123 Overall, Embedded Mitigation should minimise the risk of grounding by limiting the need for vessels to deviate around the Offshore Export Cables and maintenance vessels.

14.10.124 As a result, the magnitude of impact has been assessed as negligible.

Sensitivity of the Receptor

14.10.125 The consequences of a vessel grounding during the O&M phase is anticipated to be the same as during construction. As a result, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.10.126 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to

be **Minor** which is not significant in EIA terms, as opposed to negligible, given that the risk will not be substantially lower than during construction.

14.10.127 Within the NRA, four hazards were assessed that scored the risk of grounding across all three project phases: Construction O&M and Decommissioning. All four hazards were considered 'Low Risk' and therefore no Additional Mitigations were required which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.128 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.129 The likeliness of a vessel grounding during the decommissioning phase is anticipated to be the same as during construction. As a result, the magnitude of the receptor has been assessed as low.

Sensitivity of the Receptor

14.10.130 The consequences of a vessel grounding during the decommissioning phase is anticipated to be the same as during construction. As a result, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.10.131 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

14.10.132 Within the NRA, four hazards were assessed that scored the risk of grounding across all three project phases: Construction O&M and Decommissioning. All four hazards were considered 'Low Risk' and therefore no Additional Mitigations were required which aligns with the assessment of minor within the EIA.

Additional Mitigation and Residual Effect

14.10.133 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 6 – POTENTIAL IMPACT TO SAR CAPABILITY

14.10.134 Traffic associated with each phase of the Proposed Development would lead to an increased number of vessels and personnel in the area, and as such there may be an increase in the number of incidents requiring emergency response or impacts to emergency response procedures.

14.10.135 In the unlikely event of an incident, SAR assets are required to access the site or surrounding area without risk to themselves. In particular, Wind Turbines can pose a hazard to SAR helicopters and, therefore, the design of the Proposed Development should be such to enable helicopter access safeguarding HM Coastguard (HMCG) obligations within the UK SAR Region. An ERCoP is required and embedded in the mitigations to facilitate information sharing regarding the OWF and SAR organisations.

Construction Phase

Magnitude of Impact

14.10.136 Existing incident rates are considered low in the Shipping and Navigation Study Area based on the data studied within Volume 3, Technical Appendix 14.1: Navigation Risk Assessment. The assessments of the impact of the Proposed Development on the likelihood of collision and allision for vessels during construction showed that these are considered unlikely. Therefore, it is not anticipated that the Proposed Development would notably increase the observed existing incident rates, and consequently the likelihood of requiring SAR in the Array Area is relatively low.

14.10.137 A meeting was held on 14 May 2025 (see Table 14.13) with the MCA and NLB to discuss the Array Area layout and proposed layout options were developed following this consultation. Additionally, an ERCoP will be agreed with MCA to enable SAR helicopter operations to be undertaken safely within, and in the vicinity of, the Array Area. The current minimum spacing between the Wind Turbines will be 1,086 m and, with a maximum blade diameter of 236 m, there would be 850 m between blade tips, significantly more than the MGN 654 requirements of 500 m. Therefore, helicopter access guidance is met.

14.10.138 Although specific layouts are subject to detailed studies at a later date than when the EIA is conducted, the Section 36 Consent would typically stipulate that the MCA and NLB must agree to the design layout, in order to ensure that access of SAR assets is not compromised and confirm that principals contained in MGN 654 Annex 5 (MCA, 2021) are followed.

14.10.139 Given the Embedded Mitigations that act to minimise the likelihood of incidents, and therefore the need for SAR, the magnitude of impact has been assessed as negligible.

Sensitivity of the Receptor

14.10.140 Several trials have been conducted by HMCG and MCA in SAR at OWFs (see MCA, 2005; 2019). They found that searching within an OWF is more complex than in open sea and there may be a delay for entry into an OWF whilst the crew familiarise themselves with the site and layouts. During poor visibility, the importance of linear SAR lanes of sufficient width was identified as of significant importance. When transiting through an OWF, all communications and navigation equipment was reported to be operating successfully with Wind Turbines identifiable through radar. Unfamiliarity with transiting and winching in vicinity of Wind Turbines results in slower speeds and delays, which increases fuel consumption and may make searches less effective. Concerns have also been raised regarding visual identification of casualties, as Wind Turbines block the view, particularly during rough weather.

14.10.141 However, it should be considered that the on site presence of construction vessels would form additional resource to respond to any incidents in the area in liaison with the MCA, both in terms of incidents associated with the Proposed Development (i.e. self-help resources), but also incidents occurring to third party vessels outside of the Proposed Development site.

14.10.142 In addition, as required under MGN 654, an ERCoP would be produced and submitted to the MCA detailing how the Project vessels would cooperate and assist in the event of an incident. The principles of SAR access for OWFs are contained in MGN 654, Annex 5.

14.10.143 Should an incident occur in proximity to the Proposed Development, the project vessels are likely to be nearby and therefore be the first response vessel, further minimising the impact on SAR requirement.

14.10.144 As a result, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.10.145 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible**.** The significance of effect for this hazard is considered to be **Negligible** which is not significant in EIA terms, as opposed to minor, given that relevant guidance for SAR will be adhered to, and Embedded Mitigations including production of an ERCoP, as well as the design of the Array Area will minimise the impact as far as possible.

Additional Mitigation and Residual Effect

14.10.146 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.147 Most of the factors that might influence SAR capability, such as the lines of orientation and Wind Turbine spacing remain the same as during construction.

14.10.148 Similarly, existing incident rates are still considered low in the Shipping and Navigation Study Area based on the data studied within Volume 3, Technical Appendix 14.1: Navigation Risk Assessment. An assessment of the impact of the Proposed Development on the likelihood of collision and allision for vessels during O&M showed these are considered unlikely. It is not therefore anticipated that the Proposed Development would notably increase the observed existing incident rates.

14.10.149 Given the Embedded Mitigations, including the approval of a layout plan and the ERCoP in addition to the low likelihood of incidents, the magnitude of impact has been assessed as negligible.

Sensitivity of the Receptor

14.10.150 The outcome of an impact on SAR capabilities is anticipated to be similar to that expected during the construction phase, with a potential adverse effect on casualty visibility, but also with project vessels forming an additional resource to respond to incidents.

14.10.151 As a result, the sensitivity of the receptor has been assessed as low, given the Embedded Mitigations and minimum spacing between Wind Turbines that will allow emergency manoeuvres to be undertaken if required.

Significance of the Effect

14.10.152 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible**.** The significance of effect for this hazard is considered to be **Negligible** which is not significant in EIA terms, as opposed to minor, given that relevant guidance for SAR will be adhered to, and Embedded Mitigations including production of an ERCoP, as well as the design of the Array Area will minimise the impact as far as possible.

Additional Mitigation and Residual Effect

14.10.153 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.154 Decommissioning would lead to an increased number of vessels and personnel in the Shipping and Navigation Study Area, and as such there may be an increase in the number of incidents requiring emergency response or impacts to emergency response procedures. As with construction, the Embedded Mitigations that act to minimise the likelihood of incidents, and therefore the need for SAR, and the low baseline incident rates, the magnitude of impact has been assessed as negligible, the same as during construction. This is owed to the vessel traffic profile and activity being similar during decommissioning as during construction.

Sensitivity of the Receptor

14.10.155 The outcome of an impact on SAR capabilities is anticipated to be similar to that expected during the construction phase, with a potential adverse effect on casualty visibility, but also with project vessels forming an additional resource to respond to incidents.

14.10.156 As a result, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.10.157 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible**.** The significance of effect for this hazard is considered to be **Negligible** which is not significant in EIA terms, as opposed to minor, given that relevant guidance for SAR will be adhered to, and Embedded Mitigations including production of an ERCoP, as well as the design of the Array Area will minimise the impact as far as possible.

Additional Mitigation and Residual Effect

14.10.158 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 7 – INTERFERENCE WITH RADAR, COMMUNICATIONS AND POSITIONING SYSTEMS

14.10.159 Wind farm sites may adversely impact equipment used for navigation, collision avoidance or communications. The sound generated by the Wind Turbines could additionally mask navigational sound signals from vessels or AtoNs.

14.10.160 It is noted that the Array Area sits outside of all port limits, Vessel Traffic Service (VTS) and pilotage areas and therefore whilst shore-based radar may have partial coverage of the Array Area, it would not be actively monitored. Therefore, the presence of the Wind Turbines would not compromise vessel traffic monitoring obligations.

14.10.161 Equipment that may be adversely impacted as a result of the Proposed Development is discussed below:

- Very High Frequency (VHF): essential for communication between vessels and the shore and could be blocked by the presence of Wind Turbines;
- AIS: enhances the identification between vessels for collision avoidance. AIS signal could be blocked or interfered with by the presence of Wind Turbines;
- Global Navigation Satellite System (GNSS) (such as Global Positioning Systems (GPS)): used for satellite positioning systems and navigation. Satellite reception could be impacted by the presence of Wind Turbines;
- marine radar: used for both collision avoidance and vessel navigation. Wind Turbines, like other structures, can result in spurious returns such as side lobes, echoes, reflections and blanketing;
- shore radar: Similar to marine radars, shore radars could be impacted by the Wind Turbines;
- magnetic compass: Compasses are used for vessel navigation. These are potentially impacted by electromagnetic interference from the Wind Turbines. The degree of this impact is also related to the depth of water, cable design and alignment with the earth's magnetic field; and
- noise: The sound generated by the Wind Turbines could mask navigational sound signals from vessels or AtoNs.

14.10.162 A significant body of work has been conducted to examine these impacts in detail within the wider industry, and reference is made to the following studies:

- MCA and QinetiQ (2004). Results of the electromagnetic investigations and assessments of marine radar, communications and positioning systems undertaken at the North Hoyle wind farm by QinetiQ and the MCA;
- British Wind Energy Association (BWEA) (2007). Investigation of Technical and Operational Effects on Marine Radar Close to Kentish Flats Offshore Windfarm;
- Ocean Studies Board's Division on Earth and Life Studies (2022). W Generator Impacts to Marine Vessel Radar;
- Poupart, G (2003). Wind farms impact on radar aviation interests - final report; and
- Matthews, J *et al.* (2007). Stealth Solutions to Solve the Radar-Wind Farm Interaction Problem.

Construction Phase

Magnitude of Impact

14.10.163 A lot of the communication equipment that could be adversely impacted by the presence of the Wind Turbines and cables (including AIS, radar, and GNSS) will be used by vessels frequently transiting in proximity to the Array Area. However, not all of these vessels will experience these effects given that vessels can use different technologies, and transit at different distances from the structures. As a result, the magnitude of impact has been assessed as medium, given that these impacts do have the potential to occur frequently.

Sensitivity of the Receptor

14.10.164 The 2004 QinetiQ study found no noticeable effect on AIS reception or VHF communications both ship-shore and ship-ship within or adjacent to OWFs. A trial aboard SAR helicopters (MCA, 2005) also determined no significant impact on VHF direction finding capabilities. Similarly, the QinetiQ study found no noticeable effect on GPS reception, even in very close proximity to Wind Turbines.

14.10.165 In addition, the potential effects on marine radar were studied extensively in both the MCA and QinetiQ (2004) and BWEA (2007) studies. Both studies determined that the reduced capability to track small vessels within OWFs and the risk of losing acquired targets should be considered by mariners navigating adjacent to OWFs. It is common practice that some of these effects are able to be lessened by the vessel bridge team by careful adjustment of radar controls, such as Gain. Based on this, the MCA developed a shipping route template (MGN 654) that placed the extent of these effects at 1.5 nm (2.8 km), increasing as the vessels transit closer to the Wind Turbines. Intolerable impacts may be experienced up to 0.5 nm (0.9 km) from the OWF. Historical evidence suggests that most vessels pass more than 0.5 nm (0.9 km) from an OWF and therefore these effects are lessened. Adjacent to the Array Area, the density of traffic is relatively low and there are few other navigational hazards, enabling vessels to transit 1.5 nm (2.8 km) from the Array Area. Furthermore, it is likely that most vessels this far offshore would have AIS fitted to mitigate some of these impacts. Due to the Array Area being around 20 nm (37 km)from the mainland and 12 nm (22.2 km) from Orkney, it is also well clear of any ports and harbours, and any VTS coverage. Therefore, no appreciable impact on marine or shore radar for managing navigational safety is anticipated.

14.10.166 Whilst Wind Turbines make an audible sound whilst rotating, the low density of shipping and distance to other navigational marks make this potential impact negligible. In addition, maritime regulations for the audibility of a ship's whistle are well in excess of the typical Wind Turbine sound emissions even at very close range, with the sound level from a wind farm at a distance of 350 m estimated to be 35 dB to 45 dB (U.S Department of Energy, 2008) and a ship's whistle for a vessel of between 75 m and 200 m required to generate in the order of 138 dB and be audible at a range of 1.5 nm (2.8 km), as per Annex III of the 1972 Collision Regulations (COLREGS), so these should be heard above the background noise of the site. Given the findings of these studies, no appreciable effects on navigation safety are anticipated from any of these impacts. All these

impacts are also restricted to the Array Area alone and are unlikely to be affected by the presence of the Offshore Export Cables.

14.10.167 Compasses used for vessel navigation are potentially impacted by electromagnetic interference from the Offshore Export Cables, as well as the Wind Turbines. The degree of this impact is related to the depth of water, cable design and alignment with the earth's magnetic field. Whilst this impact has not been directly observed in studies, it is possible that small vessel compasses could be impacted near to cable Landfall. However, it is considered likely that small craft would navigate visually near to Landfall and therefore the impact on navigation safety is reduced. Moreover, the Cable Plan (CaP) set out as an Embedded Mitigation will likely consider issues including electromagnetic interference minimisation. Therefore, no appreciable impact on navigation safety from electromagnetic interference is anticipated.

14.10.168 Overall, the sensitivity of the receptor has been assessed as negligible.

Significance of the Effect

14.10.169 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as negligible, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that the impact may occur frequently for passing vessels.

Additional Mitigation and Residual Effect

14.10.170 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.171 A lot of the communication equipment that could be adversely impacted by the presence of the Wind Turbines and cables (including AIS, radar, and GNSS) will be used by vessels frequently transiting in proximity to the Array Area. However, as during construction, not all of these vessels will experience these effects given that vessels can use different technologies, and transit at different distances from the structures. As a result, the magnitude of impact has been assessed as medium.

Sensitivity of the Receptor

14.10.172 The consequence of the Proposed Development impacting on communications, radar and positioning systems is considered to be similar to that anticipated for the construction phase, with no appreciable impact on navigation safety expected from the Wind Turbines or the cables.

14.10.173 Overall, the sensitivity of the receptor has been assessed as negligible.

Significance of the Effect

14.10.174 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as negligible, the overall effect significance could be

assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that the impact may occur frequently for passing vessels.

Additional Mitigation and Residual Effect

14.10.175 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.176 As with the construction phase, the impact of communication system disturbance will be minimal. Furthermore, the frequency of occurrence will reduce throughout decommissioning as the number of structures within the Array Area decreases. As a result, the magnitude of impact has been assessed as medium.

Sensitivity of the Receptor

14.10.177 The consequence of the Proposed Development impacting on communications, radar and positioning systems is considered to be similar to that anticipated for the construction phase, with no appreciable impact on navigation safety expected from the Wind Turbines or the cables. Overall, the sensitivity of the receptor has been assessed as negligible.

Significance of the Effect

14.10.178 With the magnitude of impact assessed as medium, and the sensitivity of the receptor assessed as negligible, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that the impact may occur frequently for passing vessels.

