Partners in UK offshore wind

MONA OFFSHORE WIND PROJECT

Environmental Statement

Volume 2, Chapter 7: Shipping and navigation

Document Number: MOCNS-J3303-RPS-10045

Document Reference: F2.7

APFP Regulations: 5(2)(a)

February 2024

F01

Image of an offshore wind farm

www.morganandmona.com/en

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	Application	RPS	Mona Offshore Wind Ltd	Mona Offshore Wind Ltd	Feb 2024

Prepared by:

RPS

Prepared for:

Mona Offshore Wind Ltd.

Contents

Tables

Figures

Annexes

Volume 6, Annex 7.1: Navigational risk assessment.

Glossary

Term	Meaning
Adverse Weather	Severe weather that creates potentially unsafe conditions for vessel transits.
Aid to Navigation (AtoN)	Any sort of signal or marker to support vessel navigation including buoys, beacons or lights.
Air Draught	The distance from the surface of the water to the highest point of the vessel.
Allision	Vessel makes contact with a fixed or floating object such as wind turbine.
Anchorage	A designated area where ships lower their anchors to remain in position.
As Low As Reasonably Practical (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)	An automatic tracking system carried by ships that broadcasts their position and identity to other nearby vessels.
Beam	Side or width of a vessel.
Berth	The specific location within a port or harbour where a vessel is moored, usually for the purposes of loading or unloading.
Bow	The front of a vessel.
Bridge	The principal control centre from a vessel where it is navigated.
Cardinal Mark	A sea mark used in maritime pilotage to indicate the position of a hazard and the direction of safe water.
Cargo Shift	The dangerous movement of goods aboard a vessel, typically resulting in damage.
Chart Datum	The water level surface shown on nautical charts, approximately the lowest level due to astronomical effects.
Closest Point of Approach (CPA)	The estimated point and distance at which two vessels or objects will reach their minimum value.
Collision	Coming together of two vessels underway.
Draught	The maximum depth of any part of a vessel.
Fog	Where visibility is less than 1,000 metres.
Gale	Winds in excess of 34 Knots.
Grounding	Vessel makes contact with the seabed/shoreline or underwater assets.
Hydrography	The science and measurement of the physical features of the seabed.
Lee	The area of water downwind of an obstacle, such as a landmass.
Mona-Morgan route	The area of sea between the Morgan Generation Assets Array Area and Mona Array Area
Master	The designated person in charge of a ship, its crew, passengers and cargo.
Nautical Charts	A graphic representation of a sea area and adjacent coastal regions.

Term	Meaning
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.
Pilot	Professional seafarers with detailed knowledge of a port or sea area and expertise in ship manoeuvring.
Port	The left side of a vessel when looking forward towards the bow.
Port or Harbour	A maritime facility compromising of one or more wharves or loading areas where ships load and discharge cargo or passengers.
Routeing	The path taken by a vessel.
Significant Wave Height (H_s)	The average wave height from trough to crest of the highest one-third of waves.
Snagging	Fishing Gear or anchors coming fast on subsurface infrastructure such as cables.
Tonnage	The weight in tons of cargo or freight.
Traffic Separation Scheme (TSS)	A routeing measures aimed at the separation of opposing streams or traffic by appropriate means and by the establishment of traffic lanes.
Turnaround	The process and activities necessary between the arrival of a vessel in port and its departure, including unloading and loading of passengers or cargo.
Under Keel Clearance (UKC)	The vertical distance between the bottom of a ship and the seabed.
Vessel Monitoring System (VMS)	Satellite tracking system using a device on vessel which transmits the location, speed and course of the vessel.
Vessel Traffic Services (VTS)	A marine traffic monitoring system established by port authorities to manage vessel movements and safety.

Acronyms

Acronym	Description
AIS	Automatic Identification System
ALARP	As Low as Reasonably Practicable
AtoN	Aid to Navigation
AtoNMP	Aids to Navigation Management Plan
BEIS	Department for Business, Energy and Industrial Strategy
BWEA	British Wind Energy Association
CBRA	Cable Burial Risk Assessment
CEA	Cumulative Effects Assessment
CPA	Closest Point of Approach
CRNRA	Cumulative Regional Navigation Risk Assessment
CTV	Crew Transfer Vessel
DCO	Development Consent Order
DfT	Department for Transport

Acronym	Description
EIA	Environmental Impact Assessment
ERCoP	Emergency Response and Cooperation Plan
FSA	Formal Safety Assessment
GNSS	Global Navigation Satellite System
HMCG	His Majesty's Coastguard
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IEMA	Institute of Environmental Management and Assessment
IHO	International Hydrographic Organisation
IMO	International Maritime Organization
IoMSPC	Isle of Man Steam Packet Company
IWRAP	IALA Waterway Risk Assessment Program
LAT	Lowest Astronomical Tide
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MDS	Maximum Design Scenario
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
MMO	Marine Management Organisation
MNEF	Marine Navigation Engagement Forum
NFFO	National Federation of Fishermen's Organisation
NPS	National Policy Statement
NRA	Navigational Risk Assessment
NRW	Natural Resources Wales
NSIP	Nationally Significant Infrastructure Projects
OREI	Offshore Renewable Energy Installations
OSP	Offshore Substation Platforms
PEIR	Preliminary Environmental Information Report
PIANC	The World Association for Waterborne Transport Infrastructure
PPE	Personal Protective Equipment
REZ	Renewable Energy Zone
RNLI	Royal National Lifeboat Institution
RYA	Royal Yachting Association
SAR	Search and Rescue
SIRA	Simplified IALA Risk Assessment Method
SOLAS	Safety of Life at Sea

Acronym	Description
SoS	Secretary of State
TSS	Traffic Separation Scheme
UKC	Under Keel Clearance
UKHO	UK Hydrographic Office
UNCLOS	UN Convention on the Law of the Sea
VHF	Very High Frequency
VMS	Vessel Monitoring System
VTS	Vessel Traffic Services

Units

Unit	Description
%	Percentage
£	Pound sterling
H_s	Significant wave height
km^2	Square kilometres
knot	Nautical miles per hour
m	Metres
m/s	Metres per Second
MW	MegaWatts
nm	Nautical miles (1,852 meters)

7 Shipping and navigation

7.1 Introduction

7.1.1 Overview

7.1.1.1 This chapter of the Environmental Statement presents the assessment of the potential impact of the Mona Offshore Wind Project on shipping and navigation. Specifically, this chapter considers the potential impact of the Mona Offshore Wind Project seaward of Mean High Water Springs (MHWS) during the construction, operations and maintenance, and decommissioning phases.

7.1.1.2 This chapter also draws upon information contained within Volume 6, Annex 7.1: Navigational risk assessment (NRA) of the Environmental Statement. The NRA has been produced for the Mona Offshore Wind Project in accordance with Maritime and Coastguard Agency (MCA) requirements under the relevant guidance.

7.1.1.3 A Cumulative Regional Navigational Risk Assessment (CRNRA) was undertaken collaboratively between the developers of the Mona Offshore Wind Project, Morgan Offshore Wind Project Generation Assets (being developed by Morgan Offshore Wind Limited) and Morecambe Offshore Windfarm Generation Assets (being developed by Morecambe Offshore Windfarm Limited) (see Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement) and is used to inform the cumulative effects assessment (CEA) in section 7.11 of this chapter.

7.1.1.4 The assessment presented is also informed by the following chapters:

- Volume 2, Chapter 6: Commercial fisheries of the Environmental Statement
- Volume 2, Chapter 10: Other sea users of the Environmental Statement
- Volume 4, Chapter 1: Aviation and radar of the Environmental Statement.

7.1.1.5 In April 2023, the Preliminary Environmental Information Report (PEIR) for the Mona Offshore Wind Project was published to support the pre-application consultation activities required under the 2008 Act. The shipping and navigation assessment of the PEIR noted that significant effects existed for impacts on both ferry routeing and collision risk. In addition, the CEA noted that significant effects existed for impacts to ferry routeing, collision and allision risk when combined with other adjacent cumulative projects.

7.1.1.6 Following the completion of the PEIR and Section 42 consultation, the Mona Offshore Wind Project made several project changes and commitments to reduce these impacts, namely:

- Reduction in the spatial extent of the Mona Array Area in the north, east and south
- Increase in separation between the Mona Array Area and the Liverpool Bay Traffic Separation Scheme (TSS)
- Commitment to two lines of orientation in the arrangement of wind turbines and Offshore Substation Platforms (OSPs).

7.1.1.7 Both Morgan Offshore Wind Limited and Morecambe Offshore Windfarm Limited made similar commitments to further reduce the impacts to shipping and navigation in a cumulative context.

7.1.1.8 These commitments form the basis of the project design assessed for the Application and are further described in Volume 1, Chapter 4, Site selection and consideration of alternatives of the Environmental Statement.

7.2 Legislative and policy context

7.2.1 Planning policy context

7.2.1.1 The Mona Offshore Wind Project will be located in Welsh offshore waters (beyond 12 nautical miles (nm) from the Welsh coast) and inshore waters, with the onshore infrastructure located wholly within Wales. As the Mona Offshore Wind Project is an offshore generating station with a capacity of greater than 350 MW located in Welsh waters, it is a Nationally Significant Infrastructure Project (NSIP) as defined by Section 15(3) of the Planning Act 2008 (the 2008 Act). As such, there is a requirement to submit an application for a Development Consent Order (DCO) to the Planning Inspectorate to be decided by the Secretary of State (SoS) for the Department for Energy Security and Net Zero.

7.2.2 National Policy Statements

7.2.2.1 There are currently six energy National Policy Statements (NPSs), three of which contain policy relevant to offshore wind development and the Mona Offshore Wind Project, specifically:

- Overarching NPS for Energy (NPS EN-1) which sets out the UK Government's policy for the delivery of major energy infrastructure (Department for Energy Security & Net Zero, November 2024a)
- NPS for Renewable Energy Infrastructure (NPS EN-3) (Department for Energy Security & Net Zero, November 2024b)
- NPS for Electricity Networks Infrastructure (NPS EN-5) (Department for Energy Security & Net Zero, November 2024c).

7.2.2.2 NPS EN-3 includes guidance on what matters are to be considered in the assessment. These are summarised in Table 7.1. NPS EN-3 also highlight a number of factors relating to the determination of an application and in relation to mitigation. These are summarised in Table 7.2.

Table 7.1: Summary of the NPS EN-3 provisions relevant to shipping and navigation.

Summary of NPS EN-3 provision	How and where considered in the Environmental Statement
Offshore wind farms and offshore transmission will occupy an area of the sea or sea bed. For offshore wind farms in particular it is inevitable that there will be an impact on navigation in and around the area of the site. This is relevant to both commercial and recreational users of the sea who may be affected by disruption or economic loss because of the proposed offshore wind farm and/or offshore transmission. [Paragraph 2.8.178]	Impact on vessel routeing is considered in section 7.9.3 and section 7.9.4 for ferries and other commercial shipping. Routeing in both typical and adverse weather conditions is considered.
To ensure safety of shipping applicants should reduce risks to navigational safety to As Low As Reasonably Practicable (ALARP), as described in Section 2.8.331 of this NPS. [Paragraph 2.8.179]	The guidance and process followed in producing this NRA are described within Volume 4, Annex 7.1: Navigational risk assessment of the Environmental Statement.

Summary of NPS EN-3 provision	How and where considered in the Environmental Statement
There is a public right of navigation over navigable tidal waters and in International Law, foreign vessels have the right of innocent passage through the UK's territorial waters. [Paragraph 2.8.180]	A summary of key legislation and policy is contained in section 7.2.
Beyond the seaward limit of the territorial sea, shipping has the freedom of navigation although offshore infrastructure and the imposition of safety zones can hinder this. [Paragraph 2.8.181]	Applied risk controls, including safety zones, are described in section 7.8 and Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Additional risk control options are discussed Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
Impacts on navigation can arise from the wind farm or other infrastructure and equipment creating a physical barrier during construction and operation. [Paragraph 2.8.182]	Impact on vessel routeing is considered in section 7.9.3 and section 7.9.4 for ferries and other commercial shipping. Impacts to small craft routeing are considered in section 7.9.10.
There may be some situations where reorganisation of shipping traffic activity might be both possible and desirable when considered against the benefits of the wind farm and/or offshore transmission application and such circumstances should be discussed with the government officials, including SoS and MCA, and other stakeholders, including Trinity House, as The General Lighthouse Authority consultee, and the commercial shipping sector. It should be recognised that alterations might require national endorsement and international agreement and that the negotiations involved may take considerable time and do not have a guaranteed outcome. [Paragraph 2.8.183]	Significant consultation has been undertaken through the Marine Navigation Engagement Forum (MNEF), individual meetings, hazard workshops and written correspondence. These are summarised in the NRA (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement). Through this engagement feedback has been received on the impacts of the Mona Offshore Wind Project on different receptors, and as a result, substantial alterations were made to the Mona Offshore Wind Project design to minimise these impacts.
Applicants should engage with interested parties in the navigation sector early in the pre-application phase of the proposed offshore wind farm or offshore transmission to help identify mitigation measures to reduce navigational risk to ALARP, to facilitate proposed offshore wind development. This includes the Marine Management Organisation (MMO) or Natural Resources Wales (NRW) in Wales, MCA, the relevant General Lighthouse Authority, such as Trinity House, the relevant industry bodies (both national and local) and any representatives of recreational users of the sea, such as the Royal Yachting Association (RYA), who may be affected. This should continue throughout the life of the development including during the construction, operation and decommissioning phases. [Paragraph 2.8.184]	
Engagement should seek solutions that allow offshore wind farms, offshore transmission and navigation and shipping users of the sea to co-exist successfully. [Paragraph 2.8.185]	
The presence of the wind turbines can also have impacts on communication and shipborne and shore-based radar systems. See section 5.5 in EN-1 for further guidance. [Paragraph 2.8.186]	Impacts on shipborne and shorebased navigation, communication and positioning systems are described in section 7.9.9.
Prior to undertaking assessments, applicants should consider information on internationally recognised sea lanes, which is publicly available.	The NRA utilises a number of different datasets of shipping and navigation activities and features across the Shipping and Navigation Study Area

Summary of NPS EN-3 provision	How and where considered in the Environmental Statement
[Paragraph 2.8.187]	(see Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement). The proximity of the TSSs in the Irish Sea was assessed and it is concluded that there are no significant effects.
Applicants should refer in assessments to any relevant, publicly available data available on the Maritime Database. [Paragraph 2.8.188]	
Applicants must undertake an NRA in accordance with relevant government guidance prepared in consultation with the MCA and the other navigation stakeholders listed above. [Paragraph 2.8.189]	An NRA has been undertaken and is provided in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. The NRA follows MCA Marine Guidance Note (MGN) 654 and the International Maritime Organizations (IMO) Formal Safety Assessment (FSA). The NRA includes detailed vessel traffic data collection and analysis for the Shipping and Navigation Study Area (and with data durations in excess of MGN654 requirements). The NRA for the Mona Offshore Wind Project concluded that there were no unacceptable risks and that all risks had been reduced to Broadly Acceptable or ALARP. A Cumulative Regional NRA (CRNRA) has also been undertaken to assess the impacts of the Mona Offshore Wind Project in combination with the Morgan and Morecambe Generation Assets and other Tier 1 and Tier 2 projects. The CRNRA is available in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. The CRNRA, undertaken with the Mona Offshore Wind Project, Morgan Offshore Wind Project and Morecambe Offshore Windfarm, concluded that there were no unacceptable risks and that all risks had been reduced to Broadly Acceptable or ALARP. An addendum which included the Mooir Vannin Offshore Windfarm Scoping Boundary identified unacceptable risks for passages between the Morgan Array Area and Mooir Vannin Offshore Wind Farm Scoping Boundary.
The navigation risk assessment will for example necessitate: • A survey of vessel traffic in the vicinity of the proposed wind farm • A full NRA of the likely impact of the wind farm on navigation in the immediate area of the wind farm in accordance with the relevant marine guidance; and • Cumulative and in-combination risks associated with the development and other developments (including other wind farms) in the same area of sea. [Paragraph 2.8.190]	
In some circumstances applicants may seek declaration of a safety zone around wind turbines and other infrastructure. Although these might not be applied until after consent to the wind farm has been granted. [Paragraph 2.8.191]	Applied risk controls, including safety zones, are described in section 7.8 and Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Additional risk control options are discussed in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
The declaration of a safety zone excludes or restricts activities within the defined sea areas including navigation and shipping. [Paragraph 2.8.192]	
Where there is a possibility that safety zones will be sought, applicant assessments should include potential effects on navigation and shipping. [Paragraph 2.8.193]	
Where the precise extents of potential safety zones are unknown, a realistic worst-case scenario should be assessed. Applicants should consult the MCA for advice on maritime and safety and refer to the government guidance on safety zones as a part of this process.	

Summary of NPS EN-3 provision	How and where considered in the Environmental Statement
[Paragraph 2.8.194]	
Applicants should undertake a detailed Navigational Risk Assessment, which includes Search and Rescue (SAR) Response Assessment and emergency response assessment prior to applying for consent. The specific SAR requirements will then be discussed and agreed post-consent. [Paragraph 2.8.195]	Impacts on SAR are described in section 7.9.6.

Table 7.2: Summary of NPS EN-3 policy on decision making relevant to shipping and navigation.

Summary of NPS EN-3 provision	How and where considered in the Environmental Statement
The SoS should not grant development consent in relation to the construction or extension of an offshore wind farm if it considers that interference with the use of recognised sea lanes essential to international navigation is likely to be caused by the development. [Paragraph 2.8.326]	Relevant International Maritime Organisation (IMO) routeing measures, including the Liverpool Bay TSS, are considered in relation to the Mona Array Area in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Sea lane locations are presented in section 7.5 and impact on vessel routeing measures presented in section 7.9.2 and section 7.9.3 which concludes there are no significant effects.
The use of recognised sea lanes essential to international navigation means: a) anything that constitutes the use of such a sea lane for the purposes of article 60(7) of the United Nations Convention on the Law of the Sea (UNCLOS) 1982; and b) any use of waters in the territorial sea adjacent to Great Britain that would fall within paragraph (a) if the waters were in a REZ. [Paragraph 2.8.327]	
The SoS should be satisfied that the site selection has been made with a view to avoiding or minimising disruption or economic loss to the shipping and navigation industries with particular regard to approaches to ports and to strategic routes essential to regional, national and international trade, lifeline ferries and recreational users of the sea. [Paragraph 2.8.328]	Impact on vessel routeing is considered in section 7.9.3 and section 7.9.4 for ferries and other commercial shipping. Routeing in both typical and adverse weather conditions is considered.
Where after carrying out a site selection, a proposed development is likely adversely to affect major commercial navigation routes, for instance by causing appreciably longer transit times, the SoS should give these adverse effects substantial weight in its decision making. [Paragraph 2.8.329]	
Where a proposed offshore wind farm is likely to affect less strategically important shipping routes, the SoS should take a pragmatic approach to considering proposals to minimise negative impacts. [Paragraph 2.8.330]	
The SoS should be satisfied that risk to navigational safety is ALARP. It is government policy that wind farms and all types of offshore transmission should not be consented where they would pose unacceptable risks to navigational safety after mitigation measures have been adopted. [Paragraph 2.8.331]	The guidance and process followed in producing this NRA are described within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.

Summary of NPS EN-3 provision	How and where considered in the Environmental Statement
The SoS should be satisfied that the scheme has been designed to minimise the effects on recreational craft and that appropriate mitigation measures, such as buffer areas, are built into applications to allow for recreational use outside of commercial shipping routes. [Paragraph 2.8.332]	Impacts on recreational craft are described in section 7.9.10.
In view of the level of need for energy infrastructure, where an adverse effect on the users of recreational craft has been identified, and where no reasonable mitigation is feasible, the SoS should weigh the harm caused with the benefits of the scheme. [Paragraph 2.8.333]	
The SoS should make use of advice from the MCA, who will use the NRA described in paragraphs 2.8.189 and 2.8.190 above. [Paragraph 2.8.334]	Relevant stakeholders have been consulted throughout, including the MCA. A summary of the key issues raised during consultation activities, the consultee and the consultation activity undertaken is provided in section 7.3 and Table 7.5. A MNEF was established for the three Irish Sea Round 4 offshore wind projects. Two hazard workshops were undertaken and are described in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Impacts to navigation are described in section 7.9 and the guidance and process for producing the NRA is set out in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
The SoS should have regard to the extent and nature of any obstruction of or danger to navigation which (without amounting to interference with the use of such sea lanes) is likely to be caused by the development in determining whether to grant consent for the construction, or extension, of an offshore wind farm, and what requirements to include in such a consent. [Paragraph 2.8.335]	Impacts to navigation are described in section 7.9 and the guidance and process for producing the NRA are set out in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
The SoS may include provisions, compliant with national maritime legislation and UNCLOS, within the terms of a development consent as respects rights of navigation so far as they pass through waters in or adjacent to Great Britain which are between the mean low water mark and the seaward limits of the territorial sea. [Paragraph 2.8.336]	Applied risk controls, including safety zones, are described in section 7.8 and Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Additional risk control options are discussed in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
The provisions may specify or describe rights of navigation which: • Are extinguished • Are suspended for the period that is specified in the DCO • Are suspended until such time as may be determined in accordance with provisions contained in the DCO; and • Are exercisable subject to such restrictions or conditions, or both, as are set out in the DCO. [Paragraph 2.8.337]	
The SoS should specify the date on which any such provisions are to come into force, or how that date is to be determined. [Paragraph 2.8.338]	

Summary of NPS EN-3 provision	How and where considered in the Environmental Statement
The SoS should require the applicant to publish any provisions that are included within the terms of the DCO, in such a manner as appears to the SoS to be appropriate for bringing them, as soon as is reasonably practicable, to the attention of persons likely to be affected by them. [Paragraph 2.8.339]	
The SoS should include provisions as respects rights of navigation within the terms of a DCO only if the applicant has requested such provision be made as part of their application for development consent. [Paragraph 2.8.340]	

7.2.3 Welsh National Marine Plan

7.2.3.1 The shipping and navigation impact assessment has been made with consideration to the specific policies set out in the Welsh National Marine Plan (Welsh Government, 2019). Key provisions are set out in Table 7.3 along with details as to how these have been addressed within the assessment.

Table 7.3: Welsh National Marine Plan policies of relevant to shipping and navigation.

Policy	Key provisions	How and where considered in the Environmental Statement
ECON_02	Proposals should demonstrate how they have considered opportunities for coexistence with other compatible sectors in order to optimise the value and use of the marine area and marine natural resources	Impacts to commercial shipping routes are considered in section 7.9.2, 7.9.3 and 7.9.4. Impacts to the navigation safety of all marine users are assessed throughout section 7.9 and within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
GOV_01	Proposals should demonstrate that they have assessed potential cumulative effects and should, in order of preference: a. Avoid adverse effects; and/or b. Minimise effects where they cannot be avoided; and/or c. Mitigate effects where they cannot be minimised. If significant adverse effects cannot be avoided, minimised or mitigated, proposals must present a clear and convincing case for proceeding.	Impacts on navigational safety are considered in section 7.9 and 7.11. Applied risk controls, including safety zones, are described in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Additional risk control optioned are discussed in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. A CEA has been undertaken and is presented in section 7.11.
SAF_01	a. Proposals likely to have significant adverse impacts upon an established activity covered by a formal application or authorisation must demonstrate how they will address compatibility issues with that activity. Proposals unable to demonstrate adequate compatibility must present a clear and convincing case for the proposal to progress under exceptional circumstances. b. Proposals likely to have significant adverse impacts upon an established activity not subject to a formal authorisation must demonstrate how they will address compatibility issues with that activity. Proposals unable to demonstrate	

Policy	Key provisions	How and where considered in the Environmental Statement
	adequate compatibility must present a clear and convincing case for proceeding. Under SAF 01 a and b, compatibility should be demonstrated through, in order of preference: • Avoiding significant adverse impacts on those activities; and/or • Minimising significant adverse impacts where these cannot be avoided; and/or • Mitigating significant adverse impacts where they cannot be minimised.	
SOC_01	Proposals that maintain or enhance access to the marine environment are encouraged.	Impacts on recreational craft are described in section 7.9.10.

7.2.4 North West Inshore and North West Offshore Coast Marine Plans

7.2.4.1 The shipping and navigation impact assessment has also been made with consideration to the specific policies set out in the North West Inshore and North West Offshore Coast Marine Plans (MMO, 2021). Key provisions are set out in Table 7.4 along with details as to how these have been addressed within the assessment.