Additional Mitigation and Residual Effect

14.10.179 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 8 – REDUCTION IN UNDER KEEL CLEARANCE DUE TO SUBSURFACE OFFSHORE INFRASTRUCTURE

14.10.180 Although cable burial mitigates the risk of grounding post-construction, and the CBRA ensures these risks are adequately addressed for the types of gear used along the Export Cable Corridor, in some areas, cable burial may not be possible, and the Offshore Export Cables must be protected by other means, such as standard rock berm/concrete mattresses. The installation of Offshore Export Cables closer to Landfall may lead to a reduction in UKC.

14.10.181 It is noted that dynamic cables that are not on the seabed, proposed within the Array Area, can also lead to a reduction in UKC, as well as foundation mooring lines.

Construction Phase

Magnitude of Impact

14.10.182 The maximum height of Offshore Export Cable protection within the MDS is 2 m and would therefore reduce the water depth by 5% in any regions where the depth of waters is less than 40 m. However, deep draught vessels are extremely unlikely to transit this close to the shore. Moreover, there is sufficient sea room for vessels to transit further away from Landfall.

14.10.183 During construction of the Proposed Development, Safety Zones will be in operation, hence no third party vessels will be present within the Array Area where the dynamic IACs and foundation moorings would be situated.

14.10.184 Therefore, the magnitude of impact is deemed to be low.

Sensitivity of the Receptor

14.10.185 In the event of a significant reduction in UKC, and a vessel snags on subsurface infrastructure, the most likely outcome consists of minor injuries, minor vessel damage and minor adverse publicity.

14.10.186 The reasonable worst case outcome is considered to involve a single fatality, loss of small craft and minor pollution, although this is considered very unlikely given the marking and charting of the site, the use of Safety Zones, the sea room available around the Export Cable Corridor, and the development of an ERCoP.

14.10.187 Overall, taking this into account, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.188 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.189 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.190 During the O&M phase of the Proposed Development, the reduction of UKC due to subsurface infrastructure outside of the Array Area is anticipated to impact vessels with the same frequency as is anticipated during the construction phase, given the height of the cable protection and available sea room.

14.10.191 For small vessels such as fishing vessels and recreational vessels which may transit within the Array Area post-construction, the IACs and foundation moorings have potential to cause a reduction in UKC. Fishing vessels are at a higher risk due to the gear which they may deploy in proximity to subsea infrastructure. It is noted however that Embedded Mitigation of marking and charting of subsea cables and foundation moorings, and NtMs will make fishermen aware of these risks, and it would be unlikely they would deploy gear where unsafe to do so.

14.10.192 Therefore the magnitude of impact is considered to be low.

Sensitivity of the Receptor

14.10.193 In the event of a significant reduction in UKC, and a vessel snags on subsurface infrastructure, the most likely outcome consists of minor injuries, minor vessel damage and minor adverse publicity.

14.10.194 The reasonable worst case outcome is considered to involve a single fatality, loss of small craft and minor pollution, although this is considered very unlikely given the marking and charting of the site, the use of Safety Zones, the sea room available, and the development of an ERCoP.

14.10.195 Overall, taking this into account, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.196 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.197 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.198 During the decommissioning phase of the Proposed Offshore Development, the reduction of UKC due to subsurface infrastructure is anticipated to impact vessels (both transiting and fixed fishing gear vessels) with the same frequency as is anticipated during the construction phase, given the height of the cable protection and available sea room.

14.10.199 Therefore the magnitude of impact is deemed to be low.

Sensitivity of the Receptor

14.10.200 The outcome in the event of a significant reduction in UKC, and a vessel snagging on subsea infrastructure, is also anticipated to be the same as during construction, this is owed to the vessel traffic profile an activity being the same during decommissioning as during construction. The most likely outcome consisting of minor injuries and minor vessel damage, and the reasonable worst case outcome involving a single fatality.

14.10.201 Therefore, the sensitivity of the receptor is deemed to be medium.

Significance of the Effect

14.10.202 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.203 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 9 – POTENTIAL IMPACT FROM TOWAGE OPERATIONS

14.10.204 During towage operations, there is a risk that the tow line may split, enabling the towed unit to break free and drift, posing a hazard to third party vessels.

Construction Phase

Magnitude of Impact

14.10.205 Each tow out operation will have dedicated towage plans, method statements and risk assessment that accounts for the full capabilities of the vessels engaged, how the tow will be undertaken, and will design appropriate towage arrangements. Embedded Mitigation will further reduce risk, including the NSVMP and the application of the COLREGs, would also ensure that the risk of breakout during towage is limited. In constrained waters, such as the approaches to ports, risk assessments should be jointly developed with the port authority and might include the use of guard vessels or additional tugs.

14.10.206 In addition, the moorings will be subject to the requirement of the Regulatory expectations on moorings for floating wind and marine devices (HSE/MCA, 2017), which dictates that the mooring systems should be designed to resist such forces acting on it as are reasonably foreseeable conditions. These requirements also mandate that the installation will be subject to the Construction (Design and Management) Regulations 2015 (CDM Regulations) which requires risks to be managed by the application of the principles of prevention. It also imposes the need for inspection and monitoring of the moorings during the operational phase. As a result, Wind Turbine breakout during towage is considered to be very unlikely, and the magnitude of impact is therefore assessed to be low.

Sensitivity of the Receptor

14.10.207 In the unlikely event a Wind Turbine was to breakout during towage, it would still be marked and visible to other navigating vessels in accordance with the LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan) and a response plan will be included within the ERCoP with Additional Mitigation such as failure warning measures and tracking devices, as well as response and recovery procedures. Continuous monitoring by the Marine Coordination Centre and use of tracking alarms would also ensure immediate detection of such a situation and a timely response. These measures will assist other navigating vessels to identify and avoid the hazard.

14.10.208 Given the Embedded Mitigations, including promulgation of information to be provided to vessels navigating in the area along with an emergency response procedure in order to mitigate the likelihood of an allision during towing, the outcome of such an event given the available sea room would likely be a glancing blow with minor damage. Therefore, the sensitivity of the receptor is assessed to be low.

Significance of the Effect

14.10.209 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to

be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that Wind Turbine towage operations are not experienced by mariners on a daily basis.

Additional Mitigation and Residual Effect

14.10.210 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.211 In the event a maintenance activity cannot be carried out on-site, a Wind Turbine may have to towed to port. Each tow operation will have a dedicated towage plan, method statements and risk assessment that accounts for the full capabilities of the vessels engaged, how the tow will be undertaken, and will design appropriate towage arrangements. Embedded Mitigation will further reduce risk, including the NSVMP and the application of the COLREGs, would also ensure that the risk of breakout during towage is limited. In constrained waters, such as the approaches to ports, risk assessments should be jointly developed with the port authority and might include the use of guard vessels or additional tugs. Although during O&M, the frequency of tow operations will be much lower.

14.10.212 Therefore the magnitude of impact is assessed to be negligible.

Sensitivity of the Receptor

14.10.213 The outcome of an incident is anticipated to be the same as during construction, therefore the sensitivity of the receptor is low. This is owed to the vessel traffic profile and activity being similar during decommissioning as during construction.

Significance of the Effect

14.10.214 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that Wind Turbine towage operations are not experienced by mariners on a daily basis.

Additional Mitigation and Residual Effect

14.10.215 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.216 The magnitude of impact is considered to be the same as during construction, therefore low.

Sensitivity of the Receptor

14.10.217 The outcome of an incident is anticipated to be the same as during construction, therefore the sensitivity of the receptor is low.

Significance of the Effect

14.10.218 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that Wind Turbine towage operations are not experienced by mariners on a daily basis.

Additional Mitigation and Residual Effect

14.10.219 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 10 – BREAKOUT OR LOSS OF STATION OF A FLOATING WIND TURBINE

14.10.220 Were the Wind Turbine moorings to fail, it is possible that a Wind Turbine could become displaced from its position or break free and become a navigational hazard to vessels. The moorings will be subject to the requirement of the Regulatory expectations on moorings for floating wind and marine devices (HSE/MCA, 2017) which dictates that the mooring systems should be designed to resist such forces acting on it as are reasonably foreseeable conditions. These requirements also mandate that the installation will be subject to the CDM Regulations which requires risks to be managed by the application of the principles of prevention.

Construction Phase

Magnitude of Impact

14.10.221 The MDS includes up to six moorings per floater, minimising the likelihood of a Wind Turbine moving position in the event of the most likely impact scenario in which one mooring line fails. While a partial turbine failure (e.g. Wind Turbine blade) or a catastrophic failure (sinking) is possible, this is considered unlikely in normal situations given the requirement for the risks to be managed by the application of the principles of prevention imposed by the CDM Regulations.

14.10.222 Taking this into account, alongside the requirements to which the moorings are initially subject to, Wind Turbine breakout is considered to be very unlikely, and the magnitude of impact is therefore assessed to be negligible.

Sensitivity of the Receptor

14.10.223 In the unlikely event a Wind Turbine was to breakout, it would still be marked and visible to other navigating vessels in accordance with the LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan) and a response plan will be included within the ERCoP with Additional Mitigation such as failure warning measures and tracking devices, as well as response and recovery procedures. Continuous monitoring by the Marine Coordination Centre and use of tracking alarms would also ensure immediate detection of such a

situation and a timely response. These measures will assist other navigating vessels to identify and avoid the hazard.

14.10.224 The risk of an allision occurring as a result of a Wind Turbine losing station is considered very low. Nevertheless, it is noted that, in the event of a partial Wind Turbine failure or a catastrophic failure, which may result in floating or submerged obstructions, the visibility of the hazard would be reduced and the risk of an allision and major vessel damage is increased. Although information would be provided to vessels navigating in the area along with an emergency response procedure in order to mitigate the likelihood of an allision, the sensitivity of the receptor is assessed to be high.

Significance of the Effect

14.10.225 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as high, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.226 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.227 The MDS includes up to six moorings per floater, minimising the likelihood of a Wind Turbine moving position in the event of the most likely impact scenario in which one mooring line fails. While a partial turbine failure (e.g. Wind Turbine blade) or a catastrophic failure (sinking) is possible, this is considered unlikely in normal situations given the requirement for the risks to be managed by the application of the principles of prevention imposed by the Construction (Design and Maintenance) Regulations 2015.

14.10.228 Taking this into account, alongside the requirements to which the moorings are initially subject to, Wind Turbine breakout is considered to be very unlikely, and the magnitude of impact is therefore assessed to be negligible.

Sensitivity of the Receptor

14.10.229 Were the Wind Turbines to breakout, the impact of this on both navigating and project vessels and on other Wind Turbines is anticipated to be the same as is expected during construction as the nature of the hazard is independent of the project phase. Therefore, the sensitivity of the receptor is assessed to be high.

Significance of the Effect

14.10.230 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as high, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.231 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.232 The likelihood of the impact occurring is considered to be the same as during construction, and the magnitude of impact is therefore assessed to be negligible.

Sensitivity of the Receptor

14.10.233 Were the Wind Turbines to breakout, the impact of this on navigating vessels is anticipated to be the same as is expected during construction as the nature of the hazard is independent of the project phase. Therefore, the sensitivity of the receptor is assessed to be high.

Significance of the Effect

14.10.234 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as high, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.235 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 11 – POTENTIAL IMPACT ON PORTS/HARBOURS AND OTHER NEARSHORE OPERATIONS

14.10.236 Access to local ports may be affected by the presence of the Proposed Development and the operations associated with it. This can occur due to construction taking place in the vicinity of the port or due to project vessel operations from a port during each phase affecting the vessel traffic management in the area. The base ports for the Proposed Development have not been determined so it is not possible to assess the effects on them. Therefore, this section considers the effects of construction vessels operating in the vicinity of ports in the Shipping and Navigation Study Area.

14.10.237 The nearest port is the port of Wick, located 4 nm (7.4 km) south of the Landfall. Vessel anchoring or waiting were observed close to the Landfall in Sinclair's Bay (>12 hours/year). This means that there is potential for interaction between these vessels and Project vessels associated with the Offshore Export Cable installation. It is likely however that the vessels recorded within Sinclair's Bay are associated with the Subsea7 fabrication facility or taking shelter, rather than awaiting entry to the port of Wick.

Construction Phase

Magnitude of Impact

14.10.238 The Array Area is located around 20 nm (37 km) from the mainland and 12 nm (22.2 km) from Orkney and therefore there would be a negligible effect on ports and harbours from the Array Area. Similarly, given the depth of water and available sea room, it is not anticipated that the construction of the Offshore Export Cables will adversely affect the ability for vessels to access ports.

14.10.239 In addition, vessels associated with the construction of the Proposed Development are not anticipated to notably increase overall baseline traffic levels in the area, with a maximum of 30 construction vessels required on site

at any one time for the Array Area and 16 for the Offshore Export Cables. Marine coordination and vessel procedures will be in place to manage project vessel movements and minimise disruption to third party vessels as per the proposed NSVMP. As such, no notable impact on port access is expected from the construction vessels, noting any interactions with third party vessels would be managed via COLREGS in addition to the marine coordination procedures.

14.10.240 Overall, because the Export Cable Corridor is located over 4 nm (7.4 km) from the port of Wick, and the construction will be a limited footprint for a relatively short period of time, there will be a limited impact on access to the ports.

14.10.241 Given the distance of the Offshore Export Cables from the ports, the amount of loitering associated with either port, and the Embedded Mitigation that ensure management of project vessels, the magnitude of impact on access to the ports is assessed to be low.

Sensitivity of the Receptor

14.10.242 Given the traffic volumes serving the local ports, and the minimal amount of disruption that would likely be experienced in the event that access is impacted, the sensitivity of the receptor is considered to be low.

Significance of the Effect

14.10.243 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.10.244 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.245 Whilst there will be notably less vessels active on site during the O&M phase, the likelihood of there being an impact to local ports and harbours as a result of the Proposed Development is considered to be much the same as during construction. Therefore, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.10.246 Given the minimal amount of disruption that would likely be experienced in the event that port access is impacted, the sensitivity of the receptor is considered to be low.

Significance of the Effect

14.10.247 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.10.248 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.249 As with the construction phase, the magnitude of impact on access to the ports is assessed to be low. This is owed to the vessel traffic profile and activity being similar during decommissioning as during construction.

Sensitivity of the Receptor

14.10.250 As with the construction phase, given the minimal amount of disruption that would likely be experienced in the event that port access is impacted, the sensitivity of the receptor is considered to be low.

Significance of the Effect

14.10.251 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.10.252 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

IMPACT 12 – POTENTIAL IMPACT ON SMALL VESSEL ACTIVITY (INCLUDING FISHING AND RECREATION)

14.10.253 Small Craft activity throughout the Shipping and Navigation Study Area is presented within Volume 3, Technical Appendix 14.1: Shipping and Navigation RiskAssessment. During the phases of the Proposed Development, recreational vessel users may be at risk of route displacement, grounding, or a collision or allision event, while commercial fisheries may also be at risk of gear snagging. This could be in response to Proposed Development vessel traffic, installation activities and/or the physical presence of partially constructed surface and subsurface infrastructure.

Construction Phase

Magnitude of Impact

14.10.254 During the construction phase, the presence of partially protected cables during installation may increase anchor and fishing gear snagging risk in these discrete areas. During construction, it is required in the Embedded Mitigation that Safety Zones would be established of an appropriate configuration and extent to

mitigate for potential snagging hazards. Local sea users will also be made aware of the construction activities and any partially protected cables via NtMs or via the Kingfisher bulletin.

14.10.255 Moreover, as part of the NSVMP, guard vessels may be used where applicable to ensure adherence with Safety Zones or advisory passing distances to mitigate impacts which pose a gear snagging risk during construction.

14.10.256 Some fishing vessels, particularly those that fish in proximity to the Export Cable Corridor, may also experience temporary displacement from fishing grounds as a result of cable installation activity. However, this activity should be short-term, and the available sea room should be sufficient for deviations to alternative fishing grounds be undertaken safely.

14.10.257 During the construction phase, the presence of a partially constructed wind farm may increase the likelihood of an allision with a Wind Turbine. However, given the low density of recreational vessels as far offshore as the Array Area, and Embedded Mitigations including a NSVMP, this is unlikely.

14.10.258 Impacts to recreational vessels are considered more likely where there is a higher density of recreational activity, particularly near the Landfall. Impacts may be experienced temporarily during cable installation for vessels navigating close to shore. Nevertheless, there is sufficient sea room to enable vessel deviation, and Embedded Mitigation including the promulgation of information will ensure that recreational vessels are aware of any planned cable construction or maintenance activity.

14.10.259 Overall, considering all the Embedded Mitigation and the fact that construction is only temporary, the magnitude of impact on small craft is assessed as low.

Sensitivity of the Receptor

14.10.260 The Fisheries Mitigation, Monitoring and Communication Plan (Volume 4, Appendix 28: Fisheries Mitigation, Monitoring and Communication Plan) has been produced that sets out the means of ongoing fisheries liaison, such as through the appointment of a FLO, through construction and reduce effects on commercial fisheries activity, where feasibly practicable.

14.10.261 Were a fishing vessel to snag a cable, the most likely outcome is loss of gear and minor damage to the cable. A more severe worst credible outcome is the loss of the fishing vessel and potential fatalities; however, through the NRA, this scenario is considered unlikely with the application of the Embedded Mitigation, including Safety Zones, FLO (defined within the FMMCP), and the Cable Plan.

14.10.262 A recent study by the National Federation of Fishermen's Organisations (NFFO) and SFF has highlighted that the potential loss of fishing grounds can result in an effect referred to as 'Spatial Squeeze' (NFFO, 2022). Such an effect may result in boats currently fishing within the footprints of the Array Area being offset into the adjacent routes, interacting with other passing traffic and increasing the risk of collision. As shown in Section 6 of Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment, the density of traffic around the Array Area is relatively low and therefore the change in the risk of collision is not anticipated to be significant.

14.10.263 Most of the recreational vessels observed within the Shipping and Navigation Study Area were focused around Orkney in the west of the Shipping and Navigation Study Area. Therefore, construction activity within the Array Area is not considered likely to have a significant impact on recreational vessel users. If recreational vessels did want to transit through the Array Area on passage to other ports, there is still sufficient sea room around the safety zone to enable deviation given the minimum turbine spacing of 1,086 m, so little impact is expected.

14.10.264 With regard to Offshore Export Cable installation near Landfall, were a recreational vessel to run aground on the cable route, the most likely outcome is minor injuries and minor damage to the cable. A more severe outcome is the loss of the small vessel and a single fatality; however, through the NRA this is considered unlikely with the Embedded Mitigations (information promulgation, NSVMP and an ERCoP in place).

14.10.265 Considering the Embedded Mitigation and the unlikely potential for fatalities, the overall sensitivity of small craft is assessed as being medium.

Significance of the Effect

14.10.266 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.267 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.10.268 Similar to the construction phase, the presence of cables may increase anchor and fishing gear snagging risk. The presence of the Proposed Development may also increase the likelihood of an allision with a Wind Turbine or OSP. However, given the low density of recreational vessels as far offshore as the Array Area, the requirement for all cables to be charted, and the requirement for a NSVMP, this is unlikely. Local sea users (fishing and recreational) will also be made aware of any maintenance activities undertaken related to the Proposed Development via NtMs or via the Kingfisher bulletin.

14.10.269 Moreover, as part of the NSVMP, guard vessels may be used where applicable to ensure adherence with advisory passing distances to mitigate impacts which pose a gear snagging risk during operation.

14.10.270 The impact to small craft is considered to be higher nearer the Landfall, as a result of any cable maintenance activities. This activity should be short-term, and the available sea room should be sufficient for necessary deviations to be undertaken safely. Risk controls would also be established (as set out in the Embedded Mitigation) to deconflict Proposed Development vessel movements with other passing traffic.

14.10.271 Overall, considering all the Embedded Mitigation and the fact that maintenance activities are only short-term, the magnitude of impact on small craft is assessed as low.

Sensitivity of the Receptor

14.10.272 As the physical consequences of a vessel snagging or a recreational vesse runs aground are determined by the characteristics of the vessels involved, rather than by the project phase, the severity of an incident would be the same for the O&M phase as during both the construction phase. Therefore, the sensitivity of the receptor has been assessed as medium.

14.10.273 Therefore, noting that the worst case scenarios are considered very unlikely given the Embedded Mitigation in place, the sensitivity of the receptor is assessed as medium.

Significance of the Effect

14.10.274 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.275 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.10.276 Similar to the construction phase, the presence of cables may increase anchor and fishing gear snagging risk. Overall, considering all the Embedded Mitigation and the fact that decommissioning is only short-term, the magnitude of impact on small craft is assessed as low.

Sensitivity of the Receptor

14.10.277 As the physical consequences of a vessel snagging or a recreational vesse runs aground are determined by the characteristics of the vessels involved, rather than by the project phase, the severity of an incident would be the same for the decommissioning phase as during both the construction phase. Therefore, the sensitivity of the receptor has been assessed as medium.

Significance of the Effect

14.10.278 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.10.279 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

14.11 Inter-Related Effects

14.11.1 A description of the likely inter-related effects arising from the Proposed Development on shipping and navigation is provided in Volume 2, Chapter 23: Inter-Related Effects.

14.11.2 The impacts and effects identified and assessed in this chapter have the potential to interact with each other, which could give rise to synergistic impacts as a result of that interaction.

14.11.3 Table 14.14 lists the inter-related effects (project lifetime effects) that are predicted to arise during the construction, O&M phase, and decommissioning of the Proposed Development and also the inter-related effects (receptor-led effects) that are predicted to arise for shipping and navigation receptors.

14.11.4 Given the nature of shipping and navigation, project lifetime effects are uncommon because impacts occur at different times and do not typically build up across phases. No project lifetime effects with respect to shipping and navigation are predicted during construction, O&M, and decommissioning that are not already considered within the impact assessment undertaken within this chapter. None of the likely significant environmental effects considered will be worsened through interactions across different phases of the Proposed Development.

14.11.5 As noted above, effects on shipping and navigation also have the potential to have secondary effects on other receptors and these effects are fully considered in the topic-specific chapters. These receptors and effects are:

- Commercial Fisheries (Volume 2, Chapter 13):
  - Potential impact on small vessel activity.
- Socioeconomics, Tourism and Recreation (Volume 2, Chapter 18):
  - Potential impact on small vessel activity.
- Aviation and Radar (Volume 2, Chapter 15):
  - Interference with Radar, communications, and positioning systems; and
  - Potential impact to SAR capability.
- Infrastructure and Other Users (Volume 2, Chapter 16):
  - Potential impact to SAR capability.

Table 14.14: Summary of Likely Significant Inter-Related Effects for Shipping and Navigation from Individual Effects Occurring Across the Construction, O&M and Decommissioning Phase of the Proposed Development (Project Lifetime Effects) and from Multiple Effects Interacting Across all Phases (Receptor-led Effects)

Description of Impact	Phase*			Likely Significant Inter-Related Effects
	C	O	D	
Project Lifetime Effects				
Impact of floating mooring and cable systems and interactions with vessels at risk of snagging	✓	✓	✓	The Navigational Risk Assessment (NRA) conducted (Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment) was of sufficient detail that interactions between effects were considered from different phases. This identified that impacts are temporally distinct and do not produce increasingly higher impacts over multiple project phases. No impacts with respect to shipping and navigation are predicted to compound during construction, O&M, and decommissioning. None of the likely significant environmental effects considered will be worsened through interactions across different phases of the Project. Therefore, across the Project lifetime, the effects on shipping and navigation receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each individual phase.
Deviation of commercial vessels	✓	✓	✓	
Increased collision risk	✓	✓	✓	
Increased contact/allision risk	✓	✓	✓	
Increased grounding risk	✓	✓	✓	
Impact to SAR capability	✓	✓	✓	
Interference with Radar, communications and positioning systems	✓	✓	✓	
Reduction in UKC due to subsurface Offshore Infrastructure	✓	✓	✓	
Towage operations	✓	✓	✓	
Breakout or loss of station of a floating Wind Turbine	✓	✓	✓	
Impact on port/harbours and nearshore operations	✓	✓	✓	
Impact on small vessel activity (fishing/recreational)	✓	✓	✓	
Receptor-led Effects				
Displacement of fishing activity and displacement of commercial vessels leading to fishing in higher density traffic areas	✓	✓	✓	Potential exists for interactions between impacts to shipping and navigation and commercial fishing in respect of displacement of fishing activity from the Proposed Development's Array Area. This displacement of fishing activity can be further displaced or disrupted in areas of dense commercial shipping caused by changes in commercial shipping routes. Alternatively, displacement of fishing away from the Array Area can lead to reduction in impacts of allision and snagging as less fishing would occur in these areas. These impacts are assessed in Volume 2, Chapter 14: Shipping and Navigation and within Volume 2, Chapter 13: Commercial Fisheries. The NRA conducted for shipping and navigation (Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment) was of sufficient detail that interactions between effects to marine receptors were considered, both from different phases and different receptors, and therefore the assessment captures these effects on marine receptors. Embedded mitigation for the appointment of a FLO (defined within the defined within the FMMCP), advance notification (via NtMs and Kingfisher Bulletins), Navigational Safety Plan (NSP) and Vessel Management Plan (VMP) resulted in the assessment of each on any single receptor to be captured. Therefore, with the presence of Embedded Mitigation, these receptor-led effects on shipping and navigation receptors are considered to be of no greater significance than those already assessed in isolation.
Displacement of fishing activity leading changes to contact/allision risk.	✓	✓	✓	
Impact on small vessel activity (fishing/recreational) leading to changes in commercial fishing.	✓	✓	✓	
Impact on vessel routing causing delays and cancellations for local operators in normal and adverse conditions.	✓	✓	✓	Potential exists for interactions between impacts to shipping and navigation and socio-economics, tourism and recreation in respect of deviations leading to delays of sailing cancelations. The NRA conducted for shipping and navigation (Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment) identified that regular running ferry services would not be impacted by the presence of the Proposed Development in normal or adverse weather and therefore the inter-related effects of this impact is considered to be of no greater significance than that already assessed in isolation.
Impact to SAR capability from marine and aviation responders.	✓	✓	✓	Potential exists for interactions between impacts to shipping and navigation and aviation and radar in respect of:

Description of Impact	Phase*			Likely Significant Inter-Related Effects
	C	O	D	
Interference with Radar, communications and positioning systems for marine and aviation receptors.	✓	✓	✓	• lighting and marking; • impact to radar, communications and positioning systems; and • SAR requirements. The need for search and rescue assets to enter the Proposed Development Array Area has impacts upon marine (lifeboat) and aviation (SAR helicopter) receptors. These impacts are assessed in Volume 2, Chapter 14: Shipping and Navigation and within Volume 2, Chapter 15: Aviation and Radar. The NRA conducted for shipping and navigation (Volume 3, Technical Appendix 14.1: Shipping and Navigation Risk Assessment) was of sufficient detail that interactions between effects to marine receptors were considered, both from different phases and different receptors, and therefore the assessment captures these effects on marine receptors. Embedded Mitigation for joint Lighting and Marking Plan (LMP) (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan). Navigational Safety and Vessel Management Plan (NSVMP) cand ERCOP to be developed in consultation with the relevant maritime and aviation authorities resulted in the assessment of each on any single receptor to be captured. Therefore, the receptor-led effects on shipping and navigation receptors are not anticipated to interact in such a way as to result in combined effects of greater significance than the assessments presented for each receptor.
Breakout or loss of station of a floating Wind Turbine leading to changes in marine and aviation or SAR.	✓	✓	✓	

* Proposed Development Phase refers to construction (C), O&M (O) and decommissioning (D).

14.12 Cumulative Effects Assessment

Methodology

14.12.1 The Cumulative Effects Assessment (CEA) assesses the impact associated with the Proposed Development together with other relevant projects and activities. Cumulative effects are defined as the effect of the Proposed Development in combination with the effects from a number of different projects, on the same receptor or resource. Further details on CEA methodology are provided in Volume 1, Chapter 4: EIA Methodology.

14.12.2 The projects selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see Volume 3, Technical Appendix 4.4: Cumulative Effects Assessment - Screening). Volume 3, Technical Appendix 4.4: Cumulative Effects Assessment - Screening provides further information in relation to other projects and how this information is obtained and applied to the assessment. Each project has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved.

14.12.3 In undertaking the CEA for the Proposed Development, it is important to bear in mind that other projects under consideration will have differing potential for proceeding to an operational stage and hence a differing potential to ultimately contribute to a cumulative impact alongside the Proposed Development. Therefore, a tiered approach has be adopted. This provides a framework for placing relative weight upon the potential for each project to be included in the CEA to ultimately be realised, based upon the project's current stage of maturity and certainty in the projects' parameters. The tiered approach which will be utilised within the Proposed Development CEA employs the following tiers:

- Tier 1 – the onshore elements of the Proposed Development;
- Tier 2 – projects that have an application submitted, are consented, under construction or operational to the extent not already captured with the baseline;
- Tier 3 – projects which have submitted a scoping report and/or have received a scoping opinion; and
- Tier 4 – reasonably foreseeable projects including those with CES option or lease agreements.

14.12.4 The specific projects scoped into the CEA for shipping and navigation are outlined in Table 14.15.

14.12.5 The range of potential cumulative impacts that are identified and included in Table 14.15 below, is a subset of those considered for the Proposed Development alone assessment. This is because some of the potential impacts identified and assessed for the Proposed Development alone, are localised and temporary in nature. It is considered therefore, that these potential impacts have limited or no potential to interact with similar

changes associated with other plans or projects. These have therefore been scoped out of the CEA.

14.12.6 Similarly, some of the potential impacts considered within the Proposed Development alone assessment are specific to a particular phase of development (e.g. construction, O&M or decommissioning). Where the potential for cumulative effects with other projects only have potential to occur where there is spatial or temporal overlap with the Proposed Development during certain phases of development, impacts associated with a certain phase may be omitted from further consideration where no projects have been identified that have the potential for cumulative effects during this period.

14.12.7 Projects were included in the assessment based on a screening range covering both the spatial and temporal scope of the Proposed Development, defined by construction and decommissioning timelines and study area. The screening distance is set at 50 nm (92.6 km), based on industry best practice and was agreed with stakeholders present at the one-to-one consultations or the HAZID Workshop (see Section 14.4).

14.12.8 Potential cumulative impacts on shipping and navigation receptors have been evaluated using project-specific considerations and future case re-routing analysis in a cumulative project scenario as captured in the NRA (Volume 3, Technical Appendix 14.1: Sipping and Navigation Risk Assessment).