Table 7.4: North West Inshore and North West Offshore Marine Plan policies of relevance to shipping and navigation.

Policy	Key provisions	How and where considered in the Environmental Statement
NW-PS-1	Only proposals demonstrating compatibility with current port and harbour activities will be supported. Proposals within statutory harbour authority areas or their approaches that detrimentally and materially affect safety of navigation, or the compliance by statutory harbour authorities with the Open Port Duty or the Port Marine Safety Code, will not be authorised unless there are exceptional circumstances. Proposals that may have a significant adverse impact upon future opportunity for sustainable expansion of port and harbour activities, must demonstrate that they will, in order of preference: a. Avoid b. Minimise c. Mitigate adverse impacts so they are no longer significant. If it is not possible to mitigate significant adverse impacts, proposals should state the case for proceeding.	Impacts to navigation are described in section 7.9 and in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. In particular, the impacts on commercial shipping routes and the approaches to ports/harbours are given in sections 7.9.2, 7.9.3 and 7.9.4.

Policy	Key provisions	How and where considered in the Environmental Statement
NW-PS-2	Proposals that require static sea surface infrastructure or that significantly reduce under-keel clearance must not be authorised within or encroaching upon IMO routeing systems unless there are exceptional circumstances.	Sea lane locations are presented in section 7.5 and impact on vessel routeing measures presented in section 7.9.2. The assessment demonstrates that the Mona Offshore Wind Project does not encroach upon routeing schemes such as TSS.
NW-PS-3	Proposals that require static sea surface infrastructure or that significantly reduce under-keel clearance which encroaches upon high density navigation routes, strategically important navigation routes, or that pose a risk to the viability of passenger services, must not be authorised unless there are exceptional circumstances.	Impacts on Under Keel Clearance (UKC) are presented in section 7.9.12 and in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. The assessment demonstrates that the Mona Offshore Wind Project does not significantly reduce UKC.

7.3 Consultation

7.3.1.1 A summary of the key issues raised during consultation activities undertaken to date specific to shipping and navigation is presented in Table 7.5, together with how these issues have been considered in the production of this chapter. Further detail is presented within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.

Table 7.5: Summary of key consultation issues raised during consultation activities undertaken for the Mona Offshore Wind Project relevant to shipping and navigation.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
14 October 2021	MCA Consultation meeting.	• Project introduction and proposed approach • Data collection strategy (incl. survey timings).	Survey details are contained within section 7.4.
10 November 2021	MNEF Members MNEF meeting.	• Project introduction and proposed approach • Site selection in relation to shipping and navigation constraints • Impacts of COVID-19 on data collection • Impacts to ferry operators (Safety and Commercial) • Relation of impacts on ferry routes with regulation and guidance • Sensitivity of ferry operator schedules.	The data collection strategy is provided in section 7.4. Commercial impacts to ferry operators are described in section 7.9.3. Safety impacts to ferry routes are described throughout the impact assessment within section 7.9.3 and section 7.9.4 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
01 February 2022	MCA & Trinity House Consultation meeting.	• Methodological engagement. • Update on proposed approach for assessment • Status of NPS updates • Requirement for cumulative assessment • Adverse ship routeing assessment • Consenting of Walney Extension and assessment of gap with the North East Potential Development Area • Modelling to reflect local navigational conditions.	Relevant methodology and guidance is given in sections 7.4.1, 7.6, 7.10.1 and 7.2. Cumulative impacts are assessed in section 7.11 and summarised in Table 7.41. Safety impacts to ferry routes are described throughout the impact assessment within section 7.9.3 and section 7.9.4 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
09 February 2022	Department for Business, Energy and Industrial Strategy (BEIS)	• Methodological engagement • Introduction to Mona Offshore Wind Project and proposed approach for assessment • Status of NPS updates and role of BEIS • Engagement with wider stakeholders.	Relevant methodology and guidance is given in sections 7.4.1, 7.6, 7.10.1 and 7.2.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
	Consultation meeting.		
14 February 2022	UK Chamber of Shipping Seatruck Ferries Stena Line Isle of Man Steam Packet Company (IoMSPC) MCA Consultation meeting.	• Methodological engagement. • Relation of impacts on ferry routes with regulation and guidance • Site selection in relation to shipping and navigation constraints • Impacts to ferry operators (Safety and Commercial) • Need for a cumulative assessment • Adverse weather routeing decision making • Need for collaborative engagement in assessment.	Commercial impacts to ferry operators are described in section 7.9.3. Safety impacts to ferry routes are described throughout the impact assessment within section 7.9.3 and section 7.9.4 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Cumulative impacts are assessed in section 7.11 and summarised in Table 7.41. Adverse weather routeing impacts are described in section 7.9.4.
15 March 2022	Request for Info Letter: Seatruck Ferries Stena Line IoMSPC P&O Written correspondence.	• Request for Info Letter • Questionnaire issued to operators requesting details of existing operational details and constraints in normal and adverse weather.	Commercial impacts to ferry operators are described in section 7.9.3. Safety impacts to ferry routes are described throughout the impact assessment within section 7.9.3 and section 7.9.4 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
04 April 2022	IoMSPC Consultation meeting.	• Baseline data gathering • Review of current operations and constraints • Review of impacts and decision making in adverse weather • Review of future changes to operations • Significance and potential impacts to IoMSPC and Isle of Man.	Commercial impacts to ferry operators are described in section 7.9.3. Safety impacts to ferry routes are described throughout the impact assessment within section 7.9.3 and section 7.9.4 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
05 April 2022	IoMSPC Consultation meeting.	• Crossing from Douglas to Heysham aboard Ben-my-Chree • Discussions with master on decision making and passage planning.	N/A.
05 April 2022	Seatruck Ferries Consultation meeting.	• Baseline data gathering • Site selection and shipping and navigation constraints • Potential impacts of the three Round 4 Irish Sea offshore wind farm projects on safety and commercial operations for Seatruck • Review of current operations and constraints • Review of impacts and decision making in adverse weather • Review of future changes to operations.	Commercial impacts to ferry operators are described in section 7.9.3. Safety impacts to ferry routes are described throughout the impact assessment within section 7.9.3 and section 7.9.4 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Future case scenario development is described in section 7.5.5 and within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
14 April 2022	Stena Consultation meeting.	• Baseline data gathering • Potential impacts of the three Round 4 Irish Sea offshore wind farm projects on safety and commercial operations for Stena • Review of current operations and constraints • Review of impacts and decision making in adverse weather • Review of future changes to operations.	Commercial impacts to ferry operators are described in section 7.9.3. Safety impacts to ferry routes are described throughout the impact assessment within section 7.9.3 and section 7.9.4 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Future case scenario development is described in section 7.5.5 and within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
20 April 2022	Spirit Energy Written correspondence.	• Impacts to Spirit Energy • Impacts to marine and aviation movements to offshore platforms and rigs • Requirement for safe passing distances and exclusion areas • Increased traffic flow and collision risk.	Oil and gas activities are described in section 7.5. Safety impacts to oil and gas operations are described throughout the impact assessment within section 7.9 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
21 April 2022	RYA	• RYA Consultation and Survey Strategy	Data collection strategy is provided in section 7.4.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
	Consultation meeting.	• Introduction to Mona Offshore Wind Project and assessment approach • Availability of RYA Recreational Atlas • Summer survey strategy • Further engagement opportunities.	Impacts on recreational craft are described in section 7.9.10.
05 May 2022	Harbour Energy Written correspondence.	• Impacts to Harbour Energy • Decommissioning Plan for Millom West • Impacts to marine and aviation movements to offshore platforms and rigs • Requirement for safe passing distances and exclusion areas • Increased traffic flow and collision risk.	Oil and gas activities are described in section 7.5. Safety impacts to oil and gas operations are described throughout the impact assessment within section 7.9 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
06 May 2022	MNEF Members MNEF meeting.	• Project update • Cumulative impacts of multiple projects on ferry operations • How the cumulative impacts will be assessed or examined • Impacts of three Irish Sea projects on Isle of Man economy/society • Extent of incident data • Safety of navigating in gaps • Consequences of allisions with wind turbines.	Cumulative impacts are presented in section 7.11 and summarised in Table 7.41. Data collection strategy is provided in section 7.4. Impacts of Mona Offshore Wind Project, including consequences, are described in section 7.9 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
23 May 2022	Trinity House Scoping Opinion.	• Assessment approach MGN654 compliance • Cumulative impacts to be assessed • Additional and impacts to existing Aids to Navigation • Decommissioning Plan • Export cable corridor marking and protection.	Relevant methodology and guidance is given in sections 7.4.1, 7.6, 7.10.1 and 7.2. Cumulative impacts are summarised in section 7.11. Applied risk controls, including safety zones, are described within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Additional risk control optioned are identified in section 7.14 and within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
30 May 2022	MCA Scoping Opinion.	• Assessment approach MGN654 compliance • Impacts on vessel routeing and adverse weather routeing • Cumulative impacts to be assessed • Wind turbine layouts to comply with MGN654 • Export cable corridor marking and protection.	Relevant methodology and guidance is given in sections 7.4.1, 7.6, 7.10.1 and 7.2. Cumulative impacts are summarised in section 7.11. Impacts on vessel routeing are described in section 7.9.3. Applied risk controls, including safety zones, are described within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Additional risk control optioned are identified in section 7.14 and within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
31 May 2022	Isle of Man Government Scoping Opinion.	• Cumulative impacts of multiple developments • Inclusion of Isle of Man Orsted offshore wind farm proposal • Impacts on IoMSPC • Routes into Douglas • Impacts to adverse weather routeing and safe shelter • Impacts to SAR capabilities.	Cumulative impacts are presented in section 7.11 and summarised in Table 7.41. Commercial impacts to ferry operators are described in section 7.9.3. Safety impacts to ferry routes are described throughout the impact assessment within section 7.9 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Impacts to SAR are described in section 7.9.6.
15 June 2022	Planning Inspectorate Scoping Opinion.	• Assessment approach and shipping and navigation study area.	Relevant methodology and guidance is given in sections 7.4.1, 7.6, 7.10.1 and 7.2. The shipping and navigation study area is described in section 7.5.
30 June 2022	Seatruck Consultation meeting.	• Bridge Simulations Preparations • Determination of routes for assessment • Review of weather conditions and constraints • Definition of traffic and emergency scenarios • Assessment criteria and run order.	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement provides a high-level summary of the navigational simulations.
20 July 2022 21 July 2022	IoMSPC	• Bridge Simulations Preparations for the Mona Potential Array Area to inform PEIR	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement provides a high-level summary of the navigational simulations.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
	Bridge Simulations.	• Determination of routes for assessment • Review of weather conditions and constraints • Definition of traffic and emergency scenarios • Assessment criteria and run order.	
11 August 22 12 August 22	Stena Line Bridge Simulations.	• Bridge Simulations Preparations for the Mona Potential Array Area to inform PEIR • Determination of routes for assessment • Review of weather conditions and constraints • Definition of traffic and emergency scenarios • Assessment criteria and run order.	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement provides a high-level summary of the navigational simulations.
17 August 2022 18 August 2022 19 August 2022	IoMSPC Bridge Simulations.	• Bridge Simulations for the Mona Potential Array Area to inform PEIR • Safety of transits in adverse weather and traffic through Morgan-Walney route.	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement provides a high-level summary of the navigational simulations. Safety impacts to ferry routes are described throughout the impact assessment within section 7.9 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Cumulative impacts are presented in section 7.11 and summarised in Table 7.41.
23 Aug 2022 24 Aug 2022 25 Aug 2022	Stena Line Bridge Simulations.	• Bridge Simulations for the Mona Potential Array Area to inform PEIR • Safety of transits in adverse weather and traffic through the Mona-Morgan/Mona-Morecambe routes.	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement provides a high-level summary of the navigational simulations. Safety impacts to ferry routes are described throughout the impact assessment within section 7.9 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
08 September 22 09 September 22	Seatruck Bridge Simulations.	• Bridge Simulations for the Mona Potential Array Area to inform PEIR	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement provides a high-level summary of the navigational simulations.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
		• Safety of transits in adverse weather and traffic through the Mona-Morgan route.	Safety impacts to ferry routes are described throughout the impact assessment within section 7.9 and the risk assessment within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
03 October 2022	Various Online workshop.	• Webinar to prepare for hazard workshops undertaken to inform the PEIR.	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement summarises the findings of the hazard workshop undertaken to inform the PEIR.
10 October 2022	MNEF Members MNEF Meeting.	• Project update • Application process • Approach to cumulative assessment • Introduction to Morgan/Morecambe combined transmission project.	Section 7.2 describes the relevant legislation and policies.
10 October 2022	Shipping and navigation stakeholders including, statutory consultees, commercial operators, fishing industry, other sea users etc. Hazard Workshop.	• Cumulative Hazard Workshop of the Mona Potential Array Area to inform PEIR.	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement summarises the findings of the hazard workshop.
11 October 2022	Shipping and navigation stakeholders including, statutory consultees, commercial operators, fishing	• Mona Hazard Workshop of the Mona Potential Array Area to inform PEIR.	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement summarises the findings of the hazard workshop undertaken to inform the PEIR.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
	industry, other sea users etc. Hazard Workshop		
19 October 2022	Isle of Man Government Consultation meeting.	• Impacts on Isle of Man economy • Status of future Isle of Man offshore developments.	Cumulative impacts are presented in section 7.11 and summarised in Table 7.41.
20 October 2022	Orsted Consultation meeting.	• Update on the Orsted Isle of Man Offshore Wind Farm (Mooir Vannin).	Cumulative impacts are presented in section 7.11 and summarised in Table 7.41.
18 January 2023	MNEF Members MNEF Meeting.	• Project update on boundary amendments and how commitments will be tested post PEIR.	Review of commitments to be explored with stakeholders following PEIR.
31 May 2023	MCA S42 Responses.	• Concern over loss of safe navigable sea space that would increase collision risk.	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement describes the findings of the risk assessment.
01 June 2023	Stena Line S42 Responses.	• Impacts on safety, welfare and job security of workforce • Impact on bunker fuel consumption • Impact on freight and passenger safety • Cumulative impacts with proposed Mooir Vannin Offshore Wind Farm • Risk assessment method • Increase in lights making vessel identification more difficult.	Impacts to ferry routes are presented in section 7.9.3 and 7.9.4. Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement describes the findings of the risk assessment. Cumulative impacts are presented in section 7.11 and summarised in Table 7.41.
02 June 2023	IoM Government	• Cumulative impact on lifeline routes to Isle of Man	Impacts to ferry routes are presented in section 7.9.3 and 7.9.4

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
	S42 Responses.	• Inclusion of the Orsted Isle of Man Offshore Wind Farm (Mooir Vannin) within the CEA • Impact on emergency response capability • Additional fuel usage and emissions.	Impacts to emergency response are presented in section 7.9.6 Cumulative impacts are presented in section 7.11 and summarised in Table 7.41.
02 June 2023	IoMSPC S42 Responses.	• Impact on IoM community lifeline routes • Impact on turnaround times/goods supply • Navigation safety impacts due to insufficient space between wind farms • Increased fuel costs and emissions • Reputational damage and loss of volumes/revenues.	Impacts to ferry routes are presented in section 7.9.3 and 7.9.4. Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement describes the findings of the risk assessment. Cumulative impacts are presented in section 7.11 and summarised in Table 7.41.
02 June 2023	Trinity House S42 Responses.	• Requirements for marking, lighting and notification.	Relevant commitments to mitigation measures are presented in section 7.8.
02 June 2023	UK Chamber of Shipping S42 Responses.	• Impacts on vital shipping services • PEIR consultation given proposed changes to the Mona Array Area boundary • Financial costs of fuel and increased emissions • Inclusion of the proposed Mooir Vannin Offshore Wind Farm within the CEA	Impacts to ferry routes are presented in section 7.9.3 and 7.9.4. Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement describes the findings of the risk assessment. Cumulative impacts are presented in section 7.11 and summarised in Table 7.41.
02 June 2023	Seatruck S42 Responses.	• Cumulative impact on vessel traffic between wind farms • Impact on emergency response • Impact on fuel/cancellations of ferries • Impact of increased fuel on environment.	Impacts to ferry routes are presented in section 7.9.3 and 7.9.4. Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement describes the findings of the risk assessment. Impacts to emergency response are presented in section 7.9.6. Cumulative impacts are presented in section 7.11 and summarised in Table 7.41.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
23 May 2023 24 May 2023 25 May 2023	Stena Line Bridge Navigation Simulations.	• Update to navigation bridge simulations of the Mona Array Area to inform Environmental Statement.	A summary of the navigation simulations is provided in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
22 June 2023 23 June 2023	Seatruck Bridge Navigation Simulations.	• Update to navigation bridge simulations of the Mona Array Area to inform Environmental Statement.	A summary of the navigation simulations is provided in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
13 September 2023 14 September 2023 15 September 2023	IoMSPC Bridge Navigation Simulations.	• Update to navigation bridge simulations of the Mona Array Area to inform Environmental Statement.	A summary of the navigation simulations is provided in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
21 September 2023	MNEF Members Consultation meeting.	• Project update and review of boundary changes.	N/A
28 September 2023	Shipping and navigation stakeholders including, statutory consultees, commercial operators, fishing industry and other sea users. In person hazard workshop.	• Cumulative NRA hazard workshop undertaken to inform the Environmental Statement.	A summary of the hazard workshop, including details of attendees, is provided in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
29 September 2023	Shipping and navigation stakeholders including, statutory consultees, commercial operators, fishing industry and other sea users. In person hazard workshop.	• Mona Offshore Wind Project hazard workshop undertaken to inform the Environmental Statement.	A summary of the hazard workshop, including details of attendees, is provided in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
07 December 2023	Seatruck Consultation Meeting	• Review of engagements and assessments to date. • Identification of potential increases in risk to vessels. • Identification of residual impacts on commercial operations. • Cumulative impacts associated with Mooir Vannin Offshore Wind Farm.	A summary of engagement is included in section 7.3. Impacts to navigational safety are described in section 7.9 and an NRA is undertaken in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Impacts to ferry routes are described in section 7.9.3 and section 7.9.4. Cumulative impacts are assessed in section 7.11 and within the CRNRA in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
11 December 2023	IoMSPC Isle of Man Government Consultation Meeting	• Review of engagements and assessments to date. • Identification of potential increases in risk to vessels. • Identification of residual impacts on commercial operations. • Cumulative impacts associated with Mooir Vannin Offshore Wind Farm.	A summary of engagement is included in section 7.3. Impacts to navigational safety are described in section 7.9 and an NRA is undertaken in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Impacts to ferry routes are described in section 7.9.3 and section 7.9.4. Cumulative impacts are assessed in section 7.11 and within the CRNRA in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
14 December 2023	Stena Line	• Review of engagements and assessments to date. • Identification of potential increases in risk to vessels.	A summary of engagement is included in section 7.3.

Date	Consultee and type of response	Issues raised	Response to issue raised and/or where considered in this chapter
	Consultation Meeting	• Identification of residual impacts on commercial operations. • Cumulative impacts associated with Mooir Vannin Offshore Wind Farm.	Impacts to navigational safety are described in section 7.9 and an NRA is undertaken in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Impacts to ferry routes are described in section 7.9.3 and section 7.9.4. Cumulative impacts are assessed in section 7.11 and within the CRNRA in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
18 December 2023	Trinity House Consultation Meeting	• Review of engagements and assessments to date. • Review of findings of shipping and navigation assessments. • Review of Mona Offshore Wind Project mitigation measures. • Cumulative impacts associated with Mooir Vannin Offshore Wind Farm.	A summary of engagement is included in section 7.3. Impacts to navigational safety are described in section 7.9 and an NRA is undertaken in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Applied risk controls are described within section 7.8 and Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Cumulative impacts are presented in section 7.11 and summarised in Table 7.41.
19 December 2023	MCA Consultation Meeting	• Review of engagements and assessments to date. • Review of findings of shipping and navigation assessments. • Cumulative impacts associated with Mooir Vannin Offshore Wind Farm.	A summary of engagement is included in section 7.3. Impacts to navigational safety are described in section 7.9 and an NRA is undertaken in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Cumulative impacts are presented in section 7.11 and summarised in Table 7.41.

7.4 Baseline methodology

7.4.1 Relevant guidance

7.4.1.1 The primary guidance for undertaking NRAs for UK offshore wind farms are described below:

- MGN654: Safety of Navigation: Offshore Renewable Energy Installations (OREIs) – Guidance on UK Navigational Practice, Safety and Emergency Response (MCA, 2021). This highlights how to conduct shipping and navigation assessments, the impacts and risk control measures that should be considered
- The assessment has been conducted using the principles of the IMO's FSA (IMO, 2018)
- MGN372: OREIs: Guidance to Mariners Operating in the Vicinity of UK OREIs (MCA, 2022) describes issues to be taken into account when planning and undertaking voyages near OREI off the UK coast
- 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
- RYA Position of Offshore Renewable Energy Developments: Wind Energy (RYA, 2019) describes key impacts of offshore wind farms on recreational activities
- The World Association for Waterborne Transport Infrastructure (PIANC) WG161 Interaction Between Offshore Wind Farms and Maritime Navigation (PIANC, 2018) provides guidelines and recommendations on impacts and mitigations for shipping routes near offshore wind farms
- Nautical Institute (2013) The Shipping Industry and Marine Spatial Planning provides guidance on benefits and risks of marine spatial planning for shipping and navigation
- G+ IOER (2019) Good practice guidelines for offshore renewable energy developments provides guidance on emergency response for offshore wind farms.

7.4.2 Scope of the assessment

7.4.2.1 The scope of this Environmental Statement has been developed in consultation with relevant statutory and non-statutory consultees as detailed in Table 7.6.

7.4.2.2 Taking into account the scoping and consultation process, Table 7.6 summarises the issues considered as part of this assessment.

7.4.2.3 No effects have been scoped out of the assessment.

Table 7.6: Issues considered within this assessment.

Activity	Potential effects scoped into the assessment
Construction / operation and maintenance / decomissioning phases	
Construction, operation and maintenance or decomissioning of surface piercing infrastructure including WTGs and OSPs	Impact on recognised sea lanes essential to international navigation
	Impact to commercial operators including strategic routes and lifeline ferries
	Impact to adverse weather routeing
	Impact on access to ports and harbours
	Impact on emergency response capability due to increased incident rates and reduced access for SAR responders
	Impact on vessel to vessel collision risk
	Impact on allision (contact) risk to vessels
	Impact on marine navigation, communications and position fixing equipment
	Impact on recreational craft passages and safety
Vessel traffic movements associated with Mona Offshore Wind Project (including survey, construction, maintenance and decomissioning activities)	Impact on vessel to vessel collision risk
	Impact on allision (contact) risk to vessels
	Impact on emergency response capability due to increased incident rates and reduced access for SAR responders
Laying of subsea cables and associated burial or cable protection	Impact on snagging risk to vessel anchors and fishing gear
	Impact on UKC

7.4.3 Methodology to inform baseline

7.4.3.1 To characterise the baseline environment for the shipping and navigation study area (see section 7.5) a range of data sources have been collated and reviewed, in addition to feedback from project-specific consultation and site-specific surveys. Further information is included within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.

7.4.4 Study area

7.4.4.1 The shipping and navigation study area consists of waters within 10 nm of the Mona Array Area and 3 nm of the Mona Offshore Cable Corridor, as shown in Figure 7.1. The shipping and navigation study area has been discussed and agreed with key stakeholders during consultation (see section 7.3).

7.4.4.2 Additionally, the waters of the east Irish Sea to the south and east of the Isle of Man (south of 54.5 degrees north and east of 5.0 degrees west) have been considered in terms of shipping routes and their interaction with the Mona Offshore Wind Project and existing and planned offshore wind projects within this area for the CEA.

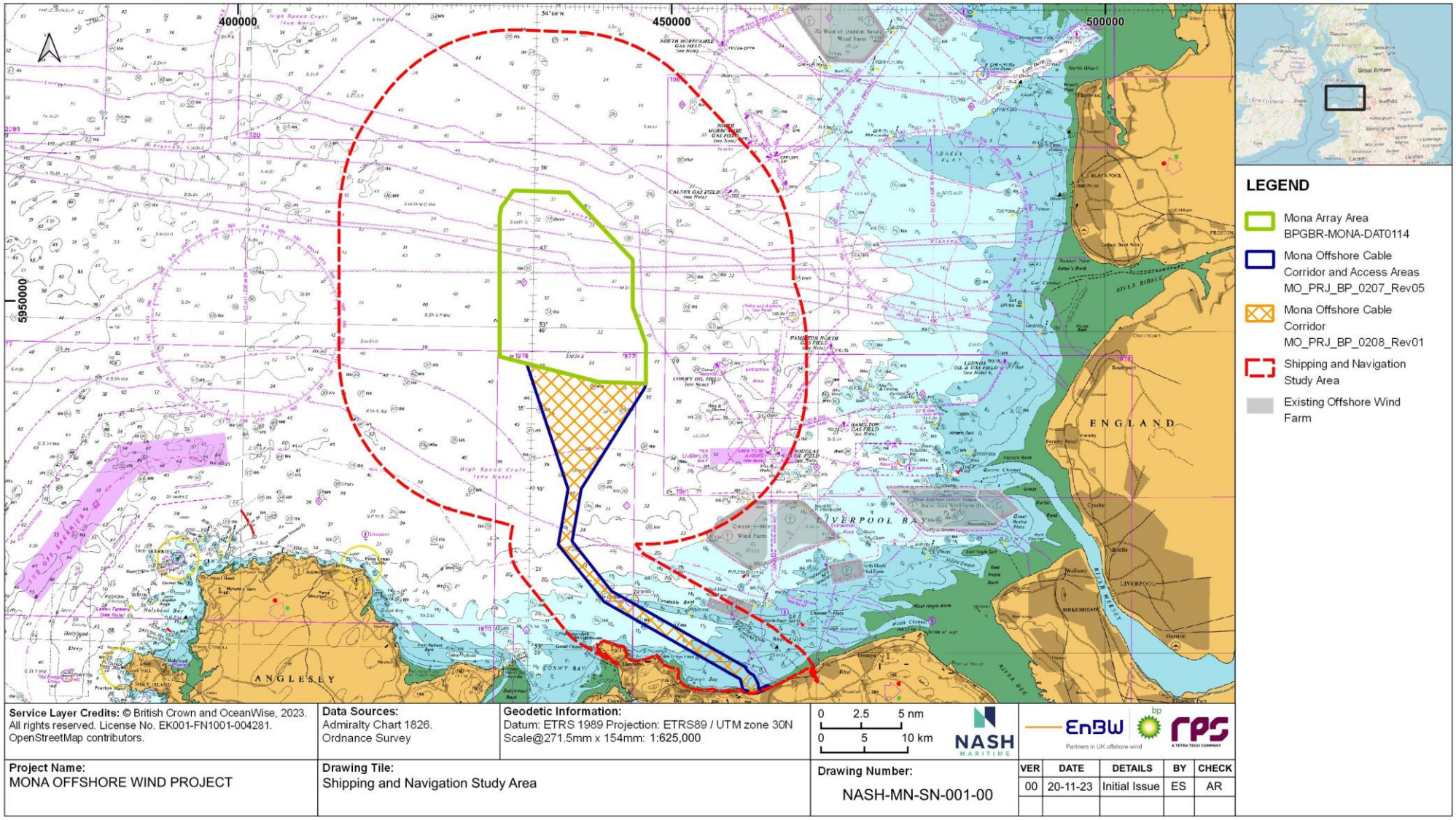

Figure 7.1: Shipping and navigation study area.

7.4.5 Desktop study

7.4.5.1 Information on shipping and navigation within the shipping and navigation study area was collected through a detailed desktop review of existing studies and datasets. These are summarised at Table 7.7 below.

7.4.6 Site specific surveys

7.4.6.1 In order to inform this Environmental Statement, site-specific surveys were undertaken, as agreed with the statutory consultees (see Table 7.5 for further details). A summary of the surveys undertaken to inform the shipping and navigation impact assessment is outlined in Table 7.8 below.

Table 7.7: Summary of key desktop data sources/reports.

Title/Dataset	Source	Year	Author
High fidelity data from the Automatic Identification System (AIS) for the Irish Sea for 2019	MarineTraffic	2019	MarineTraffic
High fidelity data from the AIS for the Irish Sea for 2022	MarineTraffic	2022	MarineTraffic
Anonymised AIS Data for UK waters for 2019	MMO	2019	MMO
Vessel density grids for 2021	EMODNet	2021	EMODNet
RYA Coastal Atlas	RYA	2022	RYA
Vessel Monitoring System (VMS) data for 2019	MMO	2019	MMO
Department for Transport (DfT) shipping statistics	DfT	2023	DfT
Marine Accident Investigation Branch (MAIB) incident data	MAIB	1992-2021	MAIB
Royal National Lifeboat Institute (RNLI) incident data	RNLI	2008-2019	RNLI
DfT SAR helicopter taskings	DfT	2022	DfT
G+ accident data	G+	2013-2022	G+
Marine aggregate dredging licenses	Crown Estate	2022	Crown Estate
Offshore renewables	Crown Estate	2023	Crown Estate
Industrial infrastructure (wind turbines, oil and gas, cables etc.)	Oceanwise	2023	Oceanwise
Oil and gas infrastructure	Oil and Gas Authority	2023	Oil and Gas Authority
Admiralty Charts	Admiralty	2023	Admiralty
Admiralty Sailing Directions	Admiralty	2023	Admiralty
Passage plans provided by Irish Sea ferry operators	Various	2022	IoMSPC, Stena Line, Seatruck and P&O
Tidal data	Admiralty Total Tide	2022	Admiralty
Metocean data	Mona Offshore Wind Project	2021	Mona Offshore Wind Project

Table 7.8: Summary of site-specific survey data.

Title	Extent of survey	Overview of survey	Survey contractor	Date	Reference to further information
Winter vessel traffic survey	Mona Array Area plus 10 nm	AIS, radar and visual observations collected as part of the 14 day marine traffic survey, as required in MGN654.	NASH Maritime	09:00 05 December 2021 to 09:00 19 December 2021	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
Summer vessel traffic survey	Mona Array Area plus 10 nm	AIS, radar and visual observations collected as part of the 14 day marine traffic survey, as required in MGN654.	NASH Maritime	10:00 30 June 2022 to 10:00 14 July 2022	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
Top up vessel traffic survey	Mona Array Area plus 10 nm	AIS, radar and visual observations collected as part of the 14 day marine traffic survey, as required in MGN654 to extend data validity.	NASH Maritime	05:30 26 October 2023 to 12:00 11 November 2023 (weather downtime on 01 to 03 November)	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
Navigation simulations to inform PEIR: IoMSPC	Irish Sea	Full bridge simulations of ferry passages through the Irish Sea were commissioned by the Applicant. The aim of the simulations was to understand, in more detail, potential navigation impacts of the PEIR boundaries of the Mona, Morgan and Morecambe Offshore Wind projects on existing commercial ferries and to test the viability and safety of commercial ferry transits through routes between the offshore wind farms in normal and adverse weather conditions. These were attended by representatives from the IoMSPC, Seatruck and Stena Line, including masters, who generously provided their time and expertise by participating in the simulations.	HR Wallingford/NASH Maritime	21/22 July 2022 16-19 July 2022	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
Navigation simulations to inform PEIR: Stena	Irish Sea		HR Wallingford/NASH Maritime	11/12 August 2022 23-25 August 2022	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
Navigation simulations to inform PEIR: Seatruck	Irish Sea		HR Wallingford/NASH Maritime	08/09 September 2022	Volume 6, Annex 7.1: Navigational risk assessment of the

Title	Extent of survey	Overview of survey	Survey contractor	Date	Reference to further information
					Environmental Statement.
Navigation simulations to inform PEIR: P&O	Irish Sea	P&O declined attendance at the navigation simulations, therefore a dedicated session to assess impacts on P&O routes was undertaken by the project team.	HR Wallingford/NASH Maritime	26 August 2022	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
Navigation simulations to inform Environmental Statement: IoMSPC	Irish Sea	The navigation simulations were repeated with the respective ferry companies to re-test the impacts on navigation and safety following commitments made by the Mona, Morgan and Morecambe Offshore Wind projects, including boundary changes. In addition, the assessments considered a more detailed understanding of fishing activity and night time simulations. The presence of the proposed Mooir Vannin Offshore Wind Farm was included in the IoMSPC simulations.	HR Wallingford/NASH Maritime	13-15 September 2023 (with Steam Packet) 12-14 June 2023 (without Steam Packet)	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
Navigation simulations to inform Environmental Statement: Stena	Irish Sea		HR Wallingford/NASH Maritime	23-25 May 2023	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.
Navigation simulations to inform Environmental Statement: Seatruck	Irish Sea		HR Wallingford/NASH Maritime	22-23 June 2023	Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.

7.5 Baseline environment

7.5.1 Introduction

7.5.1.1 A full assessment of the baseline environment for shipping and navigation is provided in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement, including details of navigational features, maritime incidents, and an assessment of the marine traffic baseline. 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. Key features relevant to the Mona Offshore Wind Project and features relating to the management of vessels and safety of navigation are described in this section.

7.5.2 Description of the marine environment

7.5.2.1 Figure 7.2 presents the principal navigational activities in proximity to the Mona Array Area. The key navigational features in the area are considered to be the two IMO adopted routeing measures located within the Irish Sea. These are the Liverpool Bay TSS, located approximately 4.5 nm southeast of the most southeast boundary of the Mona Array Area and the Off Skerries TSS, located 18 nm southwest of the Mona Array Area.

7.5.2.2 The area surrounding the Douglas Oil Field infrastructure is charted on Admiralty Chart 1826 as an Area to be Avoided with the accompanying note: *'The IMO-adopted Area to be Avoided should only be entered by authorised vessels to access the Douglas Oil Field*'. There are no reporting measures within the shipping and navigation study area.

7.5.2.3 All Aids to Navigation (AtoNs) within the shipping and navigation study area are fixed on offshore structures such as oil and gas platforms and wind turbines. The Mona Offshore Cable Corridor passes within 500 m of the West Constable cardinal mark, north of Llandudno.

7.5.2.4 Gwynt y Môr is the only operational offshore wind farm within the shipping and navigation study area, located 9.6 nm southeast of the Mona Array Area. There are four hydrocarbon fields within the shipping and navigation study area, these are Conwy Oil Field (4 nm southeast), Hamilton North Gas Field (7 nm east), Douglas Oil Field (9 nm southeast), and South Morecambe Gas Field (10 nm northeast). Calder Gas Field is the only gas field located within the shipping and navigation study area, and this is located 7 nm northeast. Further offshore wind farms and oil and gas infrastructure exist outside the shipping and navigation study area but within the east Irish Sea.

7.5.2.5 There are no charted anchorages within the shipping and navigation study area, but several are located within the east Irish Sea. Two charted anchorages are located within the Port of Liverpool Statutory Harbour Authority Area, as shown on Figure 7.2. One of these lies to the south of the approaches to Liverpool between the Burbo Bank Extension and Gwynt y Môr windfarms. The other anchorage is to the north of the approaches to the Mersey. Douglas Bay is used as an anchorage for vessels waiting to enter the Port of Douglas and for cruise vessels when undertaking tendering operations. There is an anchorage called Rhyl North used by vessels waiting for pilotage to the Port of Mostyn located directly north of the Mostyn Pilot Boarding Station. Whilst not charted, analysis of vessel traffic data identified a commercial ship

anchorage located to the east of Anglesey, by Point Lynas, that offers good shelter in westerly winds.

7.5.2.6 There are no ports or harbours within the shipping and navigation study area. The largest nearby port is the Port of Liverpool, located 10 nm southeast of the Mona Array Area.

7.5.2.7 A total of nine submarine cables pass through the shipping and navigation study area and five pass through the Mona Array Area, these are shown in in Figure 7.2.

7.5.2.8 There are two production agreement marine aggregate dredging areas within the shipping and navigation study area, these include Liverpool Bay (area number 457) located 6 nm east of the Mona Array Area and Hilbre Swash (area number 392/393) located 12 nm southeast of the Mona Array Area. There is an exploration and option area called Liverpool Bay (area number 1808) located 11 nm to the southeast.

7.5.2.9 A single spoil ground located to the north of Hamilton Gas Field was identified within the shipping and navigation study area.

7.5.2.10 The predominant wind direction is from the southwest, and accounts for the greatest proportion of strong wind events. The Admiralty Sailing Directions state that gales are reported between 12 days/year (at Walney) and 30 days/year (at Ronaldsway). Wave conditions are predominately southwesterly with monthly significant wave heights of 2.9 m and annual significant wave heights of 4.2 m. There are limited tidal currents within the shipping and navigation study area, with spring flows less than 1.5 m/s.

7.5.2.11 The Admiralty Sailing Directions report fog conditions between 12 days/year (at Crosby) and 24 days/year (at Ronaldsway).

7.5.2.12 His Majesty's Coastguard (HMCG) is responsible for requesting and coordinating SAR activities within the UK's SAR region. The local coastguard base for the region is Holyhead Coastguard Operations Centre. The nearest HMCG helicopter base is located at Caernarfon Airport, Gwynedd. The Caernarfon facility provides a 24-hour SAR service, with two Sikorsky S-92 helicopters.

7.5.2.13 There are 19 RNLI lifeboat stations within the east Irish Sea. The nearest lifeboat station is Llandudno, situated 17 nm south of the Mona Array Area and equipped with a Shannon class all-weather lifeboat and a D class inshore boat.

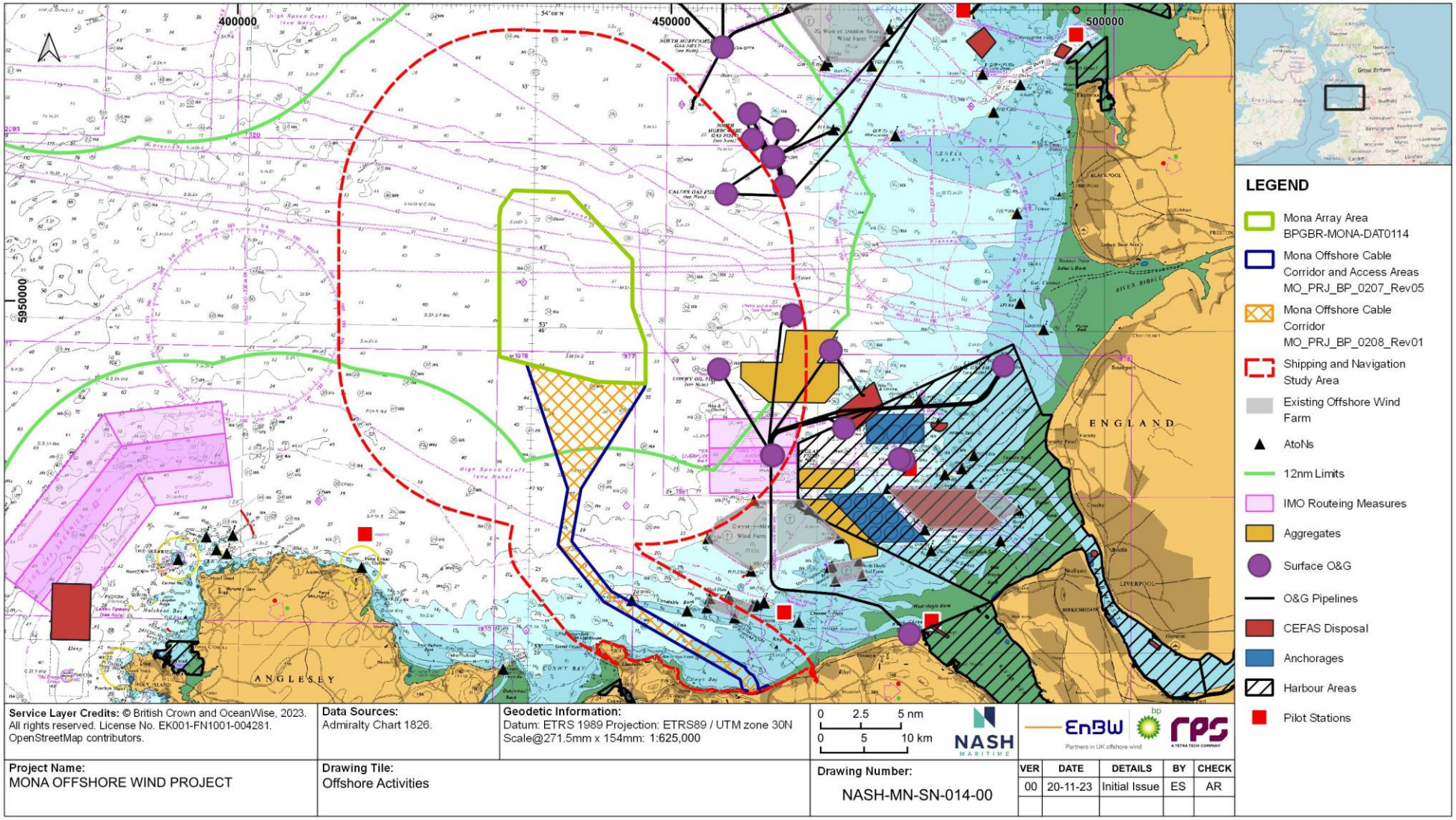

Figure 7.2: Offshore activities.

7.5.3 Vessel Traffic

7.5.3.1 This section presents a summary of the vessel traffic analysis undertaken in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.

7.5.3.2 Analysis of vessel traffic has been conducted using summer and winter vessel traffic survey data and two years of AIS data covering 2019 and 2022. A top-up vessel traffic survey was conducted in October/November 2023. Table 7.9 provides a summary of the vessel traffic surveys. Figure 7.3 and Table 7.9 show that cargo, fishing, passenger, tanker, tug and service vessels were recorded in both winter and summer vessel traffic surveys, whilst recreational vessels were only recorded during the summer survey. Fishing vessel activity was greater during the winter survey. Relatively few recreational and fishing vessels were recorded by radar who didn't have AIS fitted, whilst all vessels of other types had AIS fitted.

7.5.3.3 Annualised vessel traffic density from 2022 AIS data is shown in Figure 7.4, which presents the number of vessel transits through each grid cell. Figure 7.4 shows the Mona Array Area in relation to the general shipping routes within the Irish Sea. The key vessel traffic route in the shipping and navigation study area is determined by the Liverpool Bay TSS located approximately 4.5 nm southeast of the Mona Array Area. A vessel traffic route also runs from Liverpool Port northwest through the Mona Array Area. The ferry route between Liverpool and Belfast intersects the Mona Array Area. Routes between Liverpool-Dublin, Heysham-Dublin and Liverpool-Douglas pass immediately adjacent to the Mona Array Area. Vessel traffic activity shows a seasonal trend that peaks over the summer months (May to August) and decreases in the winter months (November to February). This is primarily due to an increase in ferry service operations and recreational activity.

7.5.3.4 The majority of vessels crossing the Mona Offshore Cable Corridor are commercial cargo, tanker and passenger vessels of between 75 m and 200 m. Commercial traffic is largely concentrated where the route crosses the approaches to Liverpool and the associated ferry routes. The vessel traffic data suggests little recreational and fishing activity immediately adjacent to the Mona landfall. However, small boats operating inshore may not carry AIS and therefore the actual numbers could be under-represented. The most frequent vessel types are service vessels (including hydrographic survey work) and 90 m general cargo vessels calling at Raynes Jetty. A small harbour at Rhos-on-Sea accounts for some small craft movements near to cable landfall.

7.5.3.5 Vessels of all draughts navigate within the shipping and navigation study area. Vessels with a draught over 10 m largely navigate within the vessel traffic routes adjoining Liverpool Bay TSS and transiting south of the Mona Array Area. Vessel traffic within the Mona Array Area largely comprises vessels with a draught under 7.5 m.

Table 7.9: Summary of vessel traffic surveys.

Attributes	Winter	Summer	Top-Up
Vessel	Karelle (28 m Fishing Vessel)	Morning Star (23 m Fishing Vessel)	Morning Star (23 m Fishing Vessel)
Dates	09:00 05 December 2021 to 09:00 19 December 2021	10:00 30 June 2022 to 10:00 14 July 2022	05:30 26 October 2023 to 12:00 11 November 2023
Downtime	None	None	06:00 01 November 2023 to 09:30 03 November 2023 (Storm Ciaran)
Survey Area	Mona Array Area + 10 nm	Mona Array Area + 10 nm	Mona Array Area + 10 nm
Total Vessels Recorded (Mona Array Area + 10 nm)	857 (61.2/day)	771 (55.1/day)	602 (43.2/day)
Total Vessels Recorded (Mona Array Area)	188 (13.4/day)	175 (12.5/day)	118 (8.4/day)
Cargo	**Mona Array Area+ 10 nm**: 182 (13/day) **Mona Array Area**: 31 (2.2/day)	**Mona Array Area + 10 nm**: 124 (8.9/day) **Mona Array Area**: 29 (2.1/day)	**Mona Array + 10nm**: 158 (11.3/day) **Mona Array**: 31 (2.2/day)
Fishing	**Mona Array Area + 10 nm**: 124 (8.9/day) **Mona Array Area**: 27 (1.9/day)	**Mona Array Area + 10 nm**: 18 (1.3/day) **Mona Array Area**: 6 (0.4/day)	**Mona Array + 10nm**: 31 (2.2/day) **Mona Array**: 8 (0.6/day)
Passenger	**Mona Array Area + 10 nm**: 268 (19.1/day) **Mona Array Area**: 81 (5.8/day)	**Mona Array Area + 10 nm**: 349 (24.9/day) **Mona Array Area**: 82 (5.9/day)	**Mona Array + 10nm**: 218 (15.6/day) **Mona Array**: 57 (4.1/day)
Recreational	None	**Mona Array Area + 10 nm**: 10 (0.7/day) **Mona Array Area**: 5 (0.4/day)	None
Tanker	**Mona Array Area + 10 nm**: 120 (8.6/day) **Mona Array Area**: 19 (1.4/day)	**Mona Array Area + 10 nm**: 98 (7/day) **Mona Array Area**: 19 (1.4/day)	**Mona Array + 10nm**: 46 (3.3/day) **Mona Array**: 6 (0.4/day)
Tug and Service	**Mona Array Area + 10 nm**: 134 (9.6/day) **Mona Array Area**: 30 (2.1/day)	**Mona Array Area + 10 nm**: 160 (11.4/day) **Mona Array Area**: 33 (2.4/day)	**Mona Array + 10nm**: 149 (10.6/day) **Mona Array**: 16 (1.1/day)

7.5.3.6 Vessels of all length between 0 and 350 m navigate within the shipping and navigation study area. Vessels over 200 m are largely limited to the vessel traffic route adjoining the Liverpool Bay TSS and either the Off Skerries TSS or transiting through the southwest portion of the Mona Array Area towards the south end of the Isle of Man and Belfast. There are distinct vessel traffic routes of vessels between 100 m and 200 m in length, due to the major ferry routes from Liverpool to Belfast. The largest vessels recorded in the shipping and navigation study area were the 349 m cargo vessel APL Gwangyang, the 326 m cruise ship Norwegian Getaway, and the 325 m cargo vessel, MSC Charleston. All of these vessels were bound for Liverpool.

7.5.3.7 More than 600 cargo vessel transits passed through the Mona Array Area in 2022, an average of 1.7 per day. Liverpool is a major UK port and cargo vessels passing through the shipping and navigation study area can vary in size from 90 m general cargo vessels to 300 m container ships, bulk carriers and vehicle carriers. Tanker vessel movements are consistent with the shipping routes identified for cargo ships, albeit with less frequency with less than 300 movements in 2022 through the Mona Array Area, an average of 0.8 per day.

7.5.3.8 Ferry routes, including passenger and freight services, are shown in Figure 7.5. There are ten principal ferry routes that navigate through the shipping and navigation study area, split between four operators. Ferry vessel routes and annual crossings by operator are presented in Table 7.10. A total of 1,570 ferry transits passed through the Mona Array Area in 2022, a rate of 4.3 per day. The IoMSPC operate between Douglas, Liverpool and Heysham. Seatruck operate between Heysham, Liverpool, Warrenpoint and Dublin. Stena operate between Liverpool, Heysham and Belfast. Finally, P&O operated between Liverpool and Dublin.

Table 7.10: Ferry routes and annual crossings by operator.