Table 14.15: List of Other Projects Considered within the CEA for Shipping and Navigation

Project	Status	Distance from Proposed Development (Array Area) (km)	Description of Project	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Proposed Development
Tier 1						
Ayre Onshore Transmission Infrastructure	Planning	0.00	The Onshore Infrastructure associated with the Project.			
Tier 2						
Offshore Wind Projects and Associated Cables						
Buchan OWF	Planning	53.11	Buchan Offshore Wind Farm is proposed for up to 70 Wind Turbines at a capacity of 960 MW.	2030-2033	2035 onwards	The Project construction phase will partially overlap construction phase of this project, as well as the O&M phase.
Caledonia (North and South) OWF	Planning	17.55	Caledonia Offshore Wind Farm is proposed for up to 150 Wind Turbines at a capacity of 2,000MW.	2028-2031	2032 onwards	The Project construction phase will partially overlap construction phase of this project, as well as the O&M phase.
Moray OWF (West)	Operational	45.19	Moray West Offshore Wind Farm is consented for up to 60 Wind Turbines at a capacity of 882MW	Operational	2025 onwards	The Project O&M phases will overlap with O&M phase of this project.
Pentland Floating Offshore Wind	Consented	43.42	Pentland floating Offshore Wind Farm is consented for up to six Wind Turbines with a maximum generating capacity of 100MW.	2025-2026	2027 onwards	The Project construction and O&M phases will overlap with O&M phase of this project.
West of Orkney Wind Farm	Consented	60.50	West of Orkney Wind Farm is proposed for up to 125 Wind Turbines at a capacity of 2,250 MW.	2028-2031	2032 onwards	The Project construction phase will partially overlap construction phase of this project, as well as the O&M phase.
Oil and Gas						
P1270 (Lybster)	Operational	26.22	Decommissioning of oil and gas asset owned by Star Energy Group PLC.	N/A	Until 2032	Decommissioning anticipated to commence in 2032 per CEA Longlist.
P810	Operational	66.46	Decommissioning of oil and gas asset owned by REPSOL RESOURCES UK LIMITED (00825828)	N/A	Until 2030	Decommissioning anticipated to commence in 2030 per CEA Longlist.
P973	Operational	78.98	Decommissioning of oil and gas asset owned by REPSOL RESOURCES UK LIMITED (00825828)	N/A	Until 2028	Decommissioning anticipated to commence in 2028 per CEA Longlist.
P729 (Blake Field/Ross Field)	Operational	75.93	Decommissioning of oil and gas asset owned by REPSOL RESOURCES UK LIMITED (00825828)	N/A	Until 2028	Decommissioning anticipated to commence in 2028 per CEA Longlist.
Cables and Pipelines						

Project	Status	Distance from Proposed Development (Array Area) (km)	Description of Project	Dates of Construction (If Applicable)	Dates of Operation (If Applicable)	Overlap with the Proposed Development
SSE distribution cable projects between islands in eastern Orkney	Construction	19.60	Cable, Submarine, Power line.	2024-2027	2028 onwards	Operation anticipated to commence in 2028 per CEA Longlist.
SSEN-T Spittal to Peterhead HVDC	Planning	0.00	Cable, Submarine, Power line.	2025-2030	Unspecified	Operation anticipated to commence in 2030 per CEA Longlist.
Tier 3						
Offshore Wind Projects and Associated Cables						
Broadshore Hub OWFs	Scoping	51.81	The Broadshore Hub OWFs (comprising Broadshore OWF, Sinclair OWF and Scaraben OWF) is proposed for up to 72 Wind Turbines at a capacity of 1,100 MW across the three projects.	2028-2029	2030 onwards	The Project will overlap the O&M phase.
Marram Offshore Wind Farm	Scoping	92.06	Marram Offshore Wind Farm is proposed for up to 150 Wind Turbines at a capacity of 3,000MW.	2026-2029	2030 onwards	The Project will overlap the O&M phase.
Stromar Offshore Wind Farm	Scoping	10.84	Stromar is proposed for up to 1.5,000 GMW capacity.Stromar is proposed for up 71 turbines at a 1,500 MW capacity.	2026-2032	2033 onwards	The Project construction phase will partially overlap construction phase of this project, as well as the O&M phase.

* Project Phase refers to construction (C), O&M (O) and decommissioning (D).

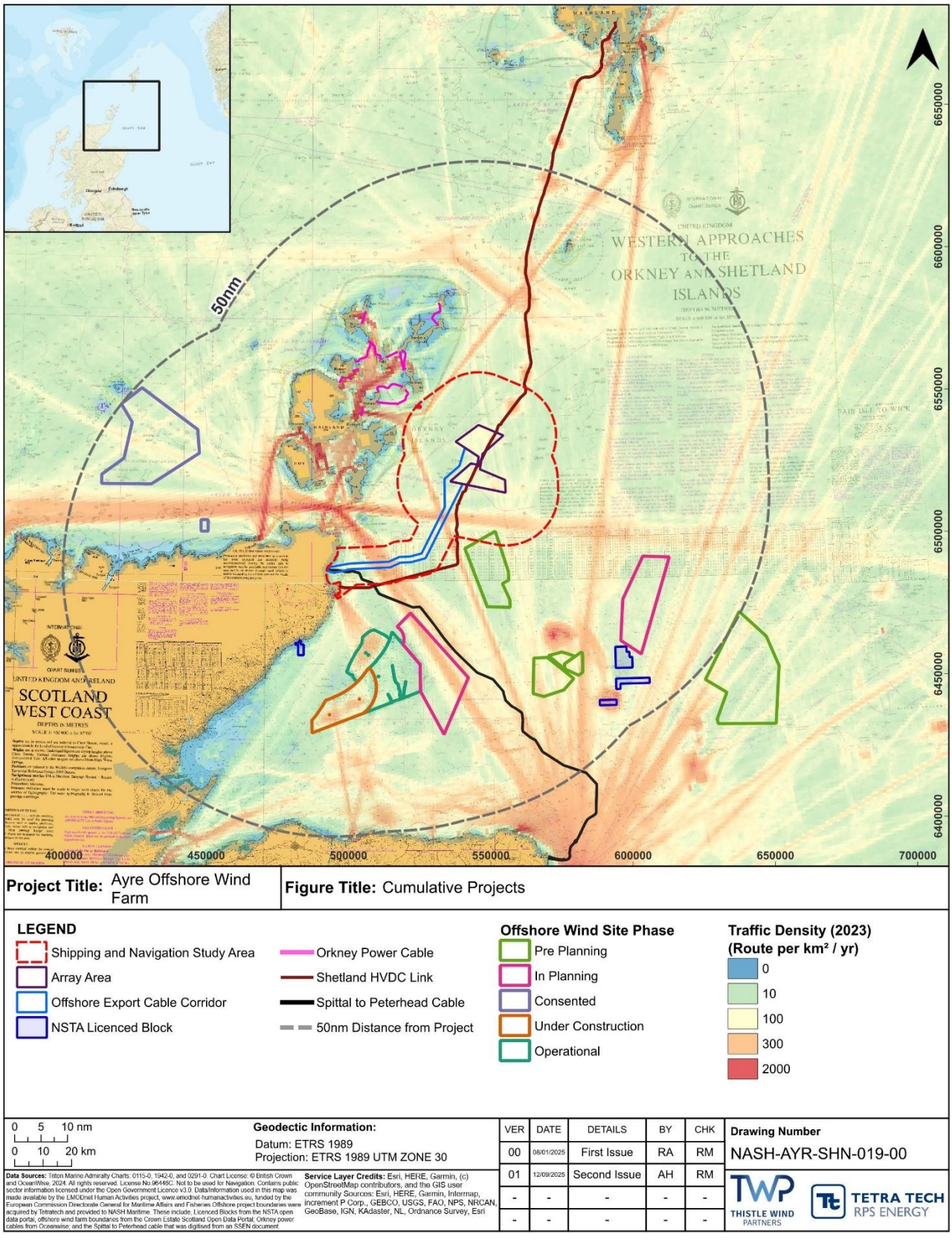

Figure 14.1: Other Projects Screened into the CEA for Shipping and Navigation

Maximum Design Scenario

14.12.9 The MDS identified in Table 14.16 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. The cumulative effects presented and assessed in this section have been selected from the details provided in Volume 1, Chapter 3: Project Description as well as the information available on other projects (see Volume 3, Technical Appendix 4.4: Cumulative Effects Assessment - Screening), to inform a MDS'. Any other development scenario within the PDE, will result in the same, or less, level of environmental effect.

Table 14.16: MDS Considered for Each Impact as Part of the Assessment of Likely Significant Cumulative Effects on Shipping and Navigation

Potential Cumulative Effect	Phase*			Tier	MDS
	C	O	D		
All Impacts	**All Phases**			The MDS is as described for the Proposed Development (Table 14.7) and assessed cumulatively with the following projects: **Tier 1:** Offshore Renewables: • Ayre Onshore Transmission Infrastructure **Tier 2**: Offshore Renewables: • Caledonia Offshore Wind Farm • Moray Offshore Windfarm (West) • Pentland Floating Offshore Wind • West of Orkney Wind Farm Oil and Gas: • P1270 (decommissioning) • P810 (decommissioning) • P973 (decommissioning) • P729 (decommissioning) Cables: • SSE distribution cable projects between islands in eastern Orkney • SSEN-T Spittal to Peterhead HVDC **Tier 3:** Offshore Renewables: • Broadshore Hub OWFs • Buchan OWF • Marram OWF • Stromar OWF **Tier 4:** No Tier 4 projects.	These projects involve activities which will result in potential impact to shipping and navigation which may contribute to the impact that the Proposed Development will also affect. **Tier 1:** The same worst case design parameters for the Proposed Development as detailed for the in isolation impact assessment are relevant for the shipping and navigation CEA in addition to the full build out of all Tier 1 projects listed. **Tier 2:** The same worst case design parameters for the Proposed Development as detailed for the in isolation impact assessment are relevant for the shipping and navigation CEA in addition to the full build out of all Tier 1 and 2 projects listed. **Tier 3:** The same worst case design parameters for the Proposed Development as detailed for the in isolation impact assessment are relevant for the shipping and navigation CEA in addition to the full build out of all Tier 1, 2 and 3 projects listed. **Tier 4:** No Tier 4 projects identified to have a potential cumulative effect on shipping and navigation with the Proposed Development.

* Project Phase refers to construction (C), O&M (O) and decommissioning (D).

Cumulative Effects Assessment

14.12.10 An assessment of the likely significance of the cumulative effects of the Proposed Development upon shipping and navigation receptors arising from each identified impact is given below.

IMPACT 1 – IMPACT OF FLOATING MOORING AND CABLE SYSTEMS AND INTERACTIONS WITH VESSELS AT RISK OF SNAGGING

Tier 1

14.12.11 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission Infrastructure.

Tier 2

Construction Phase

Magnitude of Impact

14.12.12 The cumulative scenario introduces other floating OWFs, namely Caledonia OWF (hybrid fixed and floating), Buchan Offshore Wind, and Pentland Floating Offshore Wind. This means there may be an increase in subsurface infrastructure such as dynamic IACs and foundation moorings, albeit during construction, Safety Zones would be established of an appropriate configuration and extent to prevent fishing in particularly close proximity to the infrastructure and mitigate for potential snagging hazards. In addition, promulgation of information via NtMs and the Kingfisher bulletin will increase awareness of construction activities, and attempts will be made to reach an agreement for the fisheries gear clearance to further help mitigate snagging hazards during construction.

14.12.13 The magnitude of impact is therefore deemed to be the same as during construction of the Proposed Development in isolation, and is low.

Sensitivity of the Receptor

14.12.14 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is deemed to be the same as for the construction phase of the Proposed Development in isolation and is therefore high.

Significance of the Effect

14.12.15 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be high. Each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.16 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.17 The magnitude of the impact is anticipated to be similar to the Tier 2 scenario during construction, and is therefore low.

Sensitivity of the Receptor

14.12.18 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 2 scenario during construction, and is therefore high.

Significance of the Effect

14.12.19 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be high. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.20 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.21 The magnitude of the impact is anticipated to be similar to the Tier 2 scenario during construction, and is therefore low.

Sensitivity of the Receptor

14.12.22 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 2 scenario during construction, and is therefore high.

Significance of the Effect

14.12.23 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be high. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.

Additional Mitigation and Residual Effect

14.12.24 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Tier 3

Construction Phase

Magnitude of Impact

14.12.25 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.26 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is low.

Sensitivity of the Receptor

14.12.27 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is deemed to be the same as for Tier 2 and is therefore high.

Significance of the Effect

14.12.28 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be high. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.29 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.30 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction, and is therefore low.

Sensitivity of the Receptor

14.12.31 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than

by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore high.

Significance of the Effect

14.12.32 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be high. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.33 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.34 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction, and is therefore low.

Sensitivity of the Receptor

14.12.35 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore high.

Significance of the Effect

14.12.36 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be high. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.37 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

IMPACT 2 - DEVIATION OF COMMERCIAL VESSELS

Tier 1

14.12.38 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission Infrastructure.

Tier 2

Construction Phase

Magnitude of Impact

14.12.39 The assessment of cumulative routeing as undertaken in the NRA showed that a number of commercial routes could be displaced during construction on a cumulative basis in combination with the Tier 2 projects. All of these proposed developments are anticipated to be undergoing construction or be in operation for some duration during the Proposed Development construction.

14.12.40 As shown in the NRA, a total of seven routes identified will require minor deviations for vessels transiting in proximity to the Proposed Development. One or more of four of these routes are affected by the Proposed Development, West of Orkney Wind Farm, or Caledonia Offshore Wind Farm.

14.12.41 The affected routes are relatively low usage routes, with under 300 transits per year, apart from the one route requiring deviation as a result of the Caledonia Offshore Wind Farm.

14.12.42 As a result, the magnitude of the impact is deemed to be high.

Sensitivity of the Receptor

14.12.43 Despite potential impacts to routing in the cumulative scenario, it is anticipated that there will still be adequate sea room to enable any of the minor deviations required to be undertaken safely and without significant increases to journey distances. The requirement to ensure third party vessels are aware of construction activities and display information on charts is also embedded in the mitigations which will enable advance passage planning. Other relevant Embedded Mitigation include site marking and charting, and a LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan) which would be agreed prior to construction.

14.12.44 Given the little impact that will be had on these routes, the sensitivity of the receptor is considered to be negligible.

Significance of the Effect

14.12.45 Given that the magnitude of the impact is deemed to be high**,** and the sensitivity of the receptor is considered to be negligible, the likely effect will, therefore, be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.46 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.47 It is noted that full build out of the Proposed Development during O&M will have a slightly larger impact on routing than the construction phase. Nevertheless, given the sea room available for deviations and the small additional distances, it is anticipated that the residual effect will remain the same as during the construction phase of the Proposed Development.

14.12.48 As a result, the magnitude of the impact is deemed to be high.

Sensitivity of the Receptor

14.12.49 As with the construction scenario, it is anticipated that there will still be adequate sea room to enable any of the minor deviations required to be undertaken safely and without significant increases to journey distances. The requirement to ensure third party vessels are aware of O&M activities and display information on charts is also embedded in the mitigations which will enable advance passage planning. Other relevant Embedded Mitigation include site marking and charting, and a LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan) which would be agreed prior to construction.

14.12.50 Therefore, the sensitivity of the receptor is considered to be negligible.

Significance of the Effect

14.12.51 Given that the magnitude of the impact is deemed to be high**,** and the sensitivity of the receptor is considered to be negligible, the likely effect will, therefore, be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.52 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.53 It is noted that that the impact on routeing will reduce as decommissioning progresses and the extent of structures within the Array Area reduces. Nevertheless, given the available sea room during previous phases, it is anticipated that the residual effect will remain the same as during the construction and O&M phase of the Proposed Development.