Operator	Route	Example vessels (2019-2022)	Approximate annual crossings (2022)
IoMSPC	HEY - DOUG	Ben-my-Chree	1,451
	LIV - DOUG	Manannan	552
	LIV - DOUG	Ben My Chree	41
Stena	LIV – BEL W IoM	Stena Edda/Stena Embla/Stena Mersey/Stena Horizon/ Stena Lagan/Stena Forecaster/Stena Forerunner	1,098
	LIV – BEL E IoM West of Calder Gas Field		194
	LIV – BEL E IoM East of Calder Gas Field		196
	HEY - BEL	Stena Hibernia/Stena Scotia	1,094
Seatruck	HEY - WAR	Seatruck Performance/Seatruck Precision	1,099
	HEY - DUB	Seatruck Pace/Seatruck Panorama	606
	LIV-DUB	Seatruck Pace/Seatruck Power/Seatruck Panorama/Seatruck Progress	1,627
P&O	LIV-DUB	Mistral/Norbay/Norbank	1,625

7.5.3.9 A total of 52 cruise ship transits were recorded passing through the Mona Array Area during 2022, approximately one per week. Cruise vessel activity in the area is centred around the Ports of Liverpool and Douglas.

7.5.3.10 There is little recreational activity within the Mona Array Area, with most recreational activity occurring along the coast, particularly along the entrance to Liverpool Port, and around Holyhead, Douglas and Rhyl. Inshore cruising routes are clear of the Mona Array Area but would cross the Mona Offshore Cable Corridor. Offshore cruising routes are evident between Liverpool and Douglas and between the Menai Straits and Douglas, passing adjacent to the Mona Array Area. Relatively few yachts were recorded during the 2021/2022/2023 vessel traffic surveys, with less than one per day during the summer survey and none at all recorded during the winter survey indicating strong seasonality.

7.5.3.11 Commercial fishing in the east Irish Sea region has a wide spatial distribution and targets a number of valuable fisheries for demersal, pelagic and shellfish species. Fishing ports in the region with the highest fishing efforts are Amlwch, Conwy, Holyhead and Fleetwood. Fishing vessels are also active from Annan, Douglas, Kilkeel, Kirkudbright, Maryport and Peel. In addition, Belgian trawlers are known to operate throughout the shipping and navigation study area. There is considerable fishing activity within and near the Mona Array Area, including vessels up to 40 m in length engaged in mobile and static gear fishing. However, some fishing vessels are engaged in guard vessel duties or other survey works and account for some of the concentrations around oil and gas installations. During the vessel traffic surveys, between 0.5 and two fishing vessels per day were identified within the Mona Array Area. Additional data on fishing activity is contained within the Mona Offshore Wind Project fisheries chapter (Volume 6, Annex 6.1: Commercial fisheries technical report of the Environmental Statement).

7.5.3.12 Crew Transfer Vessels (CTVs) operating between operations and maintenance bases and the existing offshore wind farms are mostly clear of the Mona Array Area, except when relocating on less routine transits. Oil and gas associated supply ships and standby safety vessels have a high intensity to the east of the shipping and navigation study area where the platforms are located. The activities of dredgers and pilot vessels are concentrated to the southeast and southwest of the shipping and navigation study area. SAR vessels are dispersed throughout the shipping and navigation study area. Other vessel types, including survey vessels and tugs, are concentrated inshore, with relatively few intersecting the Mona Array Area compared to other vessel types.

7.5.3.13 Cargo/tanker shipping routes with more than one vessel movement per day are all to/from the Port of Liverpool. The route between the Liverpool Bay TSS and the Off Skerries TSS has the most vessel traffic with four to six vessel movements per day in either direction. Two cargo/tanker vessel routes pass through the Mona Array Area with more than one vessel movement per day. Both of these routes are vessels transiting between the north Irish Sea to the west of the Isle of Man and the Liverpool Bay TSS. There are numerous cargo/tanker routes with less than one vessel per day passing through or adjacent to the Mona Array Area. These include routes into Heysham from the southwest and alternative routes to/from Liverpool that do not route via the TSS. Most of these routes have less than one cargo/tanker vessel transit per week.

7.5.3.14 Analysis of vessel tracks during MetOffice named storm events did not identify any repeatable adverse weather routeing by cargo/tanker shipping. However, during strong southwesterlies, the anchorage to the east of Anglesey was in greater demand by vessels.

7.5.3.15 Figure 7.5 shows the non-typical routes taken by ferries, including during adverse weather conditions. Prevailing southwesterlies result in vessels taking a more southwesterly transit in order to both control the course relative to the conditions and take advantage of the lee from the shore. This minimises dangerous motions aboard the vessel and improves passenger comfort.

7.5.3.16 There is considerable anchored vessel activity shown off the east coast of Anglesey near the Point Lynas Pilot Boarding Station. Use of this area as an anchorage is not displayed on the navigational chart but is regularly used by crude oil tankers waiting to berth at the Tranmere oil jetty on the River Mersey. There is also anchoring activity shown at the designated anchorages to the north and south of the entrance to the River Mersey as well as at Douglas Bay. There are no evident anchorages from AIS data within the Mona Array Area.

7.5.3.17 There are extensive non-transit vessel tracks through the Mona Array Area shown between the Liverpool Bay TSS, Douglas Bay, the north Irish Sea and the anchorage off the east coast of Anglesey. During consultation, it was identified that during strong northwesterlies, it was common for vessels to undertake pilotage transfers in the lee of the Isle of Man at Douglas, rather than at Liverpool. It is notable that during significant adverse weather events, these transfers can result in convoys of vessels navigating between Liverpool and Douglas.

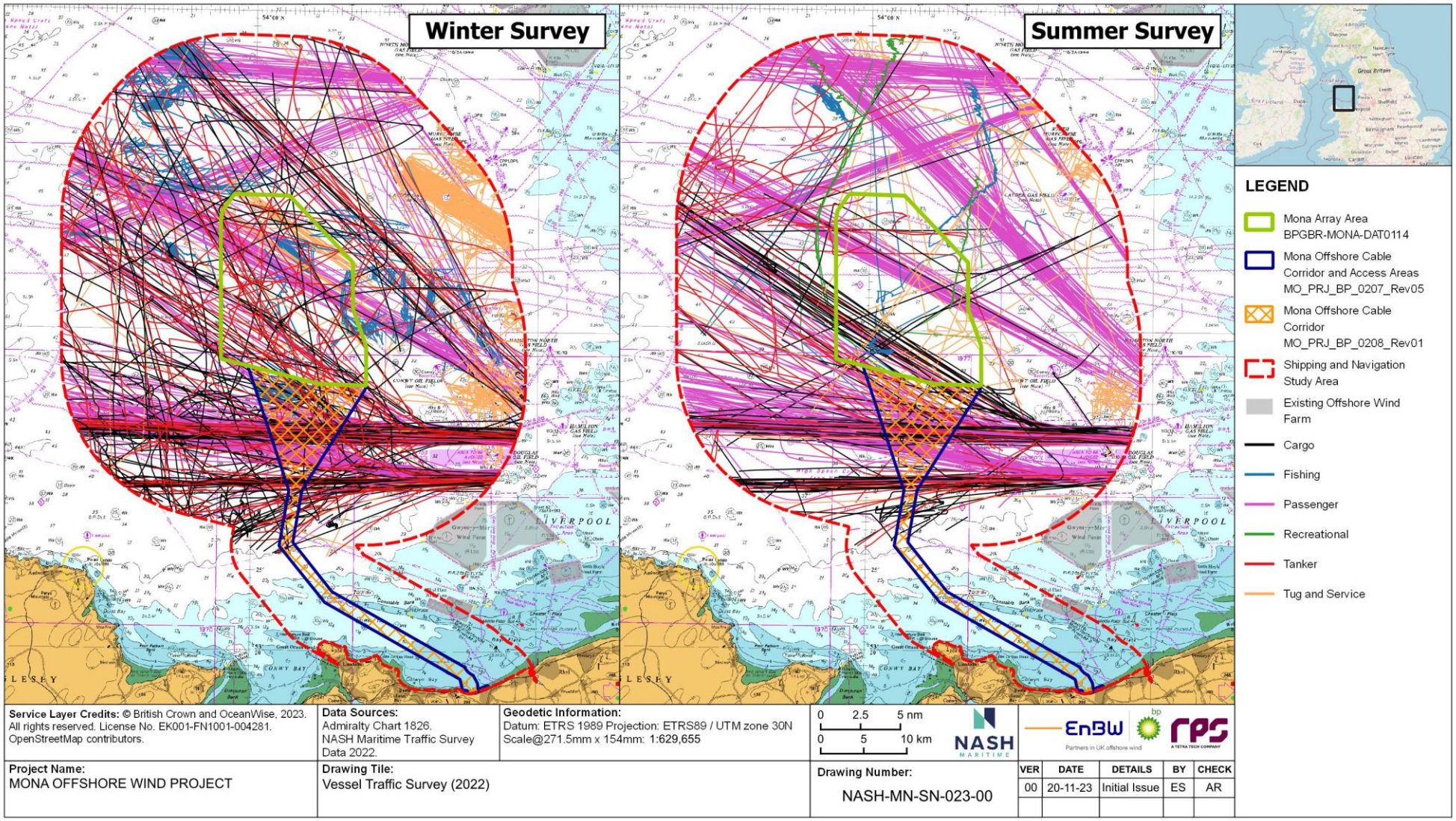

Figure 7.3: Vessel traffic survey (2022).

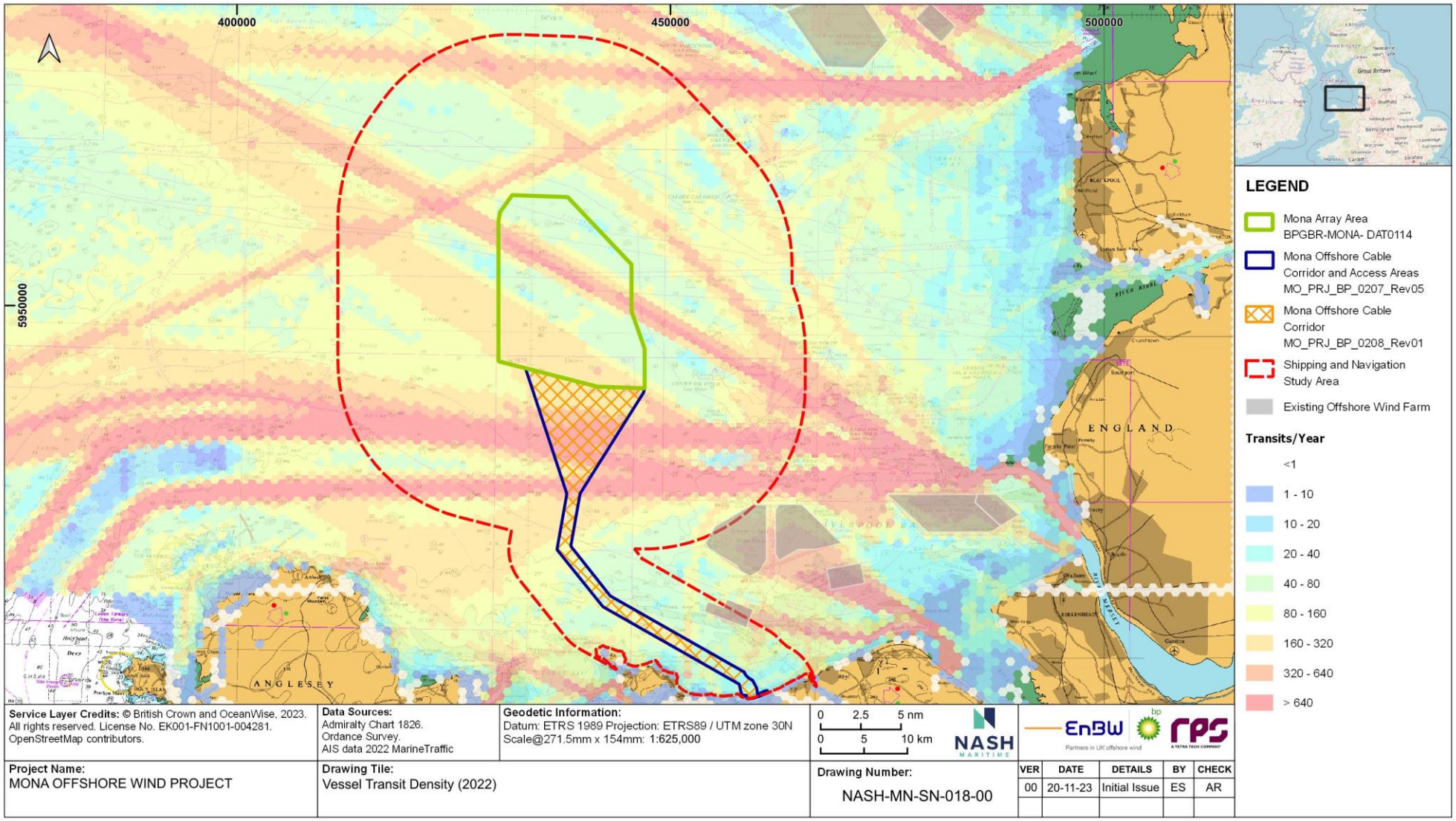

Figure 7.4: Vessel traffic density (2022).

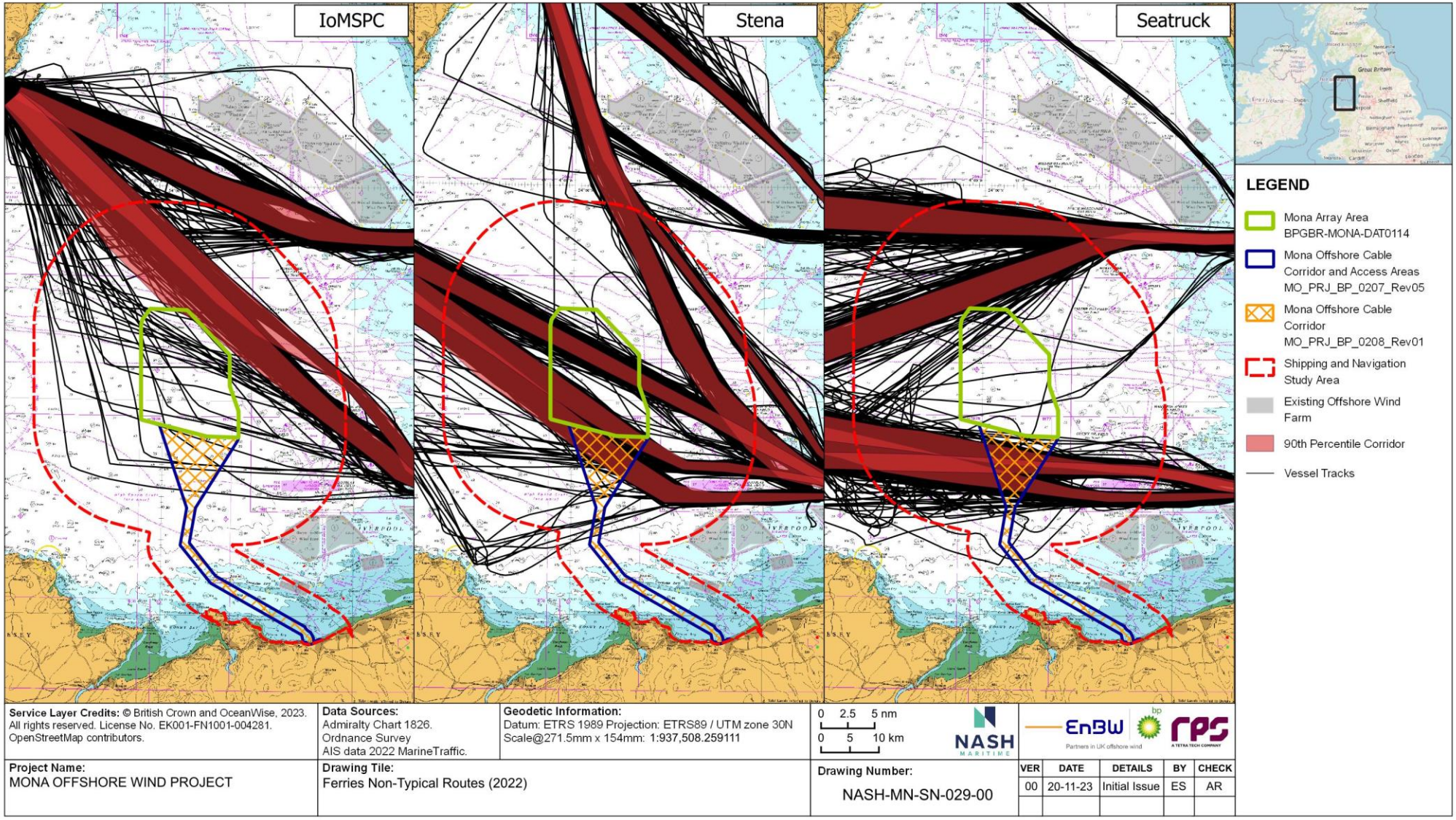

Figure 7.5: Ferries non-typical routes (2022).

7.5.4 Historical incidents

7.5.4.1 A baseline of historical maritime incidents within the shipping and navigation study area has been established through a review of MAIB and RNLI databases, reports and news reports. These are presented within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.

7.5.4.2 A total of nine navigational incidents were recorded within the footprint of the Mona Array Area between the MAIB (1992-2021) and RNLI (2008-2020) databases. These include two near misses, one flooding of a fishing vessel and six mechanical failures across recreational and fishing boats. The majority of incidents were located to the south of the shipping and navigation study area, contained within the TSS or close inshore. MAIB Report 8/2013 concerns a grounding of a general cargo vessel at Raynes Jetty, near to cable landfall.

7.5.4.3 For the most recent years of data (2008-2020), accident rates per year for all vessels within 10 nm of the Mona Array Area show very low incident rate of 1.73 per year (see Table 7.11). The incident rate for larger vessels is particularly low for larger commercial vessels, with 0.27 incidents per year involving passenger vessels and no incidents recorded involving tankers. The incident rate is significantly higher within 3 nm of the Mona Offshore Cable Corridor, however, this is largely recreational incidents responded to by the RNLI such as mechanical failure.

Table 7.11: MAIB/RNLI incident frequencies within shipping and navigation study area per year (2008-2020).

	Incident Type	Cargo	Fishing	Passenger	Recreational	Tanker	Tug and Service	Total
Mona Array Area Buffer (10 nm)	Collision	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Contact	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Grounding	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Other	0.27	0.93	0.27	0.27	0.00	0.00	0.00
	Total	**0.27**	**0.93**	**0.27**	**0.27**	**0.00**	**0.00**	**1.73**
Mona Offshore Cable Corridor Buffer (3 nm)	Collision	0.00	0.00	0.00	0.07	0.00	0.00	0.07
	Contact	0.00	0.07	0.00	0.00	0.00	0.00	0.07
	Grounding	0.20	0.00	0.00	0.53	0.00	0.00	0.73
	Other	0.07	2.60	0.13	17.73	0.00	0.27	20.80
	Total	**0.27**	**2.67**	**0.13**	**18.33**	**0.00**	**0.27**	**21.67**

7.5.4.4 To better understand the types and frequency at which navigational incidents might occur with the proposed Mona Offshore Wind Project, analysis was conducted of historical accidents associated with UK operational offshore wind farms. Analysis was conducted of the MAIB database (2010 to 2019), RNLI databases (2008 to 2019), MAIB reports and news reports.

7.5.4.5 In total, 69 incidents were identified between 2010 and 2019. This includes six collisions between vessels, 29 allisions of a vessel with a fixed structure, 21 groundings and 13 near misses. Where the information is available, 36% occurred within the offshore wind farm array boundary, 43% occurred within ports or harbours and 20% occurred on-transit between the two. 82% of incidents involved project craft (such as CTVs or construction vessels). Few allisions are recorded by a non-project vessel, however, anecdotally there have been more allisions involving fishing and recreational vessels which are not reported in the dataset.

7.5.4.6 Incident rates for an average project are derived from the historical incident records and using an estimate of the number of years of operation for UK offshore wind farms, (Table 7.12) (Rawson and Brito, 2022). The accident return rates are generally low, between 10 and 45 operational years between incidents, the majority accounted for by project vessels and have a low consequence, without loss of life or serious pollution. Therefore, over a typical 25 to 35 year operational duration it would be expected that a typical project would experience three allisions, two groundings and one collision or near miss. It is notable that there are no recorded accidents involving large commercial shipping vessels and offshore wind farms in the UK. Nor did any of the recorded navigational incidents across the UK sector result in loss of life.

Table 7.12: Average incident rate per project between 2010-2019 in UK.

Incident Type	N	Rate	Return Period (Years)
Collision	6	0.022	45.4
Grounding	21	0.077	13.0
Near Miss	13	0.048	20.9
Total Allision	29	0.107	9.4
CTV Allisions	27	0.099	10.1
Fishing Allisions	2	0.007	136.9
Total	69	0.254	3.9

7.5.5 Future baseline scenario

7.5.5.1 The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 require a future baseline scenario to be presented within the Environmental Statement, defined as, "*an outline of the likely evolution thereof without implementation of the development 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*". In the event that Mona Offshore Wind Project does not come forward, an assessment of the future baseline conditions has been carried out and is described within this section.

7.5.5.2 The future baseline scenario has been considered within the shipping and navigation study area for commercial, ferry, oil and gas, fishing and recreational vessel traffic. Further details on the development of the future baseline are presented within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.

7.5.5.3 In terms of cargo/tanker shipping trade, analysis of DfT data on UK port trade show a decline in port freight in 2020 at both national and port level. The DfT report that UK ports were affected by measures to prevent and reduce the global spread of Covid-19 throughout 2020, as well as the UK exiting the European Union at the end of 2020.

The DfT report a 9% decrease in tonnage handled by UK ports in 2020 compared to 2019. However, given the lifting of COVID-19 related restrictions, it is anticipated that port freight will continue to return to pre-pandemic levels.

7.5.5.4 In 2019, the DfT produced data for projected freight traffic into UK major ports. Overall, port traffic is forecast to remain relatively flat in the short term but grow in the long term, with tonnage 39% higher in 2050 compared to 2016. This equates to approximately a 15% increase in national freight tonnage by 2035. Additionally, the Douglas Harbour Master Plan (Isle of Man Government, 2018) considers the potential for development of a day-call cruise ship berth, which might increase the number of cruise ship calls to the Isle of Man. Other future changes that might occur by 2035 could include the use of more autonomous vessels within UK waters.

7.5.5.5 Freight and passenger ferries account for a large proportion of vessel movements within the shipping and navigation study area. These routes are subject to change both in terms of schedule, vessels and the addition of new routes in order to meet market demand. Prior to COVID-19, passenger numbers on relevant Irish Sea routes were relatively stable across most routes. There has been a noted increase in Irish Sea freight movements during the same period. A modernisation programme is ongoing between different operators to replace vessels operating within the shipping and navigation study area. Whilst passenger numbers were significantly affected by the COVID-19 pandemic for 2020 and 2021, 2022 numbers show a return to pre-pandemic numbers, with the exception of the Stena Liverpool to Belfast route which shows a significant increase. In 2023, the IoMSPC new ferry Manxman started operating between Heysham and Douglas and it was indicated through consultation with IoMSPC that it is anticipated that this vessel will start operating between Liverpool and Douglas all year round.

7.5.5.6 A review of available information for fishing and recreational activity does not suggest there would be a substantial change in activity from the baseline. Fishing effort can be highly variable, both spatially and temporally, but a need to maintain stock levels of a finite resource would suggest that any great increase in fishing effort would be unsustainable. Surveys of recreational participation conducted by the RYA has not suggested any notable increase, and more recently has suggested a downturn.

7.5.5.7 In the absence of definitive information, an assumption is made that recreational activity, fishing activity and ferry routes and schedules will be similar in 2035 as to the existing baseline environment. For the purposes of this assessment, a 15% increase in vessel traffic has been assumed for the future baseline scenario.

7.5.5.8 Irish Sea oil and gas platforms are reaching end of life and it is understood that some platforms may be decommissioned. Details of which platforms and when decommissioning will likely occur have not been fully ascertained by the Applicant. Consultation with oil and gas operators has indicated that Millom West (Harbour Energy) will be decommissioned by 2030. The South Morecambe gas field platforms are also expected to cease production before 2029 (Spirit Energy, 2019).

7.5.6 Data limitations

7.5.6.1 Since early 2020, the COVID-19 pandemic has substantially impacted recreational and commercial vessel movements both globally and locally. It is therefore possible that data collected between 2020 and 2022 may be influenced by the pandemic although vessel traffic is expected to have largely returned to pre-pandemic levels. Where appropriate, datasets have been used that precede the pandemic to benchmark those collected more recently, and in order to provide a representative overview of the baseline vessel traffic activity. In addition, following the PEIR, a 2022 AIS dataset has

been obtained to provide greater recency for the analysis. This was agreed with the MCA and key stakeholders during consultation as a suitable mitigation to the impacts of COVID-19.