14.12.54 The magnitude of the impact is therefore high.

Sensitivity of the Receptor

14.12.55 The requirement to ensure third party vessels are aware of decommissioning activities and display information on charts is also embedded in the mitigations which will enable advance passage planning. Other relevant Embedded Mitigation include site marking and charting,

and a LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan)

14.12.56 Therefore, the sensitivity of the receptor is anticipated to be negligible, the same as during the construction and O&M phase.

Significance of the Effect

14.12.57 Given that the magnitude of the impact is deemed to be high**,** and the sensitivity of the receptor is considered to be negligible, the likely effect will, therefore, be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.58 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Tier 3

Construction Phase

Magnitude of Impact

14.12.59 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram, and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.60 Tier 3 projects are not likely to begin construction during the construction phase of the Proposed Development, and so the magnitude of the impact is anticipated to be similar to the Tier 2 scenario, and is therefore high.

Sensitivity of the Receptor

14.12.61 As with the Tier 2, it is anticipated that there will still be adequate sea room to enable any of the minor deviations required to be undertaken safely and without significant increases to journey distances. The sensitivity of the receptor is therefore negligible.

Significance of the Effect

14.12.62 Overall, the magnitude of the impact is deemed to be high and the sensitivity of the receptor is considered to be negligible. Each project will undertake its own NRA and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.63 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.64 It is noted that the potential construction of Tier 3 projects during the O&M phase of the Proposed Development will have an impact on routing. Nevertheless, as is the case with Tier 2 projects, there is sufficient sea room available for deviations. The magnitude it is anticipated to be similar to the Tier 3 scenario during construction, as the vessel traffic profile and activity is the similar during construction as during decommissioning and is therefore high.

Sensitivity of the Receptor

14.12.65 As with the Tier 3 during construction scenario, it is anticipated that there will still be adequate sea room to enable any of the minor deviations required to be undertaken safely and without significant increases to journey distances. The sensitivity of the receptor is therefore negligible.

Significance of the Effect

14.12.66 Overall, the magnitude of the impact is deemed to be high and the sensitivity of the receptor is considered to be negligible. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.67 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.68 It is noted that the potential construction of Tier 3 projects during the decommissioning phase of the Proposed Development will have an impact on routing. Nevertheless, as is the case with Tier 2 projects, there is sufficient sea room available for deviations. The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction as the vessel traffic profile and activities are similar during construction and they are during decommissioning, and is therefore high.

Sensitivity of the Receptor

14.12.69 As with the Tier 3 construction scenario, it is anticipated that there will still be adequate sea room to enable any of the minor deviations required to be undertaken safely and without significant increases to journey distances. The sensitivity of the receptor is therefore negligible.

Significance of the Effect

14.12.70 Overall, the magnitude of the impact is deemed to be high and the sensitivity of the receptor is considered to be negligible. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.71 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

IMPACT 3 – INCREASED COLLISION RISK

Tier 1

14.12.72 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission Infrastructure.

Tier 2

Construction Phase

Magnitude of Impact

14.12.73 As per the cumulative routeing assessment, some of the existing commercial and passenger ferry traffic in the area would likely be displaced and/or be required to transit between multiple wind farms, due to surrounding wind farms and/or cable installations/maintenance. Impacts on routeing may in turn lead to increased collision risk.

14.12.74 It is noted in the MDS that all the proposed projects could impact the risk of collision as this cumulative scenario would generate the minimum amount of available sea room (maximum vessel constraint) and maximum additional project vessel traffic.

14.12.75 However, the applicant will establish appropriate vessel management systems and marine coordination to manage the potential for increase encounters with project vessels. These encounters will also be managed through COLREGs and SOLAS.

14.12.76 Therefore, the magnitude of impact is assessed to be low.

Sensitivity of the Receptor

14.12.77 With regard to the available sea room, the remaining sea room is still anticipated to be sufficient to safely accommodate any required deviations, and collision avoidance.

14.12.78 Nevertheless, in the event of a collision, whilst the most likely outcome is minor damage and/or minor injuries, it is feasible that a worst case collision involving a larger vessel might result in vessel holing and eventual flooding and capsize and potential loss of life, though this is considered to be very unlikely given historical incident analysis and collision risk modelling.

14.12.79 Given both the most likely and reasonable worst case outcomes, the sensitivity of the receptor is assessed to be medium.

Significance of the Effect

14.12.80 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.81 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.82 It is noted that full build out of the projects will have the largest impact on collision, as this cumulative scenario would generate the minimum amount of available sea room (maximum vessel constraint) and maximum additional project vessel traffic. Nevertheless, given the Embedded Mitigations and the sea room available for deviations and collision avoidance, it is anticipated that the residual effect will remain the same as during the construction phase of the Proposed Development.

14.12.83 Therefore, the magnitude of impact is deemed to be low.

Sensitivity of the Receptor

14.12.84 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to during construction. Therefore, the sensitivity of the receptor is deemed to be medium.

Significance of the Effect

14.12.85 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.86 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.87 As per the cumulative routeing assessment, some of the existing commercial and passenger ferry traffic in the area would likely be displaced and/or be required to transit between multiple wind farms, due to surrounding wind farms and/or cable removal/decommissioning. Impacts on routeing may in turn lead to increased collision risk.

14.12.88 It is noted that the risk of collision will reduce as decommissioning progresses and the extent of structures within the Array Area reduces and available sea room increases. Nevertheless, it is anticipated that the residual effect will remain the same as during the construction and O&M phase of the Proposed Development.

14.12.89 Therefore the magnitude of impact is low.

Sensitivity of the Receptor

14.12.90 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to during construction and O&M. Therefore, the sensitivity of the receptor is deemed to be medium.

Significance of the Effect

14.12.91 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.92 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Tier 3

Construction Phase

Magnitude of Impact

14.12.93 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram, and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.94 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is low.

Sensitivity of the Receptor

14.12.95 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than

by the project phase, the sensitivity of the receptor is anticipated to be the same as for Tier 2 and is therefore medium.

Significance of the Effect

14.12.96 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.97 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.98 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is low.

Sensitivity of the Receptor

14.12.99 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore medium.

Significance of the Effect

14.12.100 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.101 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.102 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction as the vessel traffic profile and activity is the similar during construction as during decommissioning and is therefore low.

Sensitivity of the Receptor

14.12.103 As the physical consequences of a vessel collision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore medium.

Significance of the Effect

14.12.104 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.105 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

IMPACT 4 - INCREASED ALLISION RISK

Tier 1

14.12.106 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission Infrastructure.

Tier 2

Construction Phase

Magnitude of Impact

14.12.107 As per the cumulative routeing assessment, some of the existing commercial and passenger ferry traffic in the area would likely be displaced around the Proposed Development and/or be required to transit between multiple projects due to surrounding wind farms and/or cable installations/maintenance. Impacts on routeing may in turn lead to increased allision risk.

14.12.108 It is noted in the MDS that all the proposed projects could impact the risk of allision as this cumulative scenario would generate the maximum number of structures for vessels to allide with.

14.12.109 However, in the same way that a LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan) is embedded within the Proposed Development, all cumulative developments will be required to implement lighting and marking in agreement with the NLB and in compliance with IALA G1162 (IALA, 2021). These discussions will include consideration of the current cumulative understanding, in addition to surface navigation and allision risk, and will also take place with the MCA and NLB when agreeing the layouts for each development.

14.12.110 Given the Embedded Mitigations in place and the requirements for cumulative wind farms to undergo their respective risk assessments prior to development, the magnitude of impact is considered to be low.

Sensitivity of the Receptor

14.12.111 In the event of an allision as a result of deviations, while the most likely outcome is minor damage and/or minor injuries, it is feasible that a worst case allision involving a larger vessel might result in Wind Turbine collapse, or damage to mooring line configurations, and/or holing and eventual flooding of a vessel and potential loss of life, though this is considered unlikely given the marking and charting of the site and the development of an ERCoP.

14.12.112 Given the most likely and worst case consequences, the sensitivity of the receptor is considered to be medium.

Significance of the Effect

14.12.113 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.114 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.115 As per the cumulative routeing assessment, some of the existing commercial and passenger ferry traffic in the area would likely be displaced around the Proposed Development and/or be required to transit between multiple projects due to surrounding wind farms and/or cable installations/maintenance. Impacts on routeing may in turn lead to increased allision risk. It is noted in the MDS that all the proposed projects could impact the risk of allision as this cumulative scenario would generate the maximum number of structures for vessels to allide with.

14.12.116 It is noted that full build out of the proposed offshore developments will have the largest impact on allision. Nevertheless, given the Embedded Mitigations and the sea room available for deviations, it is anticipated that the residual effect will remain the same as during the construction phase of the Proposed Development.

14.12.117 The magnitude of impact is therefore deemed to be low.

Sensitivity of the Receptor

14.12.118 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be

similar to during construction. Therefore, the sensitivity of the receptor is deemed to be medium.

Significance of the Effect

14.12.119 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.120 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.121 As per the cumulative routeing assessment, some of the existing commercial and passenger ferry traffic in the area would likely be displaced around the Proposed Development and/or be required to transit between multiple projects due to surrounding wind farms and/or cable removal and decommissioning. Impacts on routeing may in turn lead to increased allision risk. It is noted in the MDS that all the proposed projects could impact the risk of allision as this cumulative scenario would generate the maximum number of structures for vessels to allide with.

14.12.122 It is noted that the risk of allision will reduce as decommissioning progresses and the extent of structures within the Array Area reduces. Nevertheless, it is anticipated that the residual effect will remain the same as during the construction and O&M phase of the Proposed Development.

14.12.123 The magnitude of impact is therefore deemed to be low.

Sensitivity of the Receptor

14.12.124 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to during construction and O&M. Therefore, the sensitivity of the receptor is deemed to be medium.

Significance of the Effect

14.12.125 Given that the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium, the likely effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.126 No Additional Mitigation is considered necessary because the likely effect in the absence of Additional Mitigation is not significant in EIA terms.

Tier 3

Construction Phase

Magnitude of Impact

14.12.127 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram, and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.128 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is low.

Sensitivity of the Receptor

14.12.129 As the physical consequences of a vessel allision are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to Tier 2 and is therefore medium.

Significance of the Effect

14.12.130 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.131 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.132 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction and is therefore low.

Sensitivity of the Receptor

14.12.133 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be

similar to similar to the Tier 3 scenario during construction, and is therefore medium.

Significance of the Effect

14.12.134 Overall, the magnitude of the impact is deemed to be negligible and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.135 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.136 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction as the vessel traffic profile and activity is the similar during construction as during decommissioning and is therefore low.

Sensitivity of the Receptor

14.12.137 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore medium

Significance of the Effect

14.12.138 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.139 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

IMPACT 5 – INCREASED GROUNDING RISK

Tier 1

14.12.140 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission Infrastructure.

Tier 2

Construction Phase

Magnitude of Impact

14.12.141 Export cables associated with the Tier 2 wind farms as well as the two SSEN-T subsea cables have the potential to reduce UKC, particularly near to shore, therefore increasing the risk of grounding. During construction of the Proposed Development, it is noted that nearshore traffic could be displaced pushing vessels closer to shore which would also increase the likelihood of a grounding event.

14.12.142 It is however noted that with the cumulative projects considered, there is still adequate sea room available to route around any temporary construction activities or areas where UKC is compromised. Moreover, several mitigation will be in place for all subsea infrastructure associated with the projects, such as marking and charting, compliance with MGN 654, and cable burial where feasible.

14.12.143 Therefore the magnitude of impact is considered to be low.

Sensitivity of the Receptor

14.12.144 In the unlikely event of a grounding, the most likely outcome is minor injuries and minor adverse publicity. However, while unlikely, the worst case scenario could involve loss of small craft, with a single fatality.

14.12.145 Should a vessel ground on cable protection or on the seabed as a result of deviations required as a result of the Proposed Development, the ERCoP will include provision of appropriate towage services that should be able to mitigate the consequence of the incident, by ensuring the vessel could be towed away from the cable protection if required.

14.12.146 As a result, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.12.147 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, given that the risk will not be lower than during the Proposed Development in isolation assessment.

Additional Mitigation and Residual Effect

14.12.148 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.149 During the O&M phase, once cable burial is complete, the Offshore Export Cable will not cause any vessels to divert closer to Landfall. It is possible that, in some areas where burial is not possible and the cable is

protected, some large draught vessels may divert course slightly to avoid shallower ground, or that during maintenance activities, some vessels may need to deviate around the maintenance vessel. In which case, there is considerable sea room and water depths either side of the Export Cable Corridor to enable these deviations without increasing the risk of grounding.

14.12.150 Furthermore, large project vessels will be working near Landfall much less frequently during the O&M phase compared to the construction phase, further minimising the likelihood of a grounding event.

14.12.151 Although the subsea infrastructure associated with Tier 2 projects may increase the chances of such an event occurring, Embedded Mitigation such as cable burial and marking and charting should minimise the risk of grounding. Moreover, there is adequate sea room around each asset for vessels to navigate.

14.12.152 As a result, the magnitude of impact has been assessed as negligible.

Sensitivity of the Receptor

14.12.153 As the physical consequences of a vessel grounding are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated the same as during construction. As a result, the sensitivity of the receptor has been assessed as low.

Significance of the Effect

14.12.154 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, given that the risk will not be lower than during the Proposed Development in isolation assessment.

Additional Mitigation and Residual Effect

14.12.155 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.156 The magnitude of impact is anticipated to be the same as during construction of the Proposed Development as the vessel traffic profile and activity is the similar during construction as during decommissioning, although it is noted that as decommissioning goes on, the impact will reduce with the number of cables present. Therefore, the magnitude of impact is low.

Sensitivity of the Receptor

14.12.157 As the physical consequences of a vessel grounding are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be the same as during construction of the Proposed Development, and is therefore low.

Significance of the Effect

14.12.158 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, given that the risk will not be substantially lower than during construction.

Additional Mitigation and Residual Effect

14.12.159 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Tier 3

Construction Phase

Magnitude of Impact

14.12.160 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.161 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is low.

Sensitivity of the Receptor

14.12.162 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than by cumulative projects the sensitivity of the receptor is anticipated to Tier 2 and is therefore low.

Significance of the Effect

14.12.163 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.164 No Additional Mitigation mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.165 As the vessel traffic profile in a Tier 3 scenario is not anticipated to increase to a magnitude that would affect the Proposed Development, the magnitude of the impact is anticipated to be similar to the Tier 2 scenario during O&M, and is therefore negligible.

Sensitivity of the Receptor

14.12.166 As the physical consequences of a vessel grounding are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore low.

Significance of the Effect

14.12.167 Overall, the magnitude of the impact is deemed to be negligible and the sensitivity of the receptor is considered to be low. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.168 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.169 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction, as the vessel traffic profile and activity is the similar during construction as during decommissioning, and is therefore low.

Sensitivity of the Receptor

14.12.170 As the physical consequences of a vessel snagging are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore low.

Significance of the Effect

14.12.171 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.172 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

IMPACT 6 - POTENTIAL IMPACT TO SAR CAPABILITY

Tier 1

14.12.173 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission Infrastructure.

Tier 2

Construction Phase

Magnitude of Impact

14.12.174 It is noted in the MDS that all the proposed projects could impact SAR capabilities as this cumulative scenario would generate the maximum number of vessels and personnel in the Shipping and Navigation Study Area and minimum amount of sea room for them to operate in, and as such there may be an increase in the number of incidents requiring emergency response or impacts to emergency response procedures.