7.5.6.2 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. Therefore, the vessel traffic survey using visual and radar observations has been combined with secondary sources (such as VMS or the RYA Coastal Atlas) and consultation to complete the picture of small craft vessel movements.

7.6 Impact assessment methodology

7.6.1 Overview

7.6.1.1 The shipping and navigation impact assessment has followed the methodology set out in Volume 1, Chapter 5: Environmental Impact Assessment methodology of the Environmental Statement. Specific to the shipping and navigation impact assessment, the following guidance documents have also been considered:

- MGN654 and its annexes (MCA, 2021)
- IMO FSA (IMO, 2018)
- IALA guidelines G1018/G1138 on risk management and the use of the Simplified IALA Risk Assessment Method (SIRA) respectively.

7.6.2 Impact assessment criteria

7.6.2.1 The criteria for determining the significance of effects is a two-stage process that involves defining the magnitude of the 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. For the purposes of the shipping and navigation assessment, magnitude is equated to the likelihood of an incident or impact occurring, whilst sensitivity is equated to the consequence of that impact occurring.

7.6.2.2 The criteria for defining magnitude/likelihood in this chapter are outlined in Table 7.13 below.

Table 7.13: Definition of terms relating to the magnitude/likelihood of an impact.

Magnitude of impact	Definition
High	• Frequent hazard occurrence, multiple times during Mona Offshore Wind Project lifecycle (100%) • Impact continuous throughout Mona Offshore Wind Project duration (approximately daily).
Medium	• Reasonably probable that hazard may occur once during Mona Offshore Wind Project lifecycle (50%) • Impact would occur periodically under certain conditions throughout Mona Offshore Wind Project duration (multiple times per year).
Low	• Unlikely that hazard occurs during Mona Offshore Wind Project lifecycle but has occurred at other offshore wind farms (10%) • Impact would occur infrequently during uncommon conditions throughout Mona Offshore Wind Project duration (approximately once per year).

Magnitude of impact	Definition
Negligible	• Extremely unlikely that hazard occurs at Mona Offshore Wind Project and has rarely occurred within industry (1%) • Impact could occur during rare conditions throughout Mona Offshore Wind Project duration (less than once per year).
No change	• Remote probability of hazard occurrence at Mona Offshore Wind Project and few examples within maritime industry (<1%) • No impact on shipping and navigation receptors.

7.6.2.3 The criteria for defining sensitivity/consequence in this chapter are outlined in Table 7.14 below.

Table 7.14: Definition of terms relating to the sensitivity/consequence to the receptor.

Sensitivity	Definition
Very High	Major consequence - multiple loss of life, loss of vessel (> £10million), major pollution (Tier 3 as per national contingency plan (MCA, 2017)) and long-term disruption to operators/marine users.
High	Serious consequence - fatality/serious injuries, serious damage to vessel (< £10million), serious pollution (Tier 2 as per MCA, 2017) and prolonged disruption to operators/marine users.
Medium	Moderate consequence - Serious injuries, damage to vessel (< £1million), moderate pollution (Tier 2 as per MCA, 2017) and temporary disruption to operators/marine users.
Low	Minor consequence - Multiple minor injuries, minor damage (< £100k) to vessel, minor pollution (Tier 1 as per MCA, 2017) and short-term disruption to operators/marine users.
Negligible	Negligible consequence - Minor injury, minor damage (< £10k), minor spill and minimal disruption to operators/marine users.

7.6.2.4 The significance of the effect upon shipping and navigation is determined by correlating the magnitude/likelihood of the impact and the sensitivity/consequence of the receptor. The particular method employed for this assessment is presented in Table 7.15. Where a range of significance of effect is presented, the final assessment for each effect is based upon expert judgement.

7.6.2.5 For the purposes of this assessment, any effects with a significance level of minor or less have been concluded to be not significant in terms of The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017.

7.6.2.6 Where significance of effect is deemed to be ‘negligible or minor’ or ‘minor or moderate’ within Table 7.15, an expert judgement call has been made on whether it is deemed to be of minor or moderate significance in Environmental Impact Assessment (EIA) terms based on the understanding of the receptor.

Table 7.15: Matrix used for the assessment of the significance of the effect.

Sensitivity of Receptor	Magnitude of Impact				
	No Change	**Negligible**	**Low**	**Medium**	**High**
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major
High	No change	Minor	Minor or Moderate	Moderate or Major	Major
Very High	No change	Minor	Moderate or Major	Major	Major

7.7 Key parameters for assessment

7.7.1 Maximum design scenario

7.7.1.1 The Maximum Design Scenarios (MDSs) identified in Table 7.16 have been selected as those having the potential to result in the greatest effect on an identified receptor or receptor group. These scenarios have been selected from the Project Design Envelope provided in Volume 1, Chapter 3: Project description of the Environmental Statement. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Design Envelope (e.g. different infrastructure layout), to that assessed here be taken forward in the final design scheme.

Table 7.16: MDS considered for the assessment of potential impacts on shipping and navigation.

[a] C=construction, O=operations and maintenance, D=decommissioning

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
Impact on recognised sea lanes essential to international navigation.	✓	✓	✓	**Construction phase** • Four years construction duration • Construction activities over the maximum extent of the Mona Array Area (300 km^2) and a 90 km long Mona Offshore Cable Corridor. **Operations and maintenance phase** • Operational life of 35 years • Maximum extent of Mona Array Area (300 km^2) and a 90 km long Mona Offshore Cable Corridor. **Decommissioning phase** • The duration of the decommissioning programme is anticipated to be the same as for construction, and thus, up to four years • During the decommissioning phase the changes would gradually decrease from the operational MDS as the need for project-related vessels is reduced and structures are removed and cut below the seabed.	Greatest extent of the Mona Offshore Wind Project over the longest duration, would impact the most routes whilst vessels navigate around the Mona Array Area and therefore the greatest potential for impacts on recognised sea lanes essential to international navigation.
Impact to commercial operators including strategic routes and lifeline ferries.	✓	✓	✓	**Construction phase** • Four years construction duration • Construction activities over the maximum extent of the Mona Array Area (300 km^2) and a 90 km long Mona Offshore Cable Corridor. **Operations and maintenance phase** • Operational life of 35 years • Maximum extent of Mona Array Area (300 km^2) and a 90 km long Mona Offshore Cable Corridor. **Decommissioning phase** • The duration of the decommissioning programme is anticipated to be the same as for construction, and thus, up to four years	Greatest extent of the Mona Offshore Wind Project over the longest duration, would impact the most routes whilst vessels navigate around the Mona Array Area and therefore the greatest potential for impacts on commercial operators and routes.

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				• During the decommissioning phase the changes would gradually decrease from the operational MDS as the need for project-related vessels is reduced and structures are removed and cut below the seabed.	
Impact to adverse weather routeing.	✓	✓	✓	**Construction phase** • Four years construction duration • Construction activities over the maximum extent of the Mona Array Area (300 km^2). **Operations and maintenance phase** • Operational life of 35 years • Maximum extent of Mona Array Area (300 km^2). **Decommissioning phase** • The duration of the decommissioning programme is anticipated to be the same as for construction, and thus, up to four years • During the decommissioning phase the changes would gradually decrease from the operational MDS as the need for project-related vessels is reduced and structures are removed and cut below the seabed.	Greatest extent of the Mona Offshore Wind Project over the longest duration, would impact the most routes whilst vessels navigate around the Mona Array Area and therefore the greatest potential for impacts on adverse weather routing.
Impact on access to ports and harbours.	✓	✓	✓	**Construction phase** • Four years construction duration • Construction activities over the maximum extent of the Mona Array Area (300 km^2) and a 90 km long Mona Offshore Cable Corridor • Up to 86 construction vessels on site at any one time (including main installation/support vessels, tug/anchor handlers, cable lay vessels, guard vessels, survey vessels, seabed preparation vessels, CTVs, scour protection installation vessels and cable protection installation vessels) • Up to 2,055 installation vessel movements (return trips) during construction (including main installation/support vessels, tug/anchor handlers, cable lay vessels, guard vessels, survey vessels, seabed preparation vessels, CTVs, scour protection installation vessels and cable protection installation vessels) • Export cables: up to four cables with a length of 90 km and minimum burial of 0.5 m. Cable protection laid over a maximum of 72 km of the cable with a height of up to 3 m. Up to 14 cable crossings, each crossing has a length of up to 50 m and a height of up to 3 m.	Greatest extent of the Mona Offshore Wind Project over the longest duration, would impact the most routes whilst vessels navigate around the Mona Array Area and therefore the greatest potential impact on access into ports and harbours.

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				Operations and maintenance phase • Operational life of 35 years • Maximum extent of Mona Array Area (300 km^2) and a 90 km long Mona Offshore Cable Corridor • Export cables: up to four cables with a length of 90 km and minimum burial of 0.5 m. Cable protection laid over a maximum of 72 km of the cable with a height of up to 3 m. Up to 14 cable crossings, each crossing has a length of up to 50 m and a height of up to 3 m • Up to a 21 operations and maintenance vessels on site at any one time (CTVs/workboats, jack-up vessels, cable repair vessels, service operation vessels or similar and excavators/backhoe dredgers) • Up to 849 operations and maintenance vessel movements (return trips) each year (including CTVs/workboats, jack-up vessels, cable repair vessels, service operation vessels or similar and excavators/backhoe dredger). **Decommissioning phase** • The duration of the decommissioning programme is anticipated to be the same as for construction, and thus, up to four years • Export cables: up to four cables with a length of 90 km and minimum burial of 0.5 m. Cable protection laid over a maximum of 72 km of the cable with a height of up to 3 m. Up to 14 cable crossings, each crossing has a length of up to 50 m and a height of up to 3 m • During the decommissioning phase the changes would gradually decrease from the operational MDS as the need for project-related vessels is reduced and structures are removed and cut below the seabed.	
Impact on emergency response capability due to increased incident rates and reduced access for SAR responders.	✓	✓	✓	**Construction phase** • Up to four years construction duration • Construction activities over the maximum extent of the Mona Array Area (300 km^2) and a 90 km long Mona Offshore Cable Corridor • Maximum number of wind turbines (96) and four OSPs (45 m x 65 m)	The largest Mona Array Area with the minimum distance between the largest number of structures has the greatest potential to inhibit SAR response and access. Maximum number of vessels over the longest period has the greatest potential to

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				• Wind turbines: maximum rotor diameter of 320 m, upper blade tip height above Lowest Astronomical Tide (LAT) of 364 m and minimum wind turbine spacing of 1,400 m between wind turbines in a row and 1,400 m between rows of wind turbines • Up to 86 construction vessels on site at any one time (including main installation/support vessels, tug/anchor handlers, cable lay vessels, guard vessels, survey vessels, seabed preparation vessels, CTVs, scour protection installation vessels and cable protection installation vessels) • Up to 2,055 installation vessel movements (return trips) during construction (including main installation/support vessels, tug/anchor handlers, cable lay vessels, guard vessels, survey vessels, seabed preparation vessels, CTVs, scour protection installation vessels and cable protection installation vessels). **Operations and maintenance phase** • Operational life of 35 years • Wind turbine numbers, dimensions, area and supporting infrastructure as described for construction phase • Up to a 21 operations and maintenance vessels on site at any one time (CTVs/workboats, jack-up vessels, cable repair vessels, service operation vessels or similar and excavators/backhoe dredgers) • Up to 849 operations and maintenance vessel movements (return trips) each year (including CTVs/workboats, jack-up vessels, cable repair vessels, service operation vessels or similar and excavators/backhoe dredger). **Decommissioning phase** • The duration of the decommissioning programme is anticipated to be the same as for construction, and thus, up to four years • During the decommissioning phase the changes would gradually decrease from the operational MDS as the need for project-related vessels is reduced and structures are removed and cut below the seabed.	increase the incident rate requiring more frequent SAR response.
Impact on vessel to vessel collision risk.	✓	✓	✓	**Construction phase** • Four years construction duration • Construction activities over the maximum extent of the Mona Array Area (300 km^2) and a 90 km long Mona Offshore Cable Corridor	Greatest extent of the Mona Offshore Wind Project over the longest duration, with the maximum number of project vessel movements, therefore the highest potential for

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				• Up to 86 construction vessels on site at any one time (including main installation/support vessels, tug/anchor handlers, cable lay vessels, guard vessels, survey vessels, seabed preparation vessels, CTVs, scour protection installation vessels and cable protection installation vessels) • Up to 2,055 installation vessel movements (return trips) during construction (including main installation/support vessels, tug/anchor handlers, cable lay vessels, guard vessels, survey vessels, seabed preparation vessels, CTVs, scour protection installation vessels and cable protection installation vessels) • Construction base not yet identified at this stage in the pre-application processes but expected to be in the Irish Sea region. **Operations and maintenance phase** • Operational life of 35 years • Up to a 21 operations and maintenance vessels on site at any one time (CTVs/workboats, jack-up vessels, cable repair vessels, service operation vessels or similar and excavators/backhoe dredgers) • Up to 849 operations and maintenance vessel movements (return trips) each year (including CTVs/workboats, jack-up vessels, cable repair vessels, service operation vessels or similar and excavators/backhoe dredger) • Maximum extent of Mona Array Area (300 km^2) and a 90 km long Mona Offshore Cable Corridor. **Decommissioning phase** • The duration of the decommissioning programme is anticipated to be the same as for construction, and thus, up to four years • During the decommissioning phase the changes would gradually decrease from the operational MDS as the need for project-related vessels is reduced and structures are removed and cut below the seabed.	increases in the risk of collision.
Impact on allision (contact) risk to vessels.	✓	✓	✓	**Construction phase** • Up to four years construction duration • Construction activities over the maximum extent of the Mona Array Area (300 km^2) • Maximum number of wind turbines (96) plus four OSPs (45 m x 65 m) • Lower blade tip height above LAT of 34 m	Greatest extent of the Mona Offshore Wind Project with the maximum number of structures, the maximum number of project vessel movements, and over the longest duration, therefore

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				• Minimum spacing of 1,400 m between wind turbines in a row and 1,400 m between rows of wind turbines • Up to 2,055 installation vessel movements (return trips) during construction (including main installation/support vessels, tug/anchor handlers, cable lay vessels, guard vessels, survey vessels, seabed preparation vessels, CTVs, scour protection installation vessels and cable protection installation vessels). **Operations and maintenance phase** • Operational life of 35 years • Wind turbine numbers, dimensions, area and supporting infrastructure as described for construction phase • Up to 849 operations and maintenance vessel movements (return trips) each year (including CTVs/workboats, jack-up vessels, cable repair vessels, service operation vessels or similar and excavators/backhoe dredger). **Decommissioning phase** • The duration of the decommissioning programme is anticipated to be the same as for construction, and thus, up to four years • During the decommissioning phase the changes would gradually decrease from the operational MDS as the need for project-related vessels is reduced and structures are removed and cut below the seabed.	the highest potential for increases in the risk of allision/contact.
Impact on marine navigation, communications and position fixing equipment.	✓	✓	✓	**All phases** • Operational life of 35 years • Maximum extent of Mona Array Area (300 km^2) • Maximum number of wind turbines (96) plus four OSPs (45 m x 65 m) • Minimum wind turbine spacing of 1,400 m between wind turbines in a row and 1,400 m between rows of wind turbines.	Greatest extent of the Mona Offshore Wind Project over the longest period with the most wind turbines and smallest spacing, therefore has the greatest potential to exacerbate the impacts on marine navigation, communications and positioning systems.
Impact on recreational craft passages and safety.	✓	✓	✓	**Construction phase** • Four years construction duration • Maximum number of wind turbines (96) plus four OSP (45 m x 65 m)	Greatest extent of the Mona Offshore Wind Project over the longest period with the most wind turbines, smallest

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				• Lower blade tip height above LAT of 34 m • Construction activities over the maximum extent of the Mona Array Area (300 km^2) and a 90 km long Mona Offshore Cable Corridor • Up to 2,055 installation vessel movements (return trips) during construction (including main installation/support vessels, tug/anchor handlers, cable lay vessels, guard vessels, survey vessels, seabed preparation vessels, CTVs, scour protection installation vessels and cable protection installation vessels). **Operations and maintenance phase** • Operational life of 35 years • Wind turbine numbers, dimensions, area and supporting infrastructure as described for construction phase • Maximum extent of Mona Array Area (300 km^2) and a 90 km long Mona Offshore Cable Corridor • Up to a 21 operations and maintenance vessels on site at any one time (CTVs/workboats, jack-up vessels, cable repair vessels, service operation vessels or similar and excavators/backhoe dredgers) • Up to 849 operations and maintenance vessel movements (return trips) each year (including CTVs/workboats, jack-up vessels, cable repair vessels, service operation vessels or similar and excavators/backhoe dredger). **Decommissioning phase** • The duration of the decommissioning programme is anticipated to be the same as for construction, and thus, up to four years • During the decommissioning phase the changes would gradually decrease from the operational MDS as the need for project-related vessels is reduced and structures are removed and cut below the seabed.	spacing and lowest air draught clearance, therefore, has the greatest potential to impact upon recreational vessel activities and safety.
Impact on snagging risk to vessel anchors and fishing gear.	✓	✓	✓	**Construction phase** • Up to four years construction duration • Inter-array cables: up to 325 km in length, with a minimum burial depth of 0.5 m. Cable protection laid over a maximum of 32.5 km of the cable with a height of up to 3 m. Up to 67 cable crossings, each cable crossing has a length of up to 80 m and a height of up to 4 m	Longest length of cables, minimum cable burial depth and maximum length/quantities of cable protection over the greatest duration of the Mona Offshore Wind Project,

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				• Interconnector cables: up to three cables with a maximum total length of 50 km and a minimum burial depth of 0.5 m. Cable protection laid over a maximum of 10 km with a height of up to 3 m. Up to 10 cable crossings, each crossing has a length of up to 50 m and a height of up to 3 m • Export cables: up to four cables with a length of 90 km and minimum burial of 0.5 m. Cable protection laid over a maximum of 72 km of the cable with a height of up to 3 m. Up to 14 cable crossings, each crossing has a length of up to 50 m and a height of up to 3 m. **Operations and maintenance phase** • Operational life of 35 years • Lengths and dimensions of cables, cable protection and cable crossings as described for construction phase. **Decommissioning phase** • The duration of the decommissioning programme is anticipated to be the same as for construction, and thus, up to four years • Lengths and dimensions of cables, cable protection and cable crossings as described for construction phase • During the decommissioning phase the changes would gradually decrease from the operational MDS as the need for project-related vessels is reduced and structures are removed and cut below the seabed.	therefore the highest potential for increases in the risk of anchor and/or gear snagging.
Impact on UKC.	✓	✓	✓	**All phases** • Wind turbines and OSPs: scour protection extending up to 23 m from each structure to a height of 2.6 m • Inter-array cables: up to 325 km in length, with a minimum burial depth of 0.5 m. Cable protection laid over a maximum of 32.5 km of the cable with a height of up to 3 m. Up to 67 cable crossings, each cable crossing has a length of up to 80 m and a height of up to 4 m • Interconnector cables: up to three cables with a maximum total length of 50 km and a minimum burial depth of 0.5 m. Cable protection laid over a maximum of 10 km with a height of up to 3 m. Up to 10 cable crossings, each crossing has a length of up to 50 m and a height of up to 3 m	Greatest extent of cable protection and number of cable crossings will result in the greatest reduction of UKC. Greatest number of structures with the greatest extent and height of scour protection will result in greatest reduction of UKC.

Potential impact	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				• Export cables: up to four cables with a length of 90 km and minimum burial of 0.5 m. Cable protection laid over a maximum of 72 km of the cable with a height of up to 3 m. Up to 14 cable crossings, each crossing has a length of up to 50 m and a height of up to 3 m • During the decommissioning phase the changes would gradually decrease from the operational MDS as the need for project-related vessels is reduced and structures are removed and cut below the seabed.	

7.8 Measures adopted as part of the Mona Offshore Wind Project

7.8.1.1 For the purposes of the EIA process, the term 'measures adopted as part of the project' is used to include the following measures (adapted from Institute of Environmental Management and Assessment (IEMA), 2016):

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

7.8.1.2 A number of measures (primary and tertiary) have been adopted as part of the Mona Offshore Wind Project to reduce the potential for impacts on shipping and navigation. These are outlined in Table 7.17 below. As there is a commitment to implementing these measures, they are considered inherently part of the design of the Mona Offshore Wind Project and have therefore been considered in the assessment presented in section 7.9 below (i.e. the determination of magnitude/likelihood and therefore significance assumes implementation of these measures).

7.8.1.3 Where significant effects have been identified, further mitigation measures (referred to as secondary mitigation in IEMA 2016) have been identified to reduce the significance of effect to acceptable levels following the initial assessment. These are measures that could further prevent, reduce and, where possible, offset any adverse effects on the environment. These measures are set out, where relevant, in section 7.9 below.

7.8.1.4 Further to the commitments made within the PEIR, additional mitigation was adopted for inclusion in the Environmental Statement, this included amendments to the boundaries of the Mona Array Area and the commitment to two lines of orientation in the Mona array layout.

Table 7.17: Measures adopted as part of the Mona Offshore Wind Project.

Measures adopted as part of the Mona Offshore Wind Project	Justification	How the measure will be secured
Primary measures: Measures included as part of the project design		
Development and adherence to an Aids to Navigation Management Plan (AtoNMP) to ensure adequate navigational markers (including lighting), in accordance with the most recent relevant industry guidance and agreed prior to commencement of offshore construction	To ensure navigational safety and minimise risk, suitable AtoN lighting and marking of the Mona Array Area shall be undertaken complying with IALA Recommendations G1162 (IALA, 2021), to be finalised and approved in consultation with MCA and Trinity House through the preparation of an AtoNMP. Fog horns to alert vessels to the position of structures when visibility is poor. Wind turbine informal naming/associated markings shall not interfere with formal AtoNs. AIS transponders to be placed on periphery corner wind turbines.	AtoNMP secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Wind turbine blades will a minimum of 34 m clearance above LAT to ensure sufficient air draught clearance	MGN654 recommends that wind turbine blades will have at least 22 m clearance above MHWS (which is 29.4 m above LAT at Mona Array Area) in order to reduce the risk of striking yacht masts.	Secured as an offshore parameter in requirement 2 of Schedule 2 of the draft DCO and within the deemed marine licence in Schedule 14 of the draft DCO
Development of and adherence to a Design Plan (DP) which includes for two lines of orientation	Wind turbine layout plan to be agreed with NRW in consultation with MCA and Trinity House prior to commencement of construction and maintain two lines of orientation for navigation and SAR access within the Mona Array Area.	DP secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Development and adherence to an offshore environmental management plan (OEMP) that includes a fisheries liaison and co-existence plan (FLCP) which sets out use of guard vessels where required	Where cable exposures exist during the operational and maintenance phase, which could result in significant risk, guard vessels will be used where appropriate until the risk has been mitigated by burial and/or other protection methods, ensuring navigational safety and minimising the potential risk of gear snagging. Guard vessels facilitate engagement with commercial fisheries stakeholders during specific project works, maximising awareness of temporary hazards and reducing potential for interactions between the commercial fishing activity and the Morgan Generation Assets.	OEMP and FLCP is secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence. An outline of the FLCP has been submitted as part of the Application (Document Reference J13).

Measures adopted as part of the Mona Offshore Wind Project	Justification	How the measure will be secured
Development and adherence to an Offshore Construction Method Statement (OCMS) which includes a Cable Specification and Installation Plan (CSIP) and details of cable monitoring to ensure UKC is maintained and no more than a 5% reduction in water depth (referenced to Chart Datum) will occur as a result of cable protection at any point over cables without prior written approval from the Licensing Authority	To ensure navigational safety and maintain a suitable UKC for navigating vessels, a CSIP, informed by a Cable Burial Risk Assessment (CBRA) will be undertaken pre-construction. Selected methods will be based on the risk assessment and the protection will be periodically monitored and maintained as practicable. This will reduce the risk of snagging of cables and grounding of vessels.	OCMS, which includes a CSIP, are secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Tertiary measures: Measures required to meet legislative requirements, or adopted standard industry practice		
Notification of construction, maintenance and decommissioning activities through the use of Notice to Mariners (NtMs)	To ensure that the appropriate authorities and stakeholders are informed of works being carried out in waters adjacent to the Mona Offshore Wind Project. To include: • NRW • MCA • Trinity House • UK Hydrographic Office (UKHO) • Kingfisher • Northern Lighthouse Board • RYA • Local Ports and Harbours • Oil and Gas operators • MMO.	NtMs secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Marking and charting	Mona Offshore Wind Project is marked on nautical charts including an appropriate chart note to facilitate safe passage planning.	Secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Use of advisory clearance distances and safety zones during construction and periods of maintenance	To ensure navigational safety and minimise risk, 500 m safety zones will be implemented around wind turbines and OSPs during their construction. 50 m safety zones will also be implemented around each item of infrastructure during the construction phase, where no construction works are taking place on that infrastructure (for	An application for safety zones will be made under the Energy Act 2004 as set out in the Safety Zone Statement (Document Ref J6).