14.12.175 However, as per the incident assessment conducted within Volume 3, Appendix 14.1: Shipping and Navigation Risk Assessment, the baseline incident rates are low. Furthermore, there would be additional resources available at other projects and, as a result, there is not considered likely to be a notable effect on emergency response resources on a cumulative level.

14.12.176 As a result, the magnitude of the impact is deemed to be negligible.

Sensitivity of the Receptor

14.12.177 All wind farm developments will be required to agree a layout with the MCA, in alignment with MGN 654, and ensure suitable SAR access is available. Moreover, SAR operations within a given development will be localised to the area of the operation.

14.12.178 As a result, the sensitivity of the receptor is considered to be low.

Significance of the Effect

14.12.179 The magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **Minor** adverse significance. A minor rather than negligible effect has been determined given that there is the potential for a reduction in SAR capabilities, albeit a very small reduction.

Additional Mitigation and Residual Effect

14.12.180 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.181 It is noted that, while the O&M phase of the projects will have fewer project vessels transiting in the area and therefore a lower risk of incidents, the smaller presence of project vessels will also form a reduced resource to respond to any incidents in the area, both in terms of incidents associated with the Proposed Development, but also incidents occurring to third party vessels outside of the Proposed Development site. Therefore, given the Embedded Mitigations and overall low baseline incident rates, it is anticipated that the residual effect will remain similar to the construction phase of the Proposed Development.

14.12.182 As a result, the magnitude of the impact is deemed to be negligible.

Sensitivity of the Receptor

14.12.183 Similarly, as SAR operations within a given development will be localised to the area of the operation, and with the embedded mitigations in place, the sensitivity of the receptor is anticipated to be similar to during construction and is therefore deemed to be low.

Significance of the Effect

14.12.184 The magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **Minor** adverse significance. A minor rather than negligible effect has been determined given that there is the potential for a reduction in SAR capabilities, albeit a very small reduction.

Additional Mitigation and Residual Effect

14.12.185 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.186 It is noted that, while the decommissioning phase of the projects will have more project vessels transiting in the area compared to during O&M, and

therefore a higher risk of incidents, the greater presence of project vessels will also form an additional resource to respond to any incidents in the area, both in terms of incidents associated with the Proposed Development, but also incidents occurring to third party vessels outside of the Proposed Development site. Moreover, as decommissioning progresses and the extent of structures within the Array Area reduces and available sea room increases, the risk of incidents requiring SAR is reduced. Therefore, given the Embedded Mitigations and overall low baseline incident rates, it is anticipated that the residual effect will remain similar to the construction and O&M phase of the Proposed Development.

14.12.187 As a result, the magnitude of the impact is deemed to be negligible.

Sensitivity of the Receptor

14.12.188 Similarly, as SAR operations within a given development will be localised to the area of the operation, and with the embedded mitigations in place, the sensitivity of the receptor is anticipated to be similar to during construction and is therefore deemed to be low.

14.12.189 As a result, the sensitivity of the receptor is deemed to be low.

Significance of the Effect

14.12.190 The magnitude of the impact is deemed to be negligible, and the sensitivity of the receptor is considered to be low. The effect will, therefore, be of **Minor** adverse significance. A minor rather than negligible effect has been determined given that there is the potential for a reduction in SAR capabilities, albeit a very small reduction.

Additional Mitigation and Residual Effect

14.12.191 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Tier 3

Construction Phase

Magnitude of Impact

14.12.192 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.193 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the

Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is negligible.

Sensitivity of the Receptor

14.12.194 Similarly, as SAR operations within a given development will be localised to the area of the operation, and with the embedded mitigations in place, the sensitivity of the receptor is anticipated to be the same as for Tier 2 and is therefore deemed to be low.

Significance of the Effect

14.12.195 Overall, the magnitude of the impact is deemed to be negligible and the sensitivity of the receptor is considered to be low. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.196 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.197 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is negligible.

Sensitivity of the Receptor

14.12.198 Similarly, as SAR operations within a given development will be localised to the area of the operation, and with the embedded mitigations in place, the sensitivity of the receptor is anticipated to be the same as for Tier 2 and is therefore deemed to be low.

Significance of the Effect

14.12.199 Overall, the magnitude of the impact is deemed to be negligible and the sensitivity of the receptor is considered to be low. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.200 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.201 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is negligible.

Sensitivity of the Receptor

14.12.202 Similarly, as SAR operations within a given development will be localised to the area of the operation, and with the embedded mitigations in place, the sensitivity of the receptor is anticipated to be the same as for Tier 2 and is therefore deemed to be low.

Significance of the Effect

14.12.203 Overall, the magnitude of the impact is deemed to be negligible and the sensitivity of the receptor is considered to be low. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process.The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.204 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

IMPACT 7 – INTERFERENCE WITH RADAR, COMMUNICATIONS AND POSITIONING SYSTEMS

Tier 1

14.12.205 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission Infrastructure.

Tier 2

Construction Phase

Magnitude of Impact

14.12.206 It is noted in the MDS that all the proposed projects could impact equipment used for navigation, collision avoidance and communications, as well as masking sound signals from vessels or AtoNs. This is because this cumulative scenario would generate the greatest number of Wind Turbines and therefore the largest potential to exacerbate the impacts on marine navigation, communications and positioning systems.

14.12.207 As a result, the magnitude of the impact is deemed to be high, due to the increased number of developments.

Sensitivity of the Receptor

14.12.208 While the increased number of Wind Turbines and cables may increase the frequency with which some of the impacts are felt, adverse impacts are still very unlikely to be felt regularly given the sea room that will be available between projects, enabling vessels to still maintain a sufficient distance from the Wind Turbines to reduce the impacts, such as on marine radar.

14.12.209 Therefore the sensitivity of the receptor is considered to be negligible.

Significance of the Effect

14.12.210 As a result, the magnitude of the impact is deemed to be high, and the sensitivity of the receptor is considered to be negligible. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.211 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.212 It is noted that full build out of the proposed offshore developments will have the largest impact on communications and radar. Nevertheless, given the Embedded Mitigations and the sea room available, it is anticipated that the residual effect will remain the same as during the construction phase of the Proposed Development.

14.12.213 As a result, the magnitude of the impact is deemed to be high, due to the increased number of developments.

Sensitivity of the Receptor

14.12.214 The severity of effects caused by the project infrastructure are independent of the project phase and so the sensitivity of the receptor is anticipated to be negligible, the same as during construction.

Significance of the Effect

14.12.215 As a result, the magnitude of the impact is deemed to be high, and the sensitivity of the receptor is considered to be negligible. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.216 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.217 It is noted that the impact on communications and radar will reduce as decommissioning progresses and the extent of structures within the Array Area reduces. Nevertheless, it is anticipated that the residual effect will

remain the same as during the construction and O&M phase of the Proposed Development.

14.12.218 As a result, the magnitude of the impact is deemed to be high.

Sensitivity of the Receptor

14.12.219 The severity of effects caused by the project infrastructure are independent of the project phase and so the sensitivity of the receptor is anticipated to be negligible, the same as during construction and O&M.

Significance of the Effect

14.12.220 As a result, the magnitude of the impact is deemed to be high, and the sensitivity of the receptor is considered to be negligible. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.221 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Tier 3

Construction Phase

Magnitude of Impact

14.12.222 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.223 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is high.

Sensitivity of the Receptor

14.12.224 While the increased number of Wind Turbines and cables in a Tier 3 scenario may increase the frequency with which some of the impacts are felt, adverse impacts are still very unlikely to be felt regularly given the sea room that will be available between projects, therefore the sensitivity of the receptor is anticipated to be negligible, the same as during Tier 2.

Significance of the Effect

14.12.225 Overall, the magnitude of the impact is deemed to be high and the sensitivity of the receptor is considered to be negligible. Each project will

undertake its own NRA, and high-risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.226 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.227 As a full build out of Tier 2 and Tier 3 scenarios presents the highest likelihood of an interruption to radar and marine communications, the magnitude of the impact is anticipated to be similar to the Tier 2 scenario during O&M, and is therefore high.

Sensitivity of the Receptor

14.12.228 While the increased number of Wind Turbines and cables in a Tier 3 scenario may increase the frequency with which some of the impacts are felt, adverse impacts are still very unlikely to be felt regularly given the sea room that will be available between projects, therefore the sensitivity of the receptor is anticipated to be negligible, the same as during Tier 2.

Significance of the Effect

14.12.229 Overall, the magnitude of the impact is deemed to be high and the sensitivity of the receptor is considered to be negligible. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.230 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.231 Whilst it is acknowledged that as decommissioning progresses and less project-related infrastructure is present, the likelihood of disturbance to radar and marine communications systems reduces. However, the decommissioning phase also encompasses the beginning of this phase, where the Proposed Development and full build out of Tier 2 and 3 projects are in place which still present the highest likelihood of an impact. Therefore, the magnitude of the impact is anticipated to be high, the same as during Tier 2.

Sensitivity of the Receptor

14.12.232 While the increased number of Wind Turbines and cables in a Tier 3 scenario may increase the frequency with which some of the impacts are felt, adverse impacts are still very unlikely to be felt regularly given the sea room that will be available between projects. The sensitivity of impacts is also independent of the project phase therefore the sensitivity of the receptor is anticipated to be negligible, the same as during construction and O&M.

Significance of the Effect

14.12.233 Overall, the magnitude of the impact is deemed to be high and the sensitivity of the receptor is considered to be negligible. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.234 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

IMPACT 8 - REDUCTION IN UNDER KEEL CLEARANCE DUE TO SUBSURFACE OFFSHORE INFRASTRUCTURE

Tier 1

14.12.235 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission Infrastructure

Tier 2

Construction Phase

Magnitude of Impact

14.12.236 The cumulative scenario introduces a higher quantity of subsea infrastructure, albeit these will all be similar in nature to those associated with the Proposed Development and there will be adequate sea room should vessels want to navigate around such assets. The presence of the two proposed SSEN-T cables is not likely to greatly increase the risk of the impact happening due to the fact that similar mitigation will be in place, such as marking and charting and NtMs.

14.12.237 The magnitude of impact is therefore deemed to be the same as during construction of the Proposed Development in isolation, and is low.

Sensitivity of the Receptor

14.12.238 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced under-keel clearance is experienced locally within the individual projects. Therefore the sensitivity of the receptor is deemed to be the same as for

the construction phase of the Proposed Development in isolation, and is medium.

Significance of the Effect

14.12.239 As a result, the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.240 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.241 During the O&M phase of the Proposed Development, the reduction of UKC due to subsurface infrastructure outside of the Array Area is anticipated to impact vessels (both transiting and fixed fishing gear vessels) with the same frequency as is anticipated during the construction phase. There is still considered to be adequate sea room, the same as during the construction phase.

14.12.242 For small vessels such as fishing vessels and recreational vessels which may transit within the Array Area post-construction, the IACs and foundation moorings have potential to cause a reduction in UKC. Fishing vessels are at a higher risk due to the gear which they may deploy in proximity to subsea infrastructure. It is noted however that Embedded Mitigation of marking and charting of subsea cables and foundation moorings, and NtMs will make fishermen aware of these risks, and it would be unlikely they would deploy gear where unsafe to do so. The presence of the Tier 2 projects in combination is not anticipated to make the impact more likely.

14.12.243 Therefore the magnitude of the impact is considered to be low.

Sensitivity of the Receptor

14.12.244 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced under-keel clearance is experienced locally within the individual projects. Therefore, the sensitivity of the receptor is deemed to be the same as for the O&M phase of the Proposed Development in isolation, and is medium.

Significance of the Effect

14.12.245 As a result, the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.246 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.247 The magnitude of the impact is considered to be the same as during the construction phase as the vessel traffic profile and activity will be highly similarand is therefore low.

Sensitivity of the Receptor

14.12.248 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced under-keel clearance is experienced locally within the individual projects. In addition, the vessel traffic profile and activities will be similar to the construction phase. Therefore, the sensitivity of the receptor is deemed to be the same as for the construction phase and is medium.

Significance of the Effect

14.12.249 As a result, the magnitude of the impact is deemed to be low, and the sensitivity of the receptor is considered to be medium. The effect will, therefore, be of **Minor** adverse significance.

Additional Mitigation and Residual Effect

14.12.250 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Tier 3

Construction Phase

Magnitude of Impact

14.12.251 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.252 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario and is low.

Sensitivity of the Receptor

14.12.253 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced under-keel clearance is experienced locally within the individual projects.

Therefore, the sensitivity of the receptor is deemed to be the same as for Tier 2 and is medium.

Significance of the Effect

14.12.254 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.255 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.256 As is the case for the Tier 2, the increase in project traffic in conjunction with Tier 3 is unlikely to affect the likelihood of the impact and therefore, the magnitude of the impact is anticipated to be similar to the Tier 2 scenario during O&M, and is low.

Sensitivity of the Receptor

14.12.257 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced under-keel clearance is experienced locally within the individual projects. Therefore, the sensitivity of the receptor is deemed to be the same as for construction and is medium.

Significance of the Effect

14.12.258 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.259 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.260 As is the case for the Tier 2, the increase in project traffic in conjunction with Tier 3 is unlikely to affect the likelihood of the impact and therefore, the magnitude of the impact is anticipated to be similar to the Tier 2 scenario during Decommissioning, and is low.

Sensitivity of the Receptor

14.12.261 As there is sufficient sea room maintained between the Proposed Development and cumulative projects, the severity of effects of reduced under-keel clearance is experienced locally within the individual projects. Therefore, the sensitivity of the receptor is deemed to be the same as for construction and is medium.

Significance of the Effect

14.12.262 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.263 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

IMPACT 9 - POTENTIAL IMPACT FROM TOWAGE OPERATIONS

Tier 1

14.12.264 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission Infrastructure.

Tier 2

Construction Phase

Magnitude of Impact

14.12.265 Each tow out operation for the Proposed Development will have a dedicated towage plans, method statements and risk assessment that accounts for the full capabilities of the vessels engaged, how the tow will be undertaken, and will design appropriate towage arrangements. Embedded Mitigation will further reduce risk and the application of the COLREGs would also ensure that the risk of breakout during towage is limited. In constrained waters, such as the approaches to ports, risk assessments should be jointly developed with the port authority and might include the use of guard vessels or additional tugs.

14.12.266 Alongside the Tier 2 projects, it is not anticipated that the magnitude of the impact will differ from the construction phase for the Proposed Development in isolation, given that there is still adequate sea room therefore reducing the chance of the impact occurring.

14.12.267 Therefore the magnitude of impact is deemed to be the same as during construction of the Proposed Development in isolation, assessed to be low.

Sensitivity of the Receptor

14.12.268 Given the Embedded Mitigations, including promulgation of information to be provided to vessels navigating in the area along with an emergency response procedure in order to mitigate the likelihood of an allision during towing, the outcome of such an event given the available sea room would likely be a glancing blow with minor damage. Therefore, the sensitivity of the receptor is assessed to be low.

Significance of the Effect

14.12.269 With the magnitude of the impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that Wind Turbine towage operations are not experienced by mariners on a daily basis.

Additional Mitigation and Residual Effect

14.12.270 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.271 During O&M of the Proposed Development, the frequency of tow operations will be much lower as the Wind Turbines will be located within the Array Area. Towage operations will only be required for maintenance and would likely involve a single or small number of turbines.