Measures adopted as part of the Mona Offshore Wind Project	Justification	How the measure will be secured
	example, where a wind turbine generator is incomplete or is in the process of being tested before commissioning). During the maintenance phase, 500 m safety zones will also be implemented around any vessel involved in major maintenance works. Whilst no formal application for a safety zone around cable laying operations is possible under Section 95 of the Energy Act 2004, it is the Applicant's intention to propose rolling advisory safety zones of up to 500 m around vessels installing inter-array cables and interconnector cables in the interests of the safety of all users of the sea, and to provide clearance of 500 m from laid cables until burial is confirmed in case of interaction with anchors or fishing gear. Application and use of safety zones in accordance with the Safety Zone Statement (Document Ref J6).	
Development and adherence to a Vessel Traffic Management Plan (VTMP) requiring continuous Watch by multi-channel Very High Frequency (VHF), including Digital Selective Calling	Continuous watch to monitor vessel activities, reducing the risk of incidents and improving response.	VTMP secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Development and adherence to an OEMP which includes a FLCP	Provision of detailed Mona Offshore Wind Project information to fishermen to aid co-existence, such as site and export cable route location for upload into fish plotters.	OEMP and FLCP secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence. An outline FLCP has been submitted as part of the Application (document reference J.13).
Development and adherence to an Emergency Response and Cooperation Plan (ERCoP)	ERCoP, agreed with MCA prior to construction and aligned with MGN654 "OREIs – Guidance on UK Navigational Practice, Safety and Emergency Response Issues". This will establish the approach to incident response to minimise resulting consequences.	ERCoP secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Development and adherence to an OEMP which includes a Marine Pollution Contingency Plan (MPCP) to minimise and manage the risk of marine pollution events	Development of an OEMP that details minimum environmental management requirements expected of the Applicant and all contractors and subcontractors, to ensure accidental pollution into the marine environment is minimised, through the	OEMP and MPCP secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.

Measures adopted as part of the Mona Offshore Wind Project	Justification	How the measure will be secured
	development and adherence of a Marine Pollution Contingency Plan, for approval prior to commencement of construction.	
Incident investigation and reporting	Risk assessments to be reviewed following incidents, and additional risk controls identified if appropriate to reduce the likelihood of recurrence. Lessons learnt will be disseminated to improve safety record of Mona Offshore Wind Project operations.	Incident reporting requirements and expectations, including: • MAIB (Merchant Shipping Act 1995) • Health and Safety Executive (RIDDOR 2013) • Harbour Authority under Port Marine Safety Code.
Development and adherence to an AtoNMP, which includes details for a buoyed construction area	To ensure navigational safety and minimise risk, buoys will be deployed around construction work in the Mona Array Area in line with Trinity House requirements and may include a combination of cardinal and/or safe water marks. To be finalised and approved in consultation with MCA and Trinity House prior to construction through an AtoN Management Plan.	AtoNMP secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Hydrographic Surveys	To ensure depths of water and promulgated, MGN654 and its annexes requires that hydrographic surveys should fulfil the requirements of the International Hydrographic Organisation (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.	Secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Development and adherence to a OCMS which includes a CSIP that set out details of electromagnetic interference minimisation	To minimise the impact on ship compasses and preserve navigational safety, a CSIP will be prepared that will include the technical specification of offshore electrical circuits, and a desk-based assessment of attenuation of electromagnetic field strength, shielding and cable burial depth in accordance with industry good practice.	OCMS and CSIP secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Development and adherence to an OCMS Construction Programme (CP)	OCMS and CP to be approved by NRW in consultation with MCA and Trinity House. Where possible, construction to follow linear progression avoiding disparate construction sites across development area and therefore minimising impact to operators.	Secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence. An outline VTMP has been submitted as part of the Application (Document Reference J14).

Measures adopted as part of the Mona Offshore Wind Project	Justification	How the measure will be secured
Development and adherence to a Vessel Traffic Management Plan (VTMP)	To ensure navigational safety and minimise risk, a VTMP will be prepared to ensure the co-ordination of Mona Offshore Wind Project vessels during construction and operations and maintenance by the Project Marine Co-ordination Centre to ensure project vessels do not present unacceptable risks to each other or third parties. Mona Offshore Wind Project marine traffic coordination plans to be made available to all maritime users. Information and warnings will be distributed via Notices to Mariners and other appropriate media (e.g. Admiralty Charts and fishermen's awareness charts) to enable vessels and operators to effectively and safely navigate around the Mona Array Area and activities during the Mona Offshore Cable Corridor construction.	VTMP secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence. An outline VTMP has been submitted as part of the Application (Document Reference J14).
Development and adherence to a VTMP setting out vessel standards	To ensure navigational safety, all work vessels operating on behalf of the Mona Offshore Wind Project will have: • MCA Vessel Coding (e.g. Small Commercial Vessel Code) • Appropriate insurance • Crewed by suitably trained/qualified personnel • AIS (Class A/B) • VHF (Ch16) • Appropriate mooring arrangements.	VTMP secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence. An outline VTMP has been submitted as part of the Application (Document Reference J14).
Personal Protective Equipment (PPE)	To maintain the safety of those working at the Mona Offshore Wind Project, all personnel to wear the correct PPE suitable for the location and role at all times, as defined by the relevant Quality, Health, Safety and Environment documentation. This will include the use of Personal Locator Beacons.	Industry best practice.
Inspection and Maintenance Programme	To ensure the safe operation of the Mona Offshore Wind Project, regular maintenance regime by developer to check the Mona Offshore Wind Project infrastructure, its fittings and any signs of wear and tear. This should identify any defects which might cause a failure.	Industry best practice.
Training	To maintain the safety of those working at the Mona Offshore Wind Project, the Applicant is responsible for ensuring that all	Industry best practice.

Measures adopted as part of the Mona Offshore Wind Project	Justification	How the measure will be secured
	staff engaged on operations are competent to carry out the allocated work.	
Compliance with International, UK and Flag State Regulations including IMO conventions	To ensure navigational safety, compliance from all vessels associated with the proposed Mona Offshore Wind Project with international maritime regulations as adopted by the relevant flag state such as COLREGS (IMO, 1972) and Safety of Life at Sea Convention (SOLAS) (IMO, 1974).	Industry best practice.
Vessel health and safety requirements	To ensure navigational safety, the Applicant will ensure that all Mona Offshore Wind Project related vessels meet both IMO conventions for safe operation as well as Health, Safety and Environment requirements, where applicable. This shall include the following good practice: • Wind farm associated vessels will comply with International Maritime Regulations • All vessels, regardless of size, will be required to carry AIS equipment on board • All vessels engaged in activities will comply with relevant regulations for their size and class of operation and will be assessed on whether they are “fit for purpose” for activities they are required to carry out • All marine operations will be governed by operational limits, tidal conditions, weather conditions and vessel traffic information • Walk to work solutions will be utilised where possible.	VTMP secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence. A Vessel Traffic Management Plan will be prepared, an outline of this plan has been submitted as part of the Application (Document Reference J14).
Continued engagement of the MNEF post consent	To ensure that the appropriate authorities and stakeholders are informed of works being carried out in waters adjacent to the Mona Offshore Wind Project, a regular engagement forum will be maintained.	Secured through the Mitigation and Monitoring Schedule (Document reference J10)
Development and adherence to a Navigation Monitoring Strategy setting out vessel traffic monitoring	To ensure navigational safety is maintained, continuous monitoring during construction and immediate period post construction will be provided to MCA approval as set out in the Offshore In-principle Monitoring Plan (Document Reference J15).	Navigation Monitoring Strategy secured within the deemed marine licence in Schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.

7.9 Assessment of significant effects

7.9.1 Overview

7.9.1.1 The impacts of the construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project have been assessed on shipping and navigation. The potential impacts are listed in Table 7.16, along with the MDS against which each impact has been assessed.

7.9.1.2 A description of the potential effect on shipping and navigation receptors caused by each identified impact is given below.

7.9.2 Impact on recognised sea lanes essential to international navigation

7.9.2.1 The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project may lead to an impact on recognised sea lanes essential to international navigation. This would be in contravention to requirements set out in the UNCLOS Article 60 and the NPS EN-3 Paragraph 2.8.326/2.8.327. The MDS is represented by the maximum extent of the generation infrastructure and is summarised in Table 7.16.

7.9.2.2 The Mona Array Area is located 4.4 nm northwest of the TSS in Liverpool Bay. This routes traffic into the Port of Liverpool, passing the existing oil and gas and offshore wind farms. As identified in section 7.5, the key cargo/tanker routes using this TSS approach from the west, and the Off Skerries TSS, or from the northwest having passed to the west of the Isle of Man. The presence of the Mona Array Area, whilst clear of the west route, intersects the direct route taken by vessels between the TSS and a waypoint to the southwest of the Isle of Man. More than 1,000 commercial ships per year pass through both the Mona Array Area and Liverpool Bay TSS.

7.9.2.3 During consultation, several stakeholders asserted that historic routes between any two ports are necessarily “recognised sea lanes”. A review of UNCLOS Article 22 determines that: “*4. The coastal State shall clearly indicate such sea lanes and traffic separation schemes on charts to which due publicity shall be given*”. Therefore, the onus is on the MCA to put forward a proposed sea lane to IMO who would formally designate it. Given that this has not occurred, and no such routes are indicated on charts, Article 60 and NPS EN-3 Paragraph 2.8.326/2.8.327 would not apply. These principles were set out in the application for the Thanet Extension offshore wind farm and were reaffirmed by the Examining Authority in their Recommendation Report (Thanet Extension, 2019). Therefore, such routes are better defined as strategically important routes or lifeline ferry services as per NPS EN-3 Paragraph 2.8.328 and Paragraph 3.8.329.

Construction phase

Magnitude of impact

7.9.2.4 During construction, vessel traffic would be displaced from the Mona Array Area due to the presence of construction buoyage and safety zones around fixed structures which are under construction. It is anticipated that mariners would also maintain safe passing distance of at least 1 nm from navigational hazards. Therefore, there is insufficient spacing between wind turbines for a commercial vessel to safely navigate the Mona Array Area and it is anticipated vessels approaching Liverpool Bay TSS will deviate to the southwest.

7.9.2.5 Of the approximately 10,000 large commercial ships transiting through the Liverpool Bay TSS per year, approximately 10% of those vessels approach from the northwest and through the Mona Array Area and would be directly impacted, requiring a deviation to the southwest. Therefore, 90% of vessels using the TSS would not be directly impacted by the presence of the Mona Array Area.

7.9.2.6 The installation of the export cable would pass through the approaches to the TSS but is likely to be installed in this area in a short timeframe and will have minimal disruption to passing vessels.

7.9.2.7 The magnitude is therefore, considered to be **medium**.

Sensitivity of the receptor

7.9.2.8 With construction in the southwest of the Mona Array Area, a route between the southwest tip of the Isle of Man and the eastbound lane of the Liverpool Bay TSS would be deviated from a distance of 67.6 nm to 68.1 nm. This increase is minor considering the length of journeys taken by large cargo/tanker ships between international ports which is likely to be hundreds or thousands of miles.

7.9.2.9 The approaches to the TSS from the west are clear of the Mona Array Area and there is adequate sea room for vessels approaching from the northwest to deviate to the southwest of the Mona Array Area. Given that the presence of the Mona Array Area does not prevent access into Liverpool through the TSS, it is not considered that the Mona Array Area would interfere with these sea lanes.

7.9.2.10 The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.9.2.11 Overall, the magnitude of the impact is deemed to be **medium** and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Operations and maintenance phase

7.9.2.12 During the operations and maintenance phase of the Mona Offshore Wind Project, large commercial ships would not transit through the Mona Array Area due to the proximity of structures and would be required to route around the Mona Array Area. The impact on vessel routeing would therefore be similar to the latter stages of construction where vessels are displaced by construction buoyage, safety zones and the presence of structures. Furthermore, during the operations and maintenance phase, mariners will be more familiar with the presence of the Mona Array Area and able to make more effective routeing decisions. As a result, the impacts to recognised sea lanes essential to international navigation during operations and maintenance are not anticipated to be substantially different to those during construction described above.

7.9.2.13 Therefore, the magnitude of the impact is deemed to be **medium** and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Decommissioning phase

7.9.2.14 The impacts to recognised sea lanes essential to international navigation during decommissioning are not anticipated to be substantially different to those during construction. During both the construction and the decommissioning phases of the Mona Offshore Wind Project, large commercial ships will not be able to transit through

the Mona Array Area, whether through the presence of construction/decommissioning buoyage or structures and therefore the impact on vessel routeing will be the same. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.9.2.15 Therefore, the magnitude of the impact is deemed to be **medium** and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

7.9.3 Impact to commercial operators including strategic routes and lifeline ferries

7.9.3.1 The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project may lead to impacts to commercial operators including strategic routes and lifeline ferries as defined in NPS EN-3 Paragraph 2.8.328. The MDS is represented by the maximum extent of the generation infrastructure and is summarised in Table 7.16.

7.9.3.2 This impact is limited to routeing in typical weather conditions, section 7.9.4 assesses the impacts on vessel routeing in adverse weather situations.

Construction phase

Magnitude of impact

7.9.3.3 During construction, vessel traffic would be displaced from the Mona Array Area due to the presence of construction buoyage and safety zones around fixed structures which are under construction. It is anticipated that mariners would also maintain safe passing distance of at least 1 nm from navigational hazards. It is anticipated vessels approaching the Liverpool Bay TSS from the northwest, will deviate to the southwest to pass clear of the Mona Array Area.

7.9.3.4 The analysis of vessel routes in section 7.5 shows that several ferry and cargo/tanker shipping routes would necessitate deviation around the Mona Array Area (see Table 7.18 and Table 7.19, and Figure 7.6 and Figure 7.7 respectively). The revised passage plans were developed by the NASH project team, including master mariners, and account for existing decision-making principles (such as passing at least 1.5 nm from a wind turbine) that were obtained during consultation with operators and during the navigation simulation sessions (see Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement).

7.9.3.5 The Liverpool to Dublin route previously operated by P&O ceased operation in December 2023 and therefore there are no impacts to P&O routes or operations.

7.9.3.6 The construction activities will be managed through adopted risk controls listed in Table 7.17, specifically:

- Promulgation of activities through the use of Notice to Mariners will ensure approaching vessels can safely avoid the construction area
- Marking and charting of the Mona Array Area on nautical charts to facilitate safe passage planning
- Vessel Traffic Management Plan to manage vessel safety and reduce potential impacts in accordance with the Outline Vessel Traffic Management Plan (Document Reference J14).

Table 7.18: Impact on ferry routeing.

Parameter	Stena LIV-BEL-W	Stena LIV_BEL_W (TSS)	Seatruck HEY_DUB
Example Vessels (2019-2022)	Stena Edda/Stena Embla/Stena Mersey/Stena Horizon/Stena Lagan/Stena Forecaster/Stena Forerunner	Stena Edda/Stena Embla/Stena Forecaster/Stena Foreteller	Seatruck Pace/Seatruck Panorama
Approximate Annual Crossings (2022)	1,442	392	606
Baseline Distance (nm)	142.3	W: 115.2 E: 115.9	109.3
Baseline Time (Minutes)	480	480	480
Service Speed (Knots)	18.7	18.7	15.0
Deviated Distance	144.6	W: 117.3 E: 117.1	109.4
Additional Mona Offshore Wind Project Time (Minutes)	+7.4	W: +6.8 E: +3.9	+0.3

Table 7.19: Increase in distance for impacted cargo/tanker routes.

Route	Approximate Annual Crossings (2019)	Baseline Distance (nm)	Deviated Distance (nm)	Additional Deviated Distance (nm)	Total Additional Distance/Year (nm)
Off Skerries TSS to Heysham	23	59.9	62.9	+3	+69
Off Skerries TSS to Barrow (W)	4	72.7	73.2	+0.5	+2
Heysham to Off Skerries TSS (W)	7	62.0	64.5	+2.5	+17.5
Liverpool Bay TSS to W IoM (W)	533	67.6	69.3	+1.7	+906.1
Liverpool to W IoM	153	66.3	68.8	+2.5	+382.5
Douglas to Liverpool Bay TSS I	9	67.4	70.9	+3.5	+31.5
Douglas to Liverpool Bay TSS	8	59.8	58.4	-1.4	-11.2
Liverpool Bay TSS to Northern Irish	55	65.2	65.6	+0.4	+22
Douglas to Liverpool	6	58.9	58.4	-0.5	-3

Isle of Man Steam Packet Company

7.9.3.7 Both of the IoMSPC routes between Liverpool, Douglas and Heysham pass clear of the Mona Array Area. On occasion vessels on the route between Liverpool and Douglas may have deviated to the west to avoid traffic situations and this would no longer be possible. However, there is sufficient sea room for alternative routes to be taken. The magnitude is therefore, considered to be **low**.

Stena Line

7.9.3.8 The Stena route between Liverpool and Belfast to the west of the Isle of Man with approximately 1,500 movements per year directly intersects the Mona Array Area. The majority of these pass directly northwest on departure of Liverpool and do not pass through the Liverpool Bay TSS. For these, a revised passage plan was developed, departing Liverpool as they currently do before heading more north northwest than at present, passing 1.5 nm from the Hamilton North Gas Field and single buoy mooring, before turning to port 1.5 nm from the northeast boundary of Mona in order to clear Chicken Rock on the Isle of Man at their existing waypoint. This would necessitate an additional 1.1 nm/3.4 minutes of steaming time per trip.

7.9.3.9 For the minority of Stena Line vessels which take the TSS on passage between Liverpool and Belfast. A revised passage plan considered passing through the TSS and deviating further to the southwest to clear the southeast boundary of the Mona Array Area. This would necessitate between 1.2 nm/2.1 nm and 3.9/6.8 minutes of deviation depending on which direction, and therefore traffic lane, was being taken.

7.9.3.10 Other Stena Line routes including between Heysham and Belfast, Liverpool to Belfast (east of the Isle of Man) and between Liverpool and Dublin are clear of the Mona Array Area.

7.9.3.11 As daily services of Stena Line ferries would be impacted, the magnitude is therefore, considered to be **high**.

Seatruck Ferries

7.9.3.12 The Seatruck route between Heysham and Dublin with approximately 600 movements per year passes within 1.2 nm of the Mona Array Area. In order to pass more than 1.5 nm, a minor deviation of 0.1 nm would be required. This would necessitate an additional 20 seconds of steaming time per trip.

7.9.3.13 Other Seatruck routes between Heysham and Warrenpoint, and Liverpool and Dublin are clear of the Mona Array Area.

7.9.3.14 As daily services of Seatruck Ferries would be impacted, the magnitude is therefore, considered to be **high**.

Commercial cargo/tanker operators

7.9.3.15 One cargo/tanker route with more than one movement per day would be directly impacted by the Mona Array Area, namely the route into the Liverpool Bay TSS from the west or northwest. This would require an additional 1.7 nm of deviation to pass clear of the southwest of the Mona Array Area.

7.9.3.16 A further eight routes were identified which would be deviated around the Mona Array Area, including routes into Douglas, Heysham and Barrow. The majority of these minor routes have less than one vessel transit per week.

7.9.3.17 The installation of cables will impose temporary and localised impacts which would also displace vessel traffic. This will necessitate cable laying across the approaches to the Liverpool Bay TSS, which is used by more than 10,000 vessels per year. However, given the short term transient nature of these impacts, they can be more easily managed through the application of industry standard risk controls.

7.9.3.18 As daily services of strategically important routes would be impacted, the magnitude is therefore, considered to be **high**.

Sensitivity of the receptor

Isle of Man Steam Packet Company

7.9.3.19 As both IoMSPC routes are clear of the Mona Array Area, the sensitivity of this receptor is therefore, considered to be **negligible**.

Stena Line

7.9.3.20 The Stena Line route between Liverpool and Belfast to the west of the Isle of Man, with approximately 1,500 movements per year, directly intersects the Mona Array Area. To pass to the north this would necessitate an additional 3.4 minutes of steaming time per trip for the majority of transits. On an eight hour service, with greater existing operational variation in transit duration and turn around time, the deviation is not anticipated to impose significant operational impacts.

7.9.3.21 Other Stena Line routes including between Heysham and Belfast, Liverpool to Belfast (east of the Isle of Man) and between Liverpool and Dublin are clear of the Mona Array Area.

7.9.3.22 The sensitivity of this receptor is therefore, considered to be **low**. It is, however, recognised that any additional transit time will necessitate additional fuel cost, emissions and potential operating constraints on the operators.

Seatruck Ferries

7.9.3.23 The Seatruck route between Heysham and Dublin, with approximately 600 movements per year, passes through the north boundary of the Mona Array Area. To pass clear to the north, this would necessitate an additional 20 seconds of steaming time per trip. On an eight hour service, with greater existing operational variation in transit duration and turn around time, the deviation is not anticipated to impose significant operational impacts.

7.9.3.24 Other Seatruck routes between Heysham and Warrenpoint, and Liverpool and Dublin are clear of the Mona Array Area.

7.9.3.25 The sensitivity of this receptor is therefore, considered to be **low**. It is, however, recognised that any additional transit time will necessitate additional fuel cost, emissions and potential operating constraints on the operators.

Commercial cargo/tanker operators

7.9.3.26 For cargo/tanker routes, the principal routes with more than one vessel per day would necessitate less than 2 nm of deviation to the southwest to pass clear of the Mona Array Area. This increase is minor considering the length of journeys taken by cargo/tanker vessels between international ports which are likely to be hundreds or thousands of miles. Therefore, it is not anticipated to have any material impact upon the viability of these routes into Liverpool.

7.9.3.27 Less trafficked cargo/tanker routes are more widely dispersed within the shipping and navigation study area, and whilst have greater impacts, have far fewer vessel transits. The greatest impacted routes are between the Off Skerries TSS and Heysham which would necessitate an additional 3 nm of transit. It is noted that some ports, such as Heysham, are tidally constrained and therefore increased journey time could result in vessels missing the tide and having to wait until the next high water.

7.9.3.28 Given the relatively minor increase in journey times, it is considered unlikely that deviated vessels would be any more at risk of missing a tide than they already are, and this could be mitigated through passage planning. Therefore, this is not anticipated to have any significant impacts upon the viability of these routes and the sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.9.3.29 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.20: Magnitude, sensitivity and impact significance relating to impact to commercial operators including strategic routes and lifeline ferries during construction of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	Low	Negligible	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given the possibility of additional congestion encountered to the east of the Mona Array Area.
Stena Line	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.
Seatruck Ferries	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.
Commercial cargo/tanker	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.

Operation and maintenance phase

7.9.3.30 During the operations and maintenance phase of the Mona Offshore Wind Project, large commercial ships would not transit through the Mona Array Area due to the proximity of structures and would be required to route around the Mona Array Area. The impact on vessel routeing would therefore be similar to the latter stages of construction where vessels are displaced by construction buoyage, safety zones and the presence of structures. The operations and maintenance phase would be longer than other phases at up to 35 years compared to up to four years for the construction phase. During operations and maintenance, there would be far less Mona Offshore Wind Project vessels operating within and around the Mona Array Area interacting with other passing vessels. As a result, the impacts to commercial operators including strategic routes and lifeline ferries during operations and maintenance are not anticipated to be substantially different to those during construction.

7.9.3.31 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.21: Magnitude, sensitivity and impact significance relating to impact to commercial operators including strategic routes and lifeline ferries during operations and maintenance of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	Low	Negligible	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given the possibility of additional congestion encountered to the east of the Mona Array Area.
Stena Line	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.
Seatruck Ferries	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.
Commercial cargo/tanker	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.