14.12.272 Therefore, the magnitude of impact is assessed to be negligible.

Sensitivity of the Receptor

14.12.273 As the physical consequences of a vessel allision during towing are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to during construction, therefore the sensitivity of the receptor is low.

Significance of the Effect

14.12.274 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that Wind Turbine towage operations are not experienced by mariners on a daily basis.

Additional Mitigation and Residual Effect

14.12.275 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.276 The impact during decommissioning is anticipated to be the same as during construction as the vessel traffic profile and activity is the similar during construction as during decommissioning, and therefore is low.

Sensitivity of the Receptor

14.12.277 As the physical consequences of a vessel allision during towing are determined by the characteristics of the vessels involved and the point of impact, rather than by the project phase, the sensitivity of the receptor is anticipated to be similar to during construction, therefore the sensitivity of the receptor is low.

Significance of the Effect

14.12.278 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that Wind Turbine towage operations are not experienced by mariners on a daily basis.

Additional Mitigation and Residual Effect

14.12.279 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Tier 3

Construction Phase

Magnitude of Impact

14.12.280 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.281 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is low.

Sensitivity of the Receptor

14.12.282 As the physical consequences of a vessel allision during towing are determined by the characteristics of the vessels involved and the point of impact and are localised to each project, the sensitivity of the receptor is anticipated to be similar to during Tier 2 and therefore is low.

Significance of the Effect

14.12.283 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that Wind Turbine towage operations are not experienced by mariners on a daily basis.

Additional Mitigation and Residual Effect

14.12.284 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.285 As is the case for the Tier 2, the increase in project traffic in conjunction with Tier 3 is unlikely to affect the likelihood of the impact and therefore, the magnitude of the impact is anticipated to be similar to the Tier 2 scenario during O&M and is low.

Sensitivity of the Receptor

14.12.286 As the physical consequences of a vessel allision during towing are determined by the characteristics of the vessels involved and the point of impact and are localised to each project, the sensitivity of the receptor is anticipated to be similar to during Tier 2 and therefore is low.

Significance of the Effect

14.12.287 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that Wind Turbine towage operations are not experienced by mariners on a daily basis.

Additional Mitigation and Residual Effect

14.12.288 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.289 As is the case for the Tier 2, the increase in project traffic in conjunction with Tier 3 is unlikely to affect the likelihood of the impact and therefore,

the magnitude of the impact is anticipated to be similar to the Tier 2 scenario during decommissioning and is low.

Sensitivity of the Receptor

14.12.290 As the physical consequences of a vessel allision during towing are determined by the characteristics of the vessels involved and the point of impact and are localised to each project, the sensitivity of the receptor is anticipated to be similar to during Tier 2 and therefore is low.

Significance of the Effect

14.12.291 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance could be assessed as minor or negligible. The significance of effect for this hazard is considered to be **Minor** which is not significant in EIA terms, as opposed to negligible, based on the fact that Wind Turbine towage operations are not experienced by mariners on a daily basis.

Additional Mitigation and Residual Effect

14.12.292 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

IMPACT 10 - BREAKOUT OR LOSS OF STATION OF A FLOATING WIND TURBINE

Tier 1

14.12.293 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission Infrastructure.

Tier 2

Construction Phase

Magnitude of Impact

14.12.294 The MDS for the Proposed Development includes up to six moorings per floater, minimising the likelihood of a Wind Turbine moving position in the event of the most likely impact scenario in which one mooring line fails. While a partial turbine failure (e.g. Wind Turbine blade) or a catastrophic failure (sinking) is possible, this is considered unlikely in normal situations given the requirement for the risks to be managed by the application of the principles of prevention imposed by the Construction CDM Regulations. These requirements will also be imposed on other floating OWFs. Taking this into account, alongside the requirements to which the moorings are initially subject to, Wind Turbine breakout is considered to be very unlikely as per the scenario for the Proposed Development in isolation, and the magnitude of impact is therefore assessed to be negligible.

Sensitivity of the Receptor

14.12.295 In the unlikely event a turbine was to breakout (either from its moorings, or during towage), it would still be marked and visible to other navigating

vessels in accordance with the LMP (outline shown in Volume 4, Appendix 31: Outline Lighting and Marking Plan) and a response plan will be included within the ERCoP with Additional Mitigation such as failure warning measures and tracking devices as well as response and recovery procedures. Continuous monitoring by the Marine Coordination Centre and use of tracking alarms would also ensure immediate detection of such a situation and a timely response. These measures will assist other navigating vessels to identify and avoid the hazard.

14.12.296 The risk of an allision occurring as a result of a Wind Turbine losing station is considered very low. Nevertheless, it is noted that, in the event of a partial turbine failure or a catastrophic failure, which may result in floating or submerged obstructions, the visibility of the hazard would be reduced and the risk of an allision and major vessel damage is increased. Although information would be provided to vessels navigating in the area along with an emergency response procedure in order to mitigate the likelihood of an allision, the sensitivity of the receptor is assessed to be high.

Significance of the Effect

14.12.297 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as high, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.298 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.299 During O&M, the Wind Turbines will be in their designated locations within the Array Area. The MDS for the Proposed Development includes up to six moorings per floater, minimising the likelihood of a Wind Turbine moving position in the event of the most likely impact scenario in which one mooring line fails. While a partial turbine failure (e.g. Wind Turbine blade) or a catastrophic failure (sinking) is possible, this is considered unlikely in normal situations given the requirement for the risks to be managed by the application of the principles of prevention imposed by the CDM Regulations. These requirements will be imposed on other floating OWFs. Taking this into account, alongside the requirements to which the moorings are initially subject to, Wind Turbine breakout is considered to be very unlikely as per the scenario for the Proposed Development in isolation, and the magnitude of impact is therefore assessed to be negligible

Sensitivity of the Receptor

14.12.300 Were the Wind Turbines to breakout, the impact of this on both navigating and project vessels and on other Wind Turbines is anticipated to be the

same as is expected during construction. Therefore, the sensitivity of the receptor is assessed to be high.

Significance of the Effect

14.12.301 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as high, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.302 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.303 The magnitude of impact is deemed to be no different to during construction as the vessel traffic profile and activity is the similar during construction as during decommissioning, and is therefore negligible.

Sensitivity of the Receptor

14.12.304 Were the Wind Turbines to break out, the impact of this on both navigating and project vessels and on other Wind Turbines is anticipated to be the same as is expected during construction. Therefore, the sensitivity of the receptor is assessed to be high.

Significance of the Effect

14.12.305 With the magnitude of impact assessed as negligible, and the sensitivity of the receptor assessed as high, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.306 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Tier 3

Construction Phase

Magnitude of Impact

14.12.307 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.308 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is negligible.

Sensitivity of the Receptor

14.12.309 Were the Wind Turbines to break out, the impact of this on both navigating and project vessels and on other Wind Turbines is independent of cumulative projects. Therefore, the sensitivity of the receptor is assessed the same as Tier 2 and is high.

Significance of the Effect

14.12.310 Overall, the magnitude of the impact is deemed to be negligible and the sensitivity of the receptor is considered to be high. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.311 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.312 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is negligible.

Sensitivity of the Receptor

14.12.313 Were the Wind Turbines to break out, the impact of this on both navigating and project vessels and on other Wind Turbines is anticipated to be the same as is expected during construction. Therefore, the sensitivity of the receptor is assessed to be high.

Significance of the Effect

14.12.314 Overall, the magnitude of the impact is deemed to be negligible and the sensitivity of the receptor is considered to be high. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.315 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.316 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is negligible.

Sensitivity of the Receptor

14.12.317 The sensitivity of the receptor is anticipated to be similar to the Tier 3 scenario during construction, and is therefore high.

Significance of the Effect

14.12.318 Overall, the magnitude of the impact is deemed to be negligible and the sensitivity of the receptor is considered to be high. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.319 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

IMPACT 11 - POTENTIAL IMPACT ON PORTS/HARBOURS AND OTHER NEARSHORE OPERATIONS

Tier 1

14.12.320 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission Infrastructure.

Tier 2

Construction Phase

Magnitude of Impact

14.12.321 The Array Area is located approximately 20 nm (37 km) from the mainland and 12 nm (22.2 km) from Orkney and therefore there would be a negligible effect on ports and harbours from the Array Area. Similarly, given the depth of water and available sea room, it is not anticipated that the construction of the Offshore Export Cables will adversely affect the ability for vessels to access ports. The addition of the Tier 2 projects will mean there is an increase in wind farm related vessel traffic in proximity to ports and harbours. However, the base ports are not yet defined and will be determined post-consent.

14.12.322 In addition, vessels associated with the construction of the Proposed Development are not anticipated to notably increase overall baseline traffic levels in the area, with a maximum of 30 construction vessels required on site at any one time for the Array Area and 16 for the Offshore Export Cables. It is anticipated that the Tier 2 projects will introduce similar levels of vessel traffic which would further increase the level of traffic in the vicinity those OWFs; however, given the location of other Tier 2 wind farms being typically greater than 10 nm (18.5 km) from the Array Area, it is not anticipated to increase traffic levels significantly higher than the baseline in the Study Area. Marine coordination and vessel procedures will be in place to manage project vessel movements and minimise disruption to third party vessels as per the proposed NSVMP (outline shown in Volume 4, Appendix 29: Outline Navigational Safety and Vessel Management Plan). As such, no notable impact on port access is expected from the construction vessels, noting any interactions with third party vessels would be managed via COLREGS in addition to the marine coordination procedures.

14.12.323 Given the distance of the Offshore Export Cables from the ports is a minimum of 4 nm (7.4 km) to the Port of Wick, the amount of loitering associated with either port, and the Embedded Mitigation that ensure management of project vessels, the magnitude of impact on access to the ports is assessed to be low.

Sensitivity of the Receptor

14.12.324 Given the traffic volumes serving the local ports, and the minimal amount of disruption that would likely be experienced in the event that access is impacted, the sensitivity of the receptor is considered to be low.

Significance of the Effect

14.12.325 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.12.326 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.327 The likelihood of there being an impact to local ports and harbours as a result of the Proposed Development in combination with Tier 2 projects is considered to be much the same as during construction as associated vessel traffic will remain in operation throughout the projects lifecycle and not differ drastically. Therefore, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.12.328 Given the minimal amount of disruption that would likely be experienced in the event that port access is impacted, the sensitivity of the receptor is considered to be low.

Significance of the Effect

14.12.329 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Additional Mitigation and Residual Effect

14.12.330 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.331 As with during construction, Marine coordination and vessel procedures will be in place to manage project vessel movements and minimise disruption to third party vessels as per the proposed NSVMP (outline shown in Volume 4, Appendix 29: Outline Navigational Safety and Vessel Management Plan). As such, no notable impact on port access is expected from the construction vessels and so the magnitude of impact on access to the ports is assessed to be low.

Sensitivity of the Receptor

14.12.332 As with during construction, given the minimal amount of disruption that would likely be experienced in the event that port access is impacted, the sensitivity of the receptor is considered to be low.

Significance of the Effect

14.12.333 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as low, the overall effect significance has been assessed as **Minor**, which is not significant in EIA terms. A minor rather than negligible rating has been assigned, given that the base port for construction is not yet known and will be determined post-consent.

Tier 3

Construction Phase

Magnitude of Impact

14.12.334 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and subsurface infrastructure, and vessel activity. However, each OWF

development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.335 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is low.

Sensitivity of the Receptor

14.12.336 The traffic volumes serving the local ports is not anticipated to differ to the Tier 2 scenario, and a minimal amount of disruption would likely be experienced in the event that access is impacted, therefore the sensitivity of the receptor is considered to be low.

Significance of the Effect

14.12.337 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.338 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.339 The likelihood of there being an impact to local ports and harbours as a result of the Proposed Development in combination with Tier 3 projects is considered to be much the same as during construction as associated vessel traffic will remain in operation throughout the projects lifecycle and not differ drastically. Therefore, the magnitude of impact has been assessed as similar to Tier 3 construction and is low.

Sensitivity of the Receptor

14.12.340 The traffic volumes serving the local ports is not anticipated to differ to the Tier 2 scenario, and a minimal amount of disruption would likely be experienced in the event that access is impacted, therefore the sensitivity is anticipated to be similar to the Tier 3 scenario during construction, and is therefore low.

Significance of the Effect

14.12.341 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. Each project will

undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.342 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.343 The likelihood of there being an impact to local ports and harbours as a result of the Proposed Development in combination with Tier 3 projects is considered to be much the same as during construction as associated vessel traffic and activities are similar during construction as during decommissioning. Therefore, the magnitude of impact has been assessed as low.

Sensitivity of the Receptor

14.12.344 The traffic volumes serving the local ports is not anticipated to differ to the Tier 2 scenario, and a minimal amount of disruption would likely be experienced in the event that access is impacted, therefore the sensitivity is anticipated to be similar to the Tier 3 scenario during construction, and is therefore low.

Significance of the Effect

14.12.345 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be low. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.346 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms

IMPACT 12 - POTENTIAL IMPACT ON SMALL VESSEL ACTIVITY (INCLUDING FISHING AND RECREATION)

Tier 1

14.12.347 No cumulative effects are anticipated as a result of the Ayre Onshore Transmission.

Tier 2

Construction Phase

Magnitude of Impact

14.12.348 Fishing and recreational vessel activity throughout the Shipping and Navigation Study Area is presented in Section 6.2 of the NRA and further information on fishing is located in Volume 2, Chapter 12: Commercial Fisheries. It is noted in the MDS that the presence of all projects undergoing construction or operation together will have the greatest impact on small vessels, as this would generate the greatest number of deviations and allision risks.

14.12.349 A lot of the fishing vessel activity through the Array Area is from transiting vessels, with most of the activity taking place south-east of the Array Area. Recreational vessel activity within the Shipping and Navigation Study Area was focused closer to the coastline east of the Array Area, with little activity in the Array Area itself. In the cumulative scenario, small vessels which may have deviated to avoid Proposed Development activities will have adequate sea room to make safe deviations.

14.12.350 Given the available space around the Array Area in the cumulative scenario, the magnitude of impact is anticipated to be similar to the Proposed Development in isolation scenario, and is therefore low.

Sensitivity of the Receptor

14.12.351 The available sea room is considered to remain sufficient for safe navigation and collision avoidance, and the cumulative impacts will be limited to the discrete areas where construction works are ongoing simultaneously which is likely to be short-term in nature.

14.12.352 Therefore, the sensitivity to the receptor is anticipated to be the same as in the Proposed Development in isolation scenario, and is deemed to be medium, given the Embedded Mitigations and most likely and reasonable worst case outcomes of the impact.

Significance of the Effect

14.12.353 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**.

Additional Mitigation and Residual Effect

14.12.354 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.355 It is noted that the full build out of the Proposed Development during O&M will have the largest impact on small vessels given the greatest presence of surface and subsurface infrastructure. Nevertheless, given

the sea room available for deviations and the small additional distances, it is anticipated that the residual effect will remain the same as during the construction phase of the Proposed Development.

14.12.356 The magnitude of impact is therefore low.

Sensitivity of the Receptor

14.12.357 Given that project vessels will be in operation throughout the project lifecycle, the sensitivity of the receptor is likely to be similar to during construction and is therefore medium.

Significance of the Effect

14.12.358 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**.

Additional Mitigation and Residual Effect

14.12.359 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.360 It is noted that that the impact on small vessels will reduce as decommissioning progresses and the extent of structures within the Array Area and subsurface infrastructure reduces. Nevertheless, it is anticipated that the residual effect will remain the same as during the construction and O&M phases of the Proposed Development.