Decommissioning phase

7.9.3.32 The impacts to commercial operators including strategic routes and lifeline ferries during decommissioning are not anticipated to be substantially different to those during construction. During both the construction and the decommissioning phases of the Mona Offshore Wind Project, large commercial ships will not be able to transit through the Mona Array Area, whether through the presence of decommissioning buoyage or structures and therefore the impact on vessel routeing will be the same. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.9.3.33 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.22: Magnitude, sensitivity and impact significance relating to impact to commercial operators including strategic routes and lifeline ferries during decommissioning of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	Low	Negligible	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given the possibility of additional congestion encountered to the east of the Mona Array Area.
Stena Line	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.

Operator	Magnitude	Sensitivity	Significance
Seatruck Ferries	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.
Commercial cargo/tanker	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.

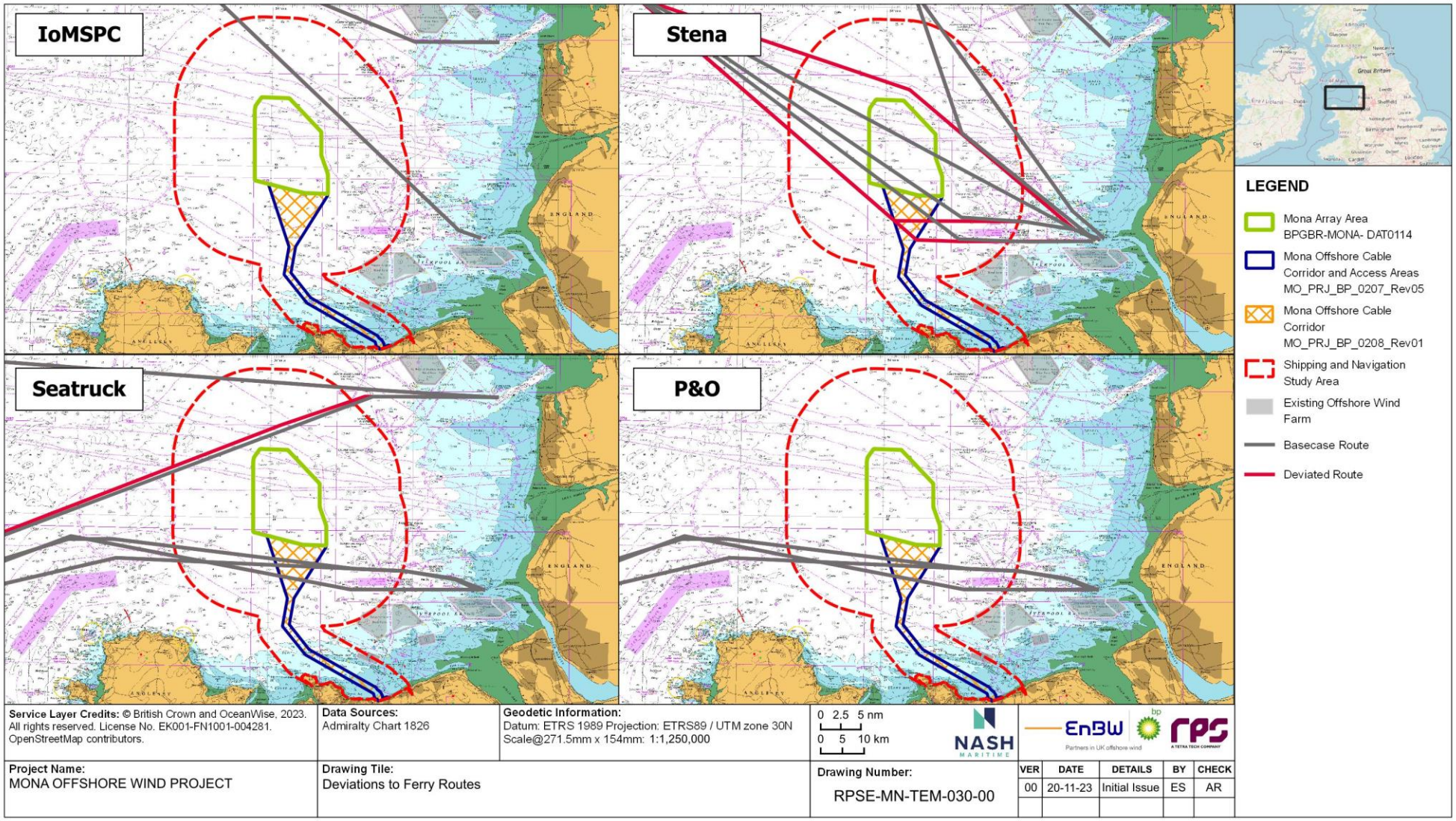

Figure 7.6: Deviations to ferry routes.

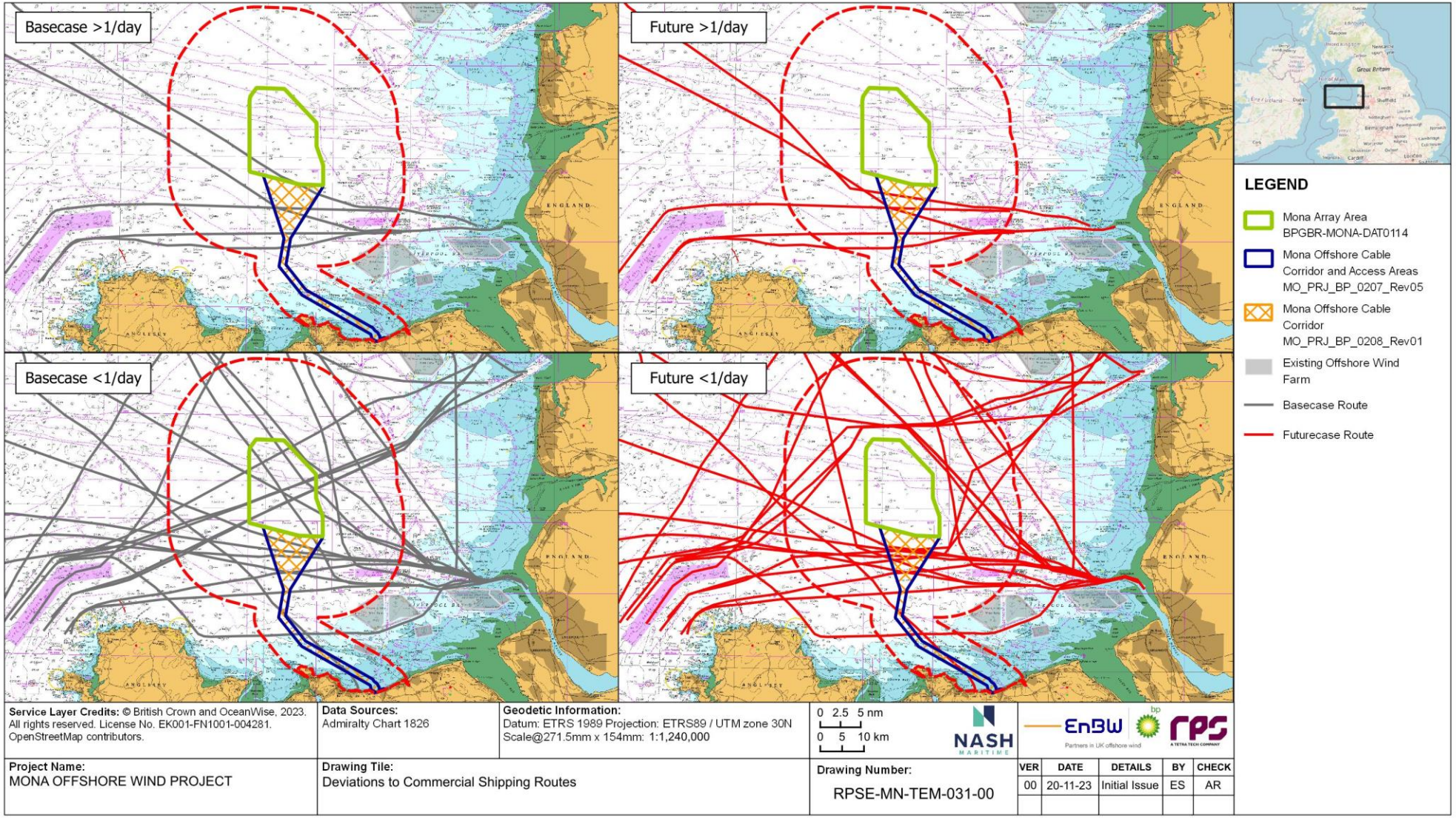

Figure 7.7: Deviations to commercial shipping routes.

7.9.4 Impact on adverse weather routeing

7.9.4.1 The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project may lead to impacts to adverse weather routeing including to strategic routes and lifeline ferries as defined in NPS EN-3 Paragraph 2.8.328. During significant wind and wave conditions, it can be hazardous for ferries to navigate beam on to the prevailing conditions, which can cause excessive roll that may result in cargo shift or injuries to passengers. The MDS is represented by the maximum extent of the generation infrastructure and is summarised in Table 7.16.

7.9.4.2 Where significant adverse weather is encountered, standard operating practices would be for the master to advise passengers to remain seated and for vessels to take less direct routes to take advantage of lees from land masses, avoid dangerous sea states or minimise the motions onboard. The navigation simulations (see Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement) demonstrated that without being able to adequately weather route, excessive roll was experienced that reduced control and would be both uncomfortable or dangerous to passengers and cargo.

7.9.4.3 This impact within the shipping and navigation chapter of the Environmental Statement has been limited to the impact on the ferry routes and their operations. Ferry services in the shipping and navigation study area are important for facilitating trade, tourism and other important functions. In particular, consultees emphasised that services between the Isle of Man and the UK are lifeline services which carry food, medical supplies and goods which are crucial in a just-in-time economy. The socio-economics approach for considering potential impacts of the Mona Offshore Wind Project on the IoM is set out within Volume 4, Chapter 3: Socio-economics chapter of the Environmental Statement.

Construction phase

Magnitude of impact

7.9.4.4 During construction, vessel traffic would be displaced from the Mona Array Area due to the presence of construction buoyage and safety zones around fixed structures which are under construction. It is anticipated that mariners would also maintain safe passing distance of at least 1 nm from navigational hazards, likely greater in adverse weather.

7.9.4.5 During severe adverse weather where it would be unsafe for a ferry to proceed to sea, some sailings are delayed or inevitably cancelled irrespective of the presence of the Mona Array Area. However, with the presence of the Mona Array Area, sailings may be required to route a greater distance and duration than they otherwise would. Over the course of a day, the accumulation of these delays could result in the potential for additional sailings to be cancelled where constraints such as hours of rest are exceeded. Such effects are already experienced by operators, but the presence of the Mona Offshore Wind Project may exacerbate this.

7.9.4.6 During consultation and navigational simulations, the conditions in which adverse weather routes would be taken, or services cancelled, was shown to be dependent on many different factors including route, vessel, wind/wave directions, wind speed and wave height. Figure 7.8 shows that several adverse weather routes either intersect or pass immediately adjacent to the Mona Array Area.

7.9.4.7 The construction activities will be managed through adopted risk controls listed in Table 7.17, specifically:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the construction area
- Marking and charting of the Mona Array Area on nautical charts to facilitate safe passage planning
- Vessel Traffic Management Plan to manage vessel safety and reduce potential impacts in accordance with the Outline Vessel Traffic Management Plan (Document Reference J14).

Isle of Man Steam Packet Company

7.9.4.8 During the navigation simulations, it was determined that the IoMSPC service between Liverpool and Douglas (Manannan) would be impacted at a significant wave height (H_s) of between 2.0 m and 2.5 m. This equates to greater than a Force 5 occurring approximately fortnightly. Based on a review of AIS data for 2022, it was estimated that the Manannan makes significant adverse weather routeing on at least 30 occasions per year out of a total of 600 crossings. However, it was noted that the Manannan would more likely reduce speed before choosing to weather route to reduce the effects of slamming. The Manannan is restricted to sailing in conditions where the significant wave height is less than 3.5 m as it is more susceptible to weather than other vessel designs.

7.9.4.9 It was noted that masters may be more precautionary in weather routeing and less likely to choose to route east of the Mona Array Area as they would have reduced optionality should conditions deteriorate and they need to turn towards the southwest to minimise the motion of the vessel. Therefore, the presence of the Mona Array Area could increase the number of occasions during which adverse weather routes are taken.

7.9.4.10 The adverse weather routes for the Heysham to Douglas route are clear of the Mona Array Area.

7.9.4.11 Given that the adverse weather routeing of a ferry service is anticipated to be impacted infrequently, but multiple times per year, the magnitude is considered to be **medium**.

Stena Line

7.9.4.12 During the navigation simulations, it was determined that the Stena route between Liverpool and Belfast would be impacted at 3.0 m H_s. This equates to greater than a Force 7 occurring at least monthly in winter. Based on a review of AIS data for 2022, it was estimated that Stena ferries make significant adverse weather routeing on at least 20 occasions per year out of a total of 1,500 crossings.

7.9.4.13 It was noted that masters may be more precautionary in weather routeing and less likely to choose to route east of the Mona Array Area as they would have reduced optionality should conditions deteriorate and they need to turn towards the southwest to minimise the motion of the vessel. Therefore, the presence of the Mona Array Area could increase the number of occasions during which adverse weather routes are taken.

7.9.4.14 Other adverse weather routes on other Stena Line services are clear of the Mona Array Area.

7.9.4.15 Given that the adverse weather routeing of a ferry service is anticipated to be impacted infrequently, but multiple times per year, the magnitude is considered to be **medium**.

Seatruck Ferries

7.9.4.16 The median adverse weather routes used by Seatruck pass clear to the north of the Mona Array Area and therefore do not require deviation. The most extreme passage plans to the southwest provided by Seatruck would necessitate a deviation to the north around the Mona Array Area, but relatively few transits were identified taking these routes in either 2019 or 2022.

7.9.4.17 Given that the majority of adverse weather routeing of this ferry service is clear of the Mona Array Area, the magnitude is considered to be **low**.

Commercial cargo/tanker operators

7.9.4.18 Analysis of cargo/tanker vessel traffic in adverse weather events did not identify any appreciable changes in vessel routes. During MetOffice named storm events, with gale/storm force winds, there was a greater use of the anchorage to the east of Anglesey as vessels seek shelter from the prevailing southwesterlies.

7.9.4.19 The installation of export cables within the Mona Offshore Cable Corridor will impose temporary and localised impacts which would also displace vessel traffic. However, cable laying is unlikely to occur during adverse weather scenarios.

7.9.4.20 The magnitude of the receptor is therefore, considered to be **low**.

Sensitivity of the receptor

7.9.4.21 Figure 7.8 shows anticipated adverse weather routeing with and without the Mona Offshore Wind Project in situ. The 2022 AIS data has been used to estimate the impact on vessel routes in adverse weather. Each revised passage plan was developed by the NASH project team, including master mariners. These passage plans are based on existing passage plans provided by operators during consultation (such as passing at least 1.5 nm from a wind turbine) and informed by the results of the navigation simulation sessions (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement).

7.9.4.22 During the most severe weather, some services may be cancelled. The Mona Array Area would not have any effect on these services. However, on some occasions the existing delays due to deviations in adverse weather may result in sailings to be cancelled where hours of rest or schedule constraints are exceeded.

Table 7.23: Impact on ferry routeing in adverse weather.

Parameter	IOMSPC LIV-DOUG	Stena LIV-BEL
Principal Vessels (2019-2022)	Manannan	Stena Edda/Stena Embla/Stena Mersey/Stena Horizon/Stena Lagan/Stena Forecaster/Stena Forerunner
Approximate Annual Crossings with Significant Deviation (2022)	30 of 600	20 of 1,500
Basecase Adverse Weather Distance (nm)	61.2	121.2
Basecase Time (Minutes)	165	480
Total Delay Basecase (Minutes)	+10 to +33	+20 to +60
Service Speed (knots)	26	17.5
Additional Distance due to Mona Array Area (nm)	4.5	0

Parameter	IOMSPC LIV-DOUG	Stena LIV-BEL
Additional Time due to Mona Array Area (Minutes)	+12.5	0
Approximate Delay with Mona Array Area (Minutes)	+22.5 to 45.5	+20 to +60

Isle of Man Steam Packet Company

7.9.4.23 The IoMSPC Liverpool and Douglas adverse weather routeing accounts for an additional 10 to 33 minutes of journey time on a 165 minute journey, as identified within the 2022 AIS data. These transits tend to trend to the southwest and therefore it has been assumed that vessels would pass to the south and west of the Mona Array Area. This would necessitate a further 12.5 minutes in journey times to transit around the Mona Array Area in addition to their typical adverse weather routes, a total approximate delay of between 23 and 46 minutes to the typical route of a 165 minute journey. It was noted that on occasion, the Manannan currently chooses to take an adverse weather route that avoids the Mona Array Area, as whilst this is extra distance, the sheltered waters of the Welsh coast offers an opportunity to maintain full speed to compensate.

7.9.4.24 Whilst adverse weather routeing of the Manannan was relatively infrequent, during the navigation simulations it was discussed what the presence of the Mona Array Area would have on master decision making. In marginal conditions, where adverse weather is encountered but the master does not yet feel the need to weather route, the vessel track may follow its more typical course as the option would remain available to turn towards the southwest should the master need to. With the Mona Array Area, this would not be possible. Therefore, it is likely that masters may more regularly choose to pass to the southwest of the Mona Array Area in marginal conditions to minimise the risk to the vessel were the conditions to deteriorate. An alternative option was reviewed that the vessel could stay further northeast on departure from Liverpool, increasing the sea room from the Mona Array Area to provide this optionality. Some 2022 AIS tracks show this behaviour, with the Manannan maintaining a typical route up to the Calder Gas Field, before turning more westerly, an action which would respond to the weather conditions and maintain clearance from the Mona Array Area.

7.9.4.25 Constraints on manning levels are likely to be far greater for the IoMSPC than other operators as these have a single bridge team who do not live aboard the vessel. The Maritime Labour Conventions sets out requirements for minimum hours of rest and existing schedules and crew rosters are designed around these requirements. For up to four transits between Douglas and Liverpool each day during a prolonged 24 hour adverse weather event, there could be an existing accumulation of delays of between 40 and 132 minutes and the Mona Array Area would necessitate an additional 50 minutes. Due to the complexity of IoMSPC schedules and the interrelationship between metocean conditions and operational impacts the effects of this would vary each day, but it is credible that services could be cancelled more frequently.

7.9.4.26 On the basis that some services of a ferry could be more frequently cancelled due to the Mona Array Area, the sensitivity of the receptor is therefore, considered to be **medium**.

Stena Line

7.9.4.27 Ferry masters operating the Stena Line route between Liverpool and Belfast (which typically intersects the Mona Array Area) often take a similar course of action to the IoMSPC, taking advantage of the lee of the Welsh coast. Because of this, the majority of adverse weather routeing takes the TSS on departure of Liverpool and passes along the Welsh coast before turning north. Therefore, on the majority of occasions, the Stena adverse weather route clears the Mona Array Area and no additional impact on transit duration as a result of the construction is anticipated. It is however recognised that masters may need to more frequently choose an adverse weather route should they wish to avoid passing east and north of the Mona Array Area. Alternatively, there may be greater use of the route to the east of the Isle of Man which offers greater shelter in adverse weather.

7.9.4.28 Whilst a greater transit duration due to the presence of the Mona Array Area may be required, it is recognised that the increase in transit time compared to the total journey length is low and that there are viable alternative routes. The sensitivity of the receptor is therefore, considered to be **low**.

Seatruck Ferries

7.9.4.29 As the majority of Seatruck adverse weather routes are clear of the Mona Array Area, the sensitivity is considered to be **negligible**.

Commercial cargo/tanker operators

7.9.4.30 As there is little evidence of major adverse weather routeing near to the Mona Array Area, the sensitivity is considered to be **negligible**.

Significance of the effect

7.9.4.31 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.24: Magnitude, sensitivity and impact significance relating to impact to adverse weather routeing during construction of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	Medium	Medium	Moderate which is significant in EIA terms
Stena Line	Medium	Low	Minor which is not significant in EIA terms
Seatruck Ferries	Low	Negligible	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given that infrequent conditions may be encountered for which the Mona Array Area disrupts the preferred adverse weather route.
Commercial cargo/tanker	Low	Negligible	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given that infrequent conditions may be encountered for which the Mona Array Area disrupts the preferred adverse weather route.

7.9.4.32 Following the identification of significant effects on adverse weather routeing within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Despite this, the assessment has concluded that a significant effect remains.

7.9.4.33 The Applicant has committed to engaging with affected stakeholders. The Applicant will seek to continue this engagement beyond submission of the application and run in parallel with the application determination process.

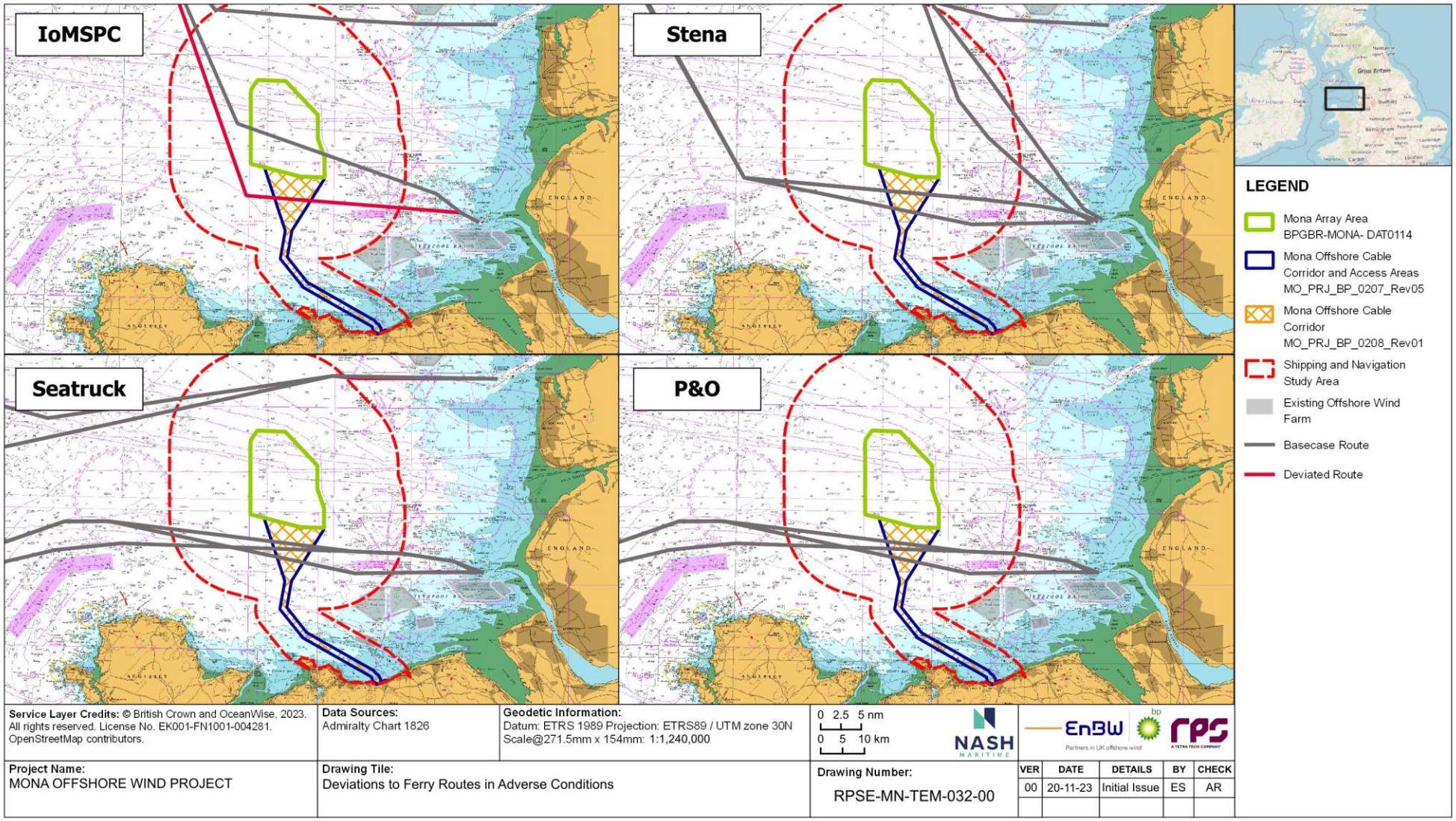

Figure 7.8: Deviations to ferry routes in adverse conditions.

Operations and maintenance phase

7.9.4.34 During the operations and maintenance phase of the Mona Offshore Wind Project, large commercial ships would not transit through the Mona Array Area due to the proximity of structures and would be required to route around the Mona Array Area. The impact on vessel routeing would therefore be similar to the latter stages of construction where vessels are displaced by construction buoyage, safety zones and the presence of structures. The operations and maintenance phase would be longer than other phases at up to 35 years compared to up to four years for the construction phase. During operations and maintenance, there would be far less Mona Offshore Wind Project vessels operating within and around the Mona Array Area interacting with other passing vessels. As a result, the impacts to adverse weather routeing during operations and maintenance are not anticipated to be substantially different to those during construction.

7.9.4.35 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.25: Magnitude, sensitivity and impact significance relating to impact to adverse weather routeing during operations and maintenance of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	Medium	Medium	Moderate which is significant in EIA terms
Stena Line	Medium	Low	Minor which is not significant in EIA terms
Seatruck Ferries	Low	Negligible	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given that infrequent conditions may be encountered for which the Mona Array Area disrupts the preferred adverse weather route.
Commercial cargo/tanker	Low	Negligible	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given that infrequent conditions may be encountered for which the Mona Array Area disrupts the preferred adverse weather route.

7.9.4.36 Following the identification of significant effects on adverse weather routeing within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Despite this, the assessment has concluded that a significant effect remains.

7.9.4.37 The Applicant has committed to engaging with affected stakeholders. The Applicant will seek to continue this engagement beyond submission of the application and run in parallel with the application determination process.

Decommissioning phase

7.9.4.38 The impacts to adverse weather routeing during decommissioning are not anticipated to be substantially different to those during construction. During both the construction and the decommissioning phases of the Mona Offshore Wind Project, large commercial ships will not be able to transit through the Mona Array Area, whether through the presence of decommissioning buoyage or structures and therefore the impact on vessel routeing will be the same. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.9.4.39 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.26: Magnitude, sensitivity and impact significance relating to impact to adverse weather routeing during decommissioning of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	Medium	Medium	Moderate which is significant in EIA terms
Stena Line	Medium	Low	Minor which is not significant in EIA terms
Seatruck Ferries	Low	Negligible	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given that infrequent conditions may be encountered for which the Mona Array Area disrupts the preferred adverse weather route.
Commercial cargo/tanker	Low	Negligible	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given that infrequent conditions may be encountered for which the Mona Array Area disrupts the preferred adverse weather route.

7.9.4.40 Following the identification of significant effects on adverse weather routeing within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Despite this, the assessment has concluded that a significant effect remains.

7.9.4.41 The Applicant has committed to engaging with affected stakeholders. The Applicant will seek to continue this engagement beyond submission of the application and run in parallel with the application determination process.

7.9.5 Impact on access to ports and harbours

7.9.5.1 The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project could lead to reduced access to ports and harbours. These include the key ports of Liverpool, Heysham and Douglas, and small harbours along the Welsh, English and Isle of Man coast.

7.9.5.2 The MDS is represented by the maximum extent of the generation infrastructure, the longest duration of construction and the maximum cable protection for the export cable and is summarised in Table 7.16.

7.9.5.3 Following determination of the construction base for the Mona Offshore Wind Project, this impact should be reviewed to ensure that appropriate risk controls are in place.

Construction phase

Magnitude of impact

7.9.5.4 The location of the Mona Array Area is well clear of the Statutory or Competent Harbour Authority Areas of any port or harbour in the Irish Sea.

7.9.5.5 The Mona Array Area would result in deviation of both ferry and cargo/tanker shipping routes, particularly to Liverpool, Douglas and Heysham. These impacts are assessed in section 7.9.2, 7.9.3 and 7.9.4.

7.9.5.6 During construction, there could be up to 86 construction vessels on site at any one time, with up to 2,055 vessel movements. These additional movements could lead to congestion or operational challenges in ports and harbours through which they transit. The construction base or bases for the Mona Offshore Wind Project is not yet determined, but previous offshore wind projects elsewhere in the UK have successfully mitigated these operational challenges, particularly through marine coordination of construction activities and liaison with ports and harbours.

7.9.5.7 The laying of the export cable will necessitate an advisory exclusion area around the cable laying vessel of up to 500 m could impede navigation of other vessels. In particular, this may cause disruption to activities at Raynes Jetty which is serviced by small general cargo vessels of approximately 90 m in length. However, cable laying operations in this area will have a short duration, reducing the extent of impact. Limited impact upon the harbour of Rhos-on-Sea is anticipated.

7.9.5.8 The magnitude is therefore, considered to be **medium**.

Sensitivity of the receptor

7.9.5.9 Any impacts during cable laying are likely to be short term and localised and therefore would have limited consequence. Given the infrequent calls to Raynes Jetty and unrestricted sea room either side of the Mona Offshore Cable Corridor, promulgation of information and notices, as committed to in section 7.8, and coordination between parties, if required, during construction can deconflict these operations.

7.9.5.10 Given the impacts to ports and harbours during construction are assumed to be manageable, the sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.9.5.11 Overall, the magnitude of the impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Operations and maintenance phase

Magnitude of impact

7.9.5.12 During operations and maintenance, there could be up to 849 vessel movements per year associated with the Mona Offshore Wind Project. These additional movements could lead to congestion or operational challenges in ports and harbours through which they transit. The operations and maintenance base or bases for the Mona Offshore

Wind Project are not yet determined, but previous offshore wind projects elsewhere in the UK have successfully mitigated these operational challenges, particularly through marine coordination of operations and maintenance activities and liaison with ports and harbours.

7.9.5.13 Given the completion of all major construction activities, direct impacts of the Mona Offshore Wind Project on other ports and harbours is limited.

7.9.5.14 The magnitude is therefore, considered to be **low**.

Sensitivity of the receptor

7.9.5.15 Given the impacts to ports and harbours during operations and maintenance are assumed to be manageable, the sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

7.9.5.16 Overall, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **negligible adverse** significance, which is not significant in EIA terms. A negligible rather than minor effect has been determined given that the Mona Offshore Wind Project is not anticipated to adversely impact port/harbour operations.

Decommissioning phase

7.9.5.17 The impacts to reduced access to ports and harbours during decommissioning are not anticipated to be substantially different to those during construction. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.9.5.18 Therefore, the magnitude of the impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

7.9.6 Impact on emergency response capability due to increased incident rates and reduced access for SAR responders

7.9.6.1 The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project may lead to an impact on emergency response capability due to increased incident rates and reduced access for SAR responders. The MDS is represented by the greatest extent of the Mona Offshore Wind Project, the maximum duration, the greatest number of vessel movements and the minimum spacing between structures and is summarised in Table 7.16.

Construction phase

Magnitude of impact

7.9.6.2 Historical incident data presented in section 7.5 shows relatively few incidents have occurred within the Mona Array Area. As demonstrated within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement, the construction activities of offshore wind farms can lead to an increase in incidents involving construction vessels, but these are usually both of low frequency and consequence.

7.9.6.3 It should be noted that often incidents within or adjacent to offshore wind farms are responded to by CTVs before conventional SAR assets (such as helicopters or lifeboats) are able to reach the casualty, providing a beneficial effect. The nearest SAR

helicopter base at HMCG Caernafron would have an estimated response time of 45 minutes and the nearest lifeboat station at Moelfre could take between 80 and 90 minutes to be on scene.

7.9.6.4 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, the design of the Mona Offshore Wind Project will be such to enable helicopter access and therefore safeguard HMCG obligations to SAR within the UK SAR Region. Several trials have been conducted by HMCG and MCA in SAR at offshore wind farms (see MCA, 2005; 2019) to establish best practice.

7.9.6.5 Emergencies on board, particularly fire or a man overboard, require immediate action by the bridge teams. For example, during fire, it may be necessary to turn the vessel into the wind such that the smoke does not blow across the passenger decks. Consultation has identified that these incidents do infrequently occur on board ferries in the east Irish Sea (in the order of less than once a year).

7.9.6.6 Whilst the Mona Offshore Wind Project does not necessarily impact upon the likelihood that fire may occur, its presence would constrict the sea room to perform these manoeuvres and may increase the resulting consequences.

- For medical evacuations, during the navigation simulations with the ferry companies, it was concluded that the likely response time of a SAR asset exceeds the transit time in proximity to the Mona Array Area and that the master would likely make for the nearest port. Therefore, the effect of the Mona Offshore Wind Project is negligible
- For fires or other serious incidents, during the navigation simulations it was shown that there was sufficient sea room to manoeuvre the vessel to avoid the effects of smoke across the passenger decks and minimise roll motion to aid the onboard response. Furthermore, it was noted that the probability of the incident occurring whilst transiting close to the Mona Array Area and the conditions being such that the presence of the turbines effected the necessary actions was remote.

7.9.6.7 Several key risk controls are committed to reduce the impact on emergency response during construction:

- An ERCoP will be developed to facilitate information sharing regarding the offshore wind farm and SAR organisations
- Periodic exercises will be undertaken at the site to prepare for incident response
- Two lines of orientation and a regular layout of structures
- Wind turbine spacing will be at least 1,400 m, far exceeding MGN654 SAR minimum requirements of 500 m
- A Design Plan, which includes a plan of the Mona Array Area, will be prepared and submitted to NRW for approval in consultation with MCA and Trinity House prior to commencement of construction
- Furthermore, a buoyed construction area, AtoNs and promulgation measures will reduce the likelihood of third party vessels being involving in an incident within the shipping and navigation study area.

7.9.6.8 The magnitude is therefore, considered to be **low**.

Sensitivity of the receptor

7.9.6.9 Whilst reduction in SAR capability could impact the likelihood of a successful rescue and could therefore have potentially high consequences, compliance with guidance and best practice would mitigate this impact.

7.9.6.10 The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.9.6.11 Overall, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given that the presence of the structures will have an adverse impact on SAR capability as opposed to open sea, albeit the Mona Offshore Wind Project will follow best practice to minimise this impact.

Operations and maintenance phase

7.9.6.12 The presence of infrastructure within the Mona Array Area, whether during construction or operations and maintenance, will have a similar effect on SAR. During construction, there may be partially constructed wind turbines, an irregular development site or the presence of jack ups which pose additional hazards. There would however be a greater duration of impact during the operations and maintenance phase than the construction phase. Therefore, the impacts to emergency response during operations and maintenance are not anticipated to be substantially different to those during construction.

7.9.6.13 Therefore, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given that the presence of the structures will have an adverse impact on SAR capability as opposed to open sea, albeit the Mona Offshore Wind Project will follow best practice to minimise this impact.

Decommissioning phase

7.9.6.14 The impacts to emergency response during decommissioning are not anticipated to be substantially different to those during construction. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.9.6.15 Therefore, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given that the presence of the structures will have an adverse impact on SAR capability as opposed to open sea, albeit the Mona Offshore Wind Project will follow best practice to minimise this impact.

7.9.7 Impact on vessel to vessel collision risk

7.9.7.1 The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project may lead to increased vessel to vessel collision risk. The MDS is represented by the maximum extent of the Mona Array Area, the greatest number of vessel movements and the maximum duration of the Mona Offshore Wind Project and is summarised in Table 7.16.

7.9.7.2 The assessment of collision risk has assumed that all vessels will comply with their obligations under the COLREGs, SOLAS and undertake prudent passage planning.

Construction phase

Magnitude of impact

7.9.7.3 During construction, vessel traffic would be displaced from the Mona Array Area due to the presence of construction buoyage and safety zones around fixed structures which are under construction. It is anticipated that mariners would also maintain safe passing distance of at least 1 nm from navigational hazards. Furthermore, there is insufficient spacing between wind turbines for a commercial vessel to safely navigate. Therefore, section 7.9.3 identifies that both cargo/tanker and ferry vessel routes will be deviated around the array which will result in a convergence of vessel routes to the southwest of the Mona Array Area, and to the north of the Mona Array Area.

7.9.7.4 The construction base or bases for the Mona Offshore Wind Project are not yet determined, but there is potential for construction vessels in transit to the Mona Array Area to be involved in a collision with other navigating vessels.

7.9.7.5 The hazard workshops and Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement highlighted that several collision hazards were likely to exist within the shipping and navigation study area during the Mona Offshore Wind Project duration, involving ferries, cargo/tanker, fishing, recreational craft and Mona Offshore Wind Project vessels.

7.9.7.6 The confluence of traffic in these regions will inevitably increase vessel encounters and therefore potential collision situations. Modelling undertaken within the NRA (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement) suggests that there would be a 26% increase in the number of encounters involving ferries and other large commercial vessels and a 7% increase in encounters between cargo/tanker vessels but that there would be a decrease in encounters between large commercial vessels and small craft. Whilst it is unlikely that most of these situations will result in a collision, there will be some residual increase in risk. Analysis of historical incident data in section 7.5 demonstrates that the greatest traffic density is to the south of the Mona Array Area, within the approaches to Liverpool. The presence of the Mona Array Area constricts this traffic further and increases the duration that vessels spend in the busy approaches to Liverpool, increasing interactions.

7.9.7.7 During full bridge simulations with ferry operators, collision situations were tested in normal and adverse weather conditions around the Mona Array Area. It was demonstrated that the revised boundaries enabled the bridge teams to take appropriate action as required by the COLREGs for complex, realistic traffic situations where they were a give way vessel whilst maintaining a desired Closest Point of Approach (CPA) of at least 1.0 nm from other vessels and structures. It was noted that with the presence of the Mona Array Area, the master may be more frequently called to the bridge than at present to support the bridge team in managing these situations. Furthermore, it was noted that what were challenging situations and failed runs with the Mona Potential Array Area were much improved following the amendments made to the Mona Array Area boundaries.

7.9.7.8 Quantitative risk modelling using the IALA Waterway Risk Assessment Program (IWRAP) was undertaken within the NRA for large commercial vessels (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement). With an estimated 15% increase in vessel traffic, the collision risk modelling estimated an increase in collision risk between ferries increasing from once in 1,926 years (base

case without Mona Array Area) to once in 1,148 years (future case with Mona Array Area). For cargo/tanker vessels in collision with ferries, this increase was from once in 716 to once in 522 years respectively. For cargo/tanker vessels in collision with other cargo/tanker vessels, this increase was from once in 3,225 to once in 2,048 years respectively.

7.9.7.9 During construction, it is likely that recreational craft on passage will avoid the Mona Array Area. This will offset their transits into adjacent waters. However, analysis of recreational activity in section 7.5 demonstrated relatively few movements through the Mona Array Area, and therefore would be unlikely to be involved in a collision.

7.9.7.10 Large parts of the Irish Sea are fished and during construction, fishing may be displaced into adjacent waters which increases the risk of collision. This is referred to as Spatial Squeeze, for which the National Federation of Fishermen's Organisations (NFFO) and Scottish Fishermen's Federation recently published a report (NFFO, 2022).

7.9.7.11 The majority of large construction vessels will be travelling at low speed within the Mona Array Area. Whilst the route taken by construction vessels is not known, it is likely that they would infrequently cross shipping routes. There is, therefore, limited risk of collision by navigating vessels.

7.9.7.12 The presence of the wind turbines may block or hinder the view of other vessels, resulting in "blind spots" which could increase the risk of collision by reducing the capability for early and effective collision avoidance. Vessels may be visually less distinct amongst the wind turbines and less prominent through radar, particularly at night and in poor visibility. The minimum spacing of 1,400 m makes such situations unlikely, particularly when compared to other offshore wind farms in the Irish Sea. As part of the navigation simulations, night navigation was also tested and it was concluded that the presence of the Mona Array Area did not interfere with the normal ability to safely determine the nature and aspect of other traffic at night.

7.9.7.13 Most commercial ships would transit at least 1 nm from the Mona Array Area. For a fishing boat or recreational craft emerging from the wind turbines boundary at six Knots, it would take 10 minutes to intersect the commercial ships path. For a CTV at 25 Knots, this is reduced to 2.4 minutes, albeit these vessels would carry AIS so would be more prominent. Such challenges currently exist for the established Irish Sea offshore wind farms but are being successfully managed by maintaining safe passing distances with no reported collisions as a direct result of reduced visibility of emerging vessels.

7.9.7.14 The construction activities will be managed through adopted risk controls listed in Table 7.17, specifically:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the construction area
- Marking and charting of the Mona Array Area on nautical charts to facilitate safe passage planning
- A buoyed construction area and safety zones will offset third party traffic and construction vessels
- Two lines of orientation and a regular layout of structures
- Wind Turbine spacing will be at least 1,400 m
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)

- Marine co-ordination will promote best practice during construction activities within the site
- Vessel Traffic Management Plan to manage vessel safety and reduce potential impacts in accordance with the Outline Vessel Traffic Management Plan (Document Reference J14).

7.9.7.15 Given the results of the modelling and findings of the navigation simulations which suggest a relatively low likelihood of collision, the magnitude is therefore, considered to be **low**.

Sensitivity of the receptor

7.9.7.16 Analysis of MAIB incident data suggests that approximately 1% of collisions would result in loss of life. Collisions between commercial vessels, even at speed, often result in only damage and no pollution or injuries (MAIB 7/2018, 28/2015, 3/2017, 15/2013).

7.9.7.17 Several consultees noted that a collision between a large cargo/tanker or ferry with a small craft such as fishing boat would likely result in the loss of the small craft and multiple fatalities (7/2007, 10/2015). However, the data indicates a more likely outcome would be serious damage to the small craft and either no or minor injuries or pollution (MAIB 4/2019, 16/2015, 20/2011, 17/2011).

7.9.7.18 During the hazard workshops, some consultees made reference to the highly fragile structural integrity of the Manannan high speed ferry. These vessels, having been designed for high-speed transit, are of aluminium construction and any collision involving this vessel could, therefore, have a higher potential consequence.

7.9.7.19 The NRA concluded that a most likely outcome for a ferry or passenger ship would be multiple injuries, moderate damage, minor pollution and widespread adverse publicity, with a worst credible outcome resulting in multiple loss of life. The most likely outcome for small craft would be minor injuries, minor damage and no pollution. Less numerous loss of life as compared to ferry collisions was identified as a worst credible outcome for all other large vessel types. Stakeholders requested that the worst credible outcome for a large vessel in collision with a small vessel was for multiple loss of life with the loss of the vessel and the risk assessment was amended to reflect this.

7.9.7.20 The consequences of a collision during construction activities will be managed through adopted risk controls listed in Table 7.17, specifically:

- ERCoP to effectively respond to an incident
- Marine Pollution Contingency Plan
- Periodic exercises and training.

7.9.7.21 The sensitivity of the receptor is therefore, considered to be **high**.

Significance of the effect

7.9.7.22 Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement assessed seven collision hazards which occurred during the construction phase of the Mona Offshore Wind Project. Of these, five were scored as Medium Risk – Tolerable if ALARP and two were scored as Low Risk – Broadly Acceptable. The highest collision hazards related to collisions involving large commercial vessels, particularly ferries, with each other or with small craft where there was the greatest potential for fatalities. The NRA concluded that given the presence of suitable risk controls and the disproportionality of any additional risk controls, where hazards were scored as Medium Risk, they could be defined as ALARP.

7.9.7.23 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 adverse** significance, which is not significant in EIA terms.

Operations and maintenance phase

Magnitude of impact

7.9.7.24 During the operations and maintenance phase of the Mona Offshore Wind Project, large commercial vessels will be deviated around the Mona Array Area, and therefore many of the impacts on cargo, tanker and ferries would not be substantially different to those during construction. During both the construction and the operations and maintenance phases of the Mona Offshore Wind Project, large commercial ships will not be able to transit through the Mona Array area, whether through the presence of construction buoyage or structures and therefore the impact on vessel routeing will be the same, albeit for different durations.

7.9.7.25 The hazard workshops and Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement highlighted that several collision hazards could occur within the shipping and navigation study area during the Mona Offshore Wind Project duration, involving ferries, cargo/tanker, fishing, recreational craft and Mona Offshore Wind Project vessels. These impacts were considered similar to those expected during the construction phase of the Mona Offshore Wind Project.

7.9.7.26 There may be up to 849 Mona Offshore Wind Project vessel movements per year which could increase the risk of collision with other vessels. The operations and maintenance base or bases for the Mona Offshore Wind Project has not yet been determined, but it is likely that the route taken by these vessels would need to cross busy shipping lanes and therefore regularly interact with other passing vessels.

7.9.7.27 During the operations and maintenance phase, small craft will be able to navigate through the Mona Array Area. Whilst it is possible that both fishing and recreational vessels may be offset from the Mona Array Area in a similar manner to that described during the construction phase, the absence of restrictions would mean that they would be less effected. Evidence from existing offshore wind farms in the Irish Sea suggest that both fishing activity and recreational cruising does take place between wind turbines, even with far narrower spacing than the Mona Array Area.

7.9.7.28 The operations and maintenance phase will be managed through adopted risk controls listed in Table 7.17:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the Mona Array Area
- Marking and charting of the Mona Array Area on nautical charts to facilitate safe passage planning
- Two lines of orientation and a regular layout of structures
- Wind Turbine spacing will be at least 1,400 m
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- Marine co-ordination will promote best practice during maintenance activities within the site (Document Reference J14).

7.9.7.29 The magnitude is therefore, considered to be **low**.

Sensitivity of the receptor

7.9.7.30 The consequences of collision would not be substantially different to those described during construction. The sensitivity of the receptor is therefore, considered to be **high**.

Significance of effect

7.9.7.31 Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement assessed six collision hazards which occurred during the operations and maintenance phase of the Mona Offshore Wind Project. All of these were scored as Medium Risk – Tolerable if ALARP. The highest collision hazards related to collisions involving large commercial vessels, particularly ferries, with each other and small craft were there was the greatest potential for fatalities. The NRA concluded that given the presence of suitable risk controls and the disproportionality of any additional risk controls, where hazards were scored as Medium Risk, they could be defined as ALARP.

7.9.7.32 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 adverse** significance, which is not significant in EIA terms.

Decommissioning phase

7.9.7.33 The impacts to vessel to vessel collision risk are not anticipated to be substantially different to those during construction. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.9.7.34 Therefore, 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 adverse** significance, which is not significant in EIA terms.

7.9.8 Impact on allision (contact) risk to vessels

7.9.8.1 The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project may lead to increased allision risk between navigating vessels and structures. The MDS is represented by the maximum extent of the Mona Array Area, the greatest number of structures, the greatest size of structures, the minimum spacing between structures and the greatest number of vessel movements and is summarised in Table 7.16.

Construction phase

Magnitude of impact

7.9.8.2 The construction of additional structures within the shipping and navigation study area increases the likelihood that contact occurrences will materialise, such instances are likely to occur through human error or mechanical failure. During construction, this is exacerbated by the partially constructed nature of the site.

7.9.8.3 For vessels navigating adjacent to the Mona Array Area, engine failure could cause them to drift and allide with a structure, or human error or steering failure could lead to a powered allision with a wind turbine or OSP. The Mona Array Area is adjacent to several major shipping routes with approximately 6,000 cargo/tanker vessel movements and 7,700 ferry movements per year within the shipping and navigation study area. In particular, the south boundary of the Mona Array Area is adjacent to the main approaches to the Port of Liverpool. However, it is notable that there have been

no reported incidents with respect to a commercial vessel allision with any of the existing offshore wind farms in the Irish Sea.

7.9.8.4 Quantitative risk modelling using IWRAP was undertaken within the NRA for large commercial vessels (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement). The modelling results were that the risk of allision with the Mona Array Area, accounting for a 15% increase in traffic, would be once in 358 years for cargo/tanker shipping and once in 2,514 years for ferries. Whilst the number of movements for ferries and cargo/tanker movements are similar, the significant proximity of large cargo/tanker vessels close to the Mona Array Area and the high redundancy of passenger vessels modelling in IWRAP have resulted in lower ferry allision scores.

7.9.8.5 The geographic distribution of risk is highly concentrated within the approaches to Liverpool and the TSS. The route to the south of the Mona Array Area including the TSS, approaches to Liverpool and up to the Off Skerries TSS contains the majority of modelled allision risk with both existing offshore wind farms (i.e. with Burbo Bank and Gwynt y Môr) but also the southern wind turbines of the Mona Array Area. This is accounted for by the high density of traffic in these areas and the proximity of transit to existing offshore wind farms.

7.9.8.6 During full bridge simulations with ferry operators (see Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement) several runs tested the safety of navigating adjacent to the Mona Array Area in both complex, realistic traffic scenarios and adverse weather. In all completed runs, it was demonstrated that the bridge teams were able to successfully respond to the situations whilst maintaining adequate CPA from other vessels and structures. It was noted that with the presence of the Mona Array Area, the master may be more frequently called to the bridge than at present to support the bridge team in managing these situations. Furthermore, it was noted that what were challenging situations and failed runs