14.12.361 The magnitude of impact is therefore low.

Sensitivity of the Receptor

14.12.362 The sensitivity of the receptor is anticipated to be the same as during the construction phase of the Proposed Development as the vessel traffic profile and activity is the similar during construction as during decommissioning so is therefore medium.

Significance of the Effect

14.12.363 With the magnitude of impact assessed as low, and the sensitivity of the receptor assessed as medium, the overall effect significance has been assessed as **Minor**.

Tier 3

Construction Phase

Magnitude of Impact

14.12.364 The Tier 3 cumulative scenario introduces other floating OWFs, namely Broadshore Hub, Marram and Stromar. Tier 3 projects are in scoping stage and have limited information available but can be reasonably expected to progress through application on this basis. Similar to the Tier 2 assessment, this means there may be a further increase in surface and

subsurface infrastructure, and vessel activity. However, each OWF development is expected to have similar mitigations supported by detailed NRAs and post-consent management plans to support minimise risk and impacts to third parties, its own infrastructure and operations during this phase.

14.12.365 The risk profile presented by the development of Tier 3 projects is considered the same as for Tier 2 projects. The mitigations listed in the Tier 2 scenario are also relevant for Tier 3. Therefore, the magnitude of impact is deemed to be the same as for the Tier 2 cumulative scenario, and is low.

Sensitivity of the Receptor

14.12.366 The available sea room is considered to remain sufficient for safe navigation and collision avoidance. As a result, the build out of Tier 3 projects is not anticipated to have an effect on the sensitivity of the receptor which is deemed to be the same as for Tier 2 and is scored as medium.

Significance of the Effect

14.12.367 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.368 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

O&M Phase

Magnitude of Impact

14.12.369 It is noted that the full build out of the Proposed Development during O&M will have the largest impact on small vessels given the greatest presence of surface and subsurface infrastructure. Nevertheless, given the sea room available for deviations and the small additional distances, it is anticipated that the residual effect will remain the same as during the Tier 3 construction phase of the Proposed Development and is therefore low.

Sensitivity of the Receptor

14.12.370 The available sea room is considered to remain sufficient for safe navigation and collision avoidance. As a result, the build out of Tier 3 projects is not anticipated to have an effect on the sensitivity of the receptor which is deemed to be the same as for Tier 2 and is scored as medium.

Significance of the Effect

14.12.371 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.372 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms.

Decommissioning Phase

Magnitude of Impact

14.12.373 The magnitude of the impact is anticipated to be similar to the Tier 3 scenario during construction as the vessel traffic profile and activities are similar during construction as in decommissioning, and is therefore scored as low.

Sensitivity of the Receptor

14.12.374 The available sea room is considered to remain sufficient for safe navigation and collision avoidance. As a result, the build out of Tier 3 projects is not anticipated to have an effect on the sensitivity of the receptor which is deemed to be the same as for Tier 2 and is scored as medium.

Significance of the Effect

14.12.375 Overall, the magnitude of the impact is deemed to be low and the sensitivity of the receptor is considered to be medium. Each project will undertake its own NRA and high risk hazards can be expected to be mitigated such that the risk is ALARP and tolerable through that process. The effect will therefore be of **Minor** adverse significance, which is not significant in EIA terms.

Additional Mitigation and Residual Effect

14.12.376 No Additional Mitigation is considered necessary because the likely effect in the absence of additional mitigation is not significant in EIA terms

14.13 Proposed Monitoring

14.13.1 No specific shipping and navigation monitoring of cumulative effects is proposed above those already proposed in Section 14.9.

14.14 Transboundary Effects

14.14.1 A screening of transboundary effects has been carried out (see Volume 3, Appendix 4.5: Transboundary Impacts Screening) and any potential for significant transboundary effects with regard to shipping and navigation

from the Proposed Development upon the interests of European Economic Area (EEA) states has been assessed as part of the EIA.

14.14.2 A transboundary effect assessment assesses the potential shipping and navigation effects from the Proposed Development upon the interests of EEA States.

14.14.3 Each individual vessel may be internationally owned or operating between ports in different states. These impacts have been captured and assessed within this shipping and navigation chapter and NRA. No additional transboundary impacts are therefore anticipated other than those already assessed in Section 14.10 and 14.12.

14.15 Summary of Impacts, Mitigation, Likely Significant Environmental Effects and Monitoring

14.15.1 Information on shipping and navigation within the Shipping and Navigation Study Area was collected through a review of desktop sources and survey as outlined in Section 14.5 This information is summarised in Table 14.4 and Table 14.5.

14.15.2 Table 14.17 presents a summary of the potential impacts, Embedded Mitigation and the conclusion of likely significant environmental effects in EIA terms in respect to shipping and navigation from the Proposed Development. The impacts assessed include:

- impact of floating mooring and cable systems and interactions with vessels at risk of snagging;
- deviation of commercial vessels;
- increased collision risk;
- increased allision risk;
- increased grounding risk;
- potential impact to SAR capability;
- interference with Radar, communications and positioning systems;
- reduction in UKC due to subsurface Offshore Infrastructure;
- potential impact from towage operations;
- breakout or loss of station of a floating Wind Turbine;
- potential impact on ports/harbours and other nearshore operations; and
- potential impact on small vessel activity (including fishing and recreation).

14.15.3 Overall, it is concluded that there will be no likely significant environmental effects arising from the Proposed Development during the construction, O&M or decommissioning phases of the Proposed Development.

14.15.4 Table 14.19 presents a summary of the CEA including potential impacts, Embedded Mitigation and the conclusion of likely significant environmental effects on shipping and navigation in EIA terms. The

cumulative effects assessed are the same impacts as listed above for the assessment of the Proposed Development in isolation.

14.15.5 Overall, it is concluded that there will be no likely significant cumulative effects from the Proposed Development alongside other projects.

14.15.6 No likely significant transboundary effects have been identified in regard to effects of the Proposed Development.

14.16 Summary of Assessment of Significance

Table 14.17: Summary of In Isolation Effects Assessment

Description of Impact	Embedded Mitigation	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Construction Phase							
Impact of floating mooring and cable systems and interactions with vessels at risk of snagging	1, 6, 8, 10, 11, 12, 15, 19, 25, 26, 39, Guard vessels	Low	High	Minor	None required above existing Embedded Mitigation.	Minor	None
Deviation of commercial vessels	6, 8, 11, 15, 25, 26, Guard vessels	Medium	Negligible	Minor	None required above existing Embedded Mitigation.	Minor	None
Increased collision risk	6, 8, 10, 11, 17, 50, Guard vessels	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None
Increased allision risk	6, 11, 12, 15, 19, 20, 24, 26, Guard vessels	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None
Increased grounding risk	1, 4, 6, 11, 16, 21, 22, 26	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None
Potential impact to SAR capability	6, 11, 12, 15, 19, 20, 22, 24, 26, Guard vessels	Negligible	Low	Negligible	None required above existing Embedded Mitigation.	Negligible	None
Interference with Radar, communications and positioning systems	11, 24, 26	Medium	Negligible	Minor	None required above existing Embedded Mitigation.	Minor	None

Description of Impact	Embedded Mitigation	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Reduction in Under Keel Clearance (UKC) due to subsurface Offshore Infrastructure	1, 4, 6, 11, 16, 21, 22, 23, 26	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None
Potential impact from towage operations	6, 8, 11, 17, 19, 50, Guard vessels	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None
Breakout or loss of station of a floating Wind Turbine	5, 6, 8, 11, 12, 15, 19, 20, 22, 26, Guard vessels	Negligible	High	Minor	None required above existing Embedded Mitigation.	Minor	None
Potential impact on ports/harbours and other nearshore operations	6, 8, 11	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None
Potential impact on small vessel activity (including fishing and recreation)	5, 6, 8, 10, 11, 12, 15, 17, 19, 20, 24, 25, 26, 50, Guard vessels	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None
O&M Phase							
Impact of floating mooring and cable systems and	1, 8, 10, 11, 12, 15, 19, 23, 25, 26, 39, Guard	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None

Description of Impact	Embedded Mitigation	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
interactions with vessels at risk of snagging	vessels						
Deviation of commercial vessels	8, 11, 15, 23, 25, 26, Guard vessels	Medium	Low	Minor	None required above existing Embedded Mitigation.	Minor	None
Increased collision risk	8, 10, 11, 17, 23, 50, Guard vessels	Negligible	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None
Increased allision risk	11, 12, 15, 19, 20, 23, 24, 26, Guard vessels	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None
Increased grounding risk	1, 4, 11, 16, 21, 22, 23, 26	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None
Potential impact to SAR capability	11, 12, 15, 19, 20, 22, 23, 24, 26, Guard vessels	Negligible	Low	Negligible	None required above existing Embedded Mitigation.	Negligible	None
Interference with Radar, communications and positioning systems	11, 24, 26	Medium	Negligible	Minor	None required above existing Embedded Mitigation.	Minor	None
Reduction in UKC due to subsurface Offshore Infrastructure	1, 4, 11, 16, 21, 22, 23, 26	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None

Description of Impact	Embedded Mitigation	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Potential impact from towage operations	8, 11, 17, 19, 23, 50, Guard vessels	Negligible	Low	Minor	None required above existing Embedded Mitigation.	Minor	None
Breakout or loss of station of a floating Wind Turbine	5, 8, 11, 12, 15, 19, 20, 22, 23, 26, Guard vessels	Negligible	High	Minor	None required above existing Embedded Mitigation.	Minor	None
Potential impact on ports/harbours and other nearshore operations	8, 11, 23	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None
Potential impact on small vessel activity (including fishing and recreation)	5, 8, 10, 11, 12, 15, 17, 19, 20, 23, 24, 25, 26, 50, Guard vessels	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None
Decommissioning Phase							
Impact of floating mooring and cable systems and interactions with vessels at risk of snagging	1, 8, 10, 11, 12, 15, 19, 25, 26, 39, Guard vessels	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None
Deviation of commercial vessels	8, 11, 15, 25, 26, Guard vessels	Medium	Negligible	Minor	None required above existing Embedded Mitigation.	Minor	None

Description of Impact	Embedded Mitigation	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Increased collision risk	8, 10, 11, 17, 50, Guard vessels	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None
Increased allision risk	11, 12, 15, 19, 20, 24, 26, Guard vessels	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None
Increased grounding risk	1, 4, 11, 16, 21, 22, 26	Negligible	Low	Minor	None required above existing Embedded Mitigation.	Minor	None
Potential impact to SAR capability	11, 12, 15, 19, 20, 22, 24, 26, Guard vessels	Negligible	Low	Negligible	None required above existing Embedded Mitigation.	Negligible	None
Interference with Radar, communications and positioning systems	11, 24, 26	Medium	Negligible	Minor	None required above existing Embedded Mitigation.	Minor	None
Reduction in UKC due to subsurface Offshore Infrastructure	1, 4, 11, 16, 21, 22, 26	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None
Potential impact from towage operations	8, 11, 17, 19, 50, Guard vessels	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None
Breakout or loss of station of a floating Wind Turbine	5, 8, 11, 12, 15, 19, 20, 22, 26, Guard vessels	Negligible	High	Minor	None required above existing Embedded Mitigation.	Minor	None

Description of Impact	Embedded Mitigation	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Potential impact on ports/harbours and other nearshore operations	8, 11	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None
Potential impact on small vessel activity (including fishing and recreation)	5, 8, 10, 11, 12, 15, 17, 19, 20, 23, 24, 25, 26, 50, Guard vessels	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None

Table 14.18: Summary of CEA

Description of Impact	CEA Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Construction Phase							
Impact of floating mooring and cable systems and interactions with vessels at risk of snagging	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
Deviation of commercial vessels	Tier 2 and 3	High	Negligible	Minor	None required above existing Embedded Mitigation.	Minor	None.

Description of Impact	CEA Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Increased collision risk	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
Increased allision risk	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
Potential impact to SAR capability	Tier 2 and 3	Negligible	Low	Minor	None required above existing Embedded Mitigation.	Minor	None.
Interference with Radar, communications and positioning systems	Tier 2 and 3	High	Negligible	Minor	None required above existing Embedded Mitigation.	Minor	None.
Reduction in UKC due to subsurface Offshore Infrastructure	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
Potential impact from towage operations	Tier 2 and 3	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None.
Breakout or loss of station of a floating Wind Turbine	Tier 2 and 3	Negligible	High	Minor	None required above existing Embedded Mitigation.	Minor	None.

Description of Impact	CEA Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Potential impact on ports/harbours and other nearshore operations	Tier 2 and 3	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None.
Potential impact on small vessel activity (including fishing and recreation)	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
O&M Phase							
Impact of floating mooring and cable systems and interactions with vessels at risk of snagging	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
Deviation of commercial vessels	Tier 2 and 3	High	Negligible	Minor	None required above existing Embedded Mitigation.	Minor	None.
Increased collision risk	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
Increased allision risk	Tier 2 and 3	Low	Medium	Minor	None required above existing	Minor	None.

Description of Impact	CEA Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
					Embedded Mitigation.		
Increased grounding risk	Tier 2 and 3	Negligible	Low	Minor	None required above existing Embedded Mitigation.	Minor	None.
Potential impact to SAR capability	Tier 2 and 3	Negligible	Low	Minor	None required above existing Embedded Mitigation.	Minor	None.
Interference with Radar, communications and positioning systems	Tier 2 and 3	High	Negligible	Minor	None required above existing Embedded Mitigation.	Minor	None.
Reduction in UKC due to subsurface Offshore Infrastructure	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
Potential impact from towage operations	Tier 2 and 3	Negligible	Low	Minor	None required above existing Embedded Mitigation.	Minor	None.
Breakout or loss of station of a floating Wind Turbine	Tier 2 and 3	Negligible	High	Minor	None required above existing Embedded Mitigation.	Minor	None.
Potential impact on	Tier 2 and 3	Low	Low	Minor	None required above existing	Minor	None.

Description of Impact	CEA Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
ports/harbours and other nearshore operations					Embedded Mitigation.		
Potential impact on small vessel activity (including fishing and recreation)	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
Decommissioning Phase							
Impact of floating mooring and cable systems and interactions with vessels at risk of snagging	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
Deviation of commercial vessels	Tier 2 and 3	High	Negligible	Minor	None required above existing Embedded Mitigation.	Minor	None.
Increased collision risk	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
Increased allision risk	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.

Description of Impact	CEA Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
Increased grounding risk	Tier 2 and 3	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None.
Potential impact to SAR capability	Tier 2 and 3	Negligible	Low	Minor	None required above existing Embedded Mitigation.	Minor	None.
Interference with Radar, communications and positioning systems	Tier 2 and 3	High	Negligible	Minor	None required above existing Embedded Mitigation.	Minor	None.
Reduction in UKC due to subsurface Offshore Infrastructure	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.
Potential impact from towage operations	Tier 2 and 3	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None.
Breakout or loss of station of a floating Wind Turbine	Tier 2 and 3	Negligible	High	Minor	None required above existing Embedded Mitigation.	Minor	None.
Potential impact on ports/harbours and other	Tier 2 and 3	Low	Low	Minor	None required above existing Embedded Mitigation.	Minor	None.

Description of Impact	CEA Tier	Magnitude of Impact	Sensitivity of Receptor	Significance of Effect	Additional Mitigation	Significance Residual Effect	Proposed Monitoring
nearshore operations							
Potential impact on small vessel activity (including fishing and recreation)	Tier 2 and 3	Low	Medium	Minor	None required above existing Embedded Mitigation.	Minor	None.

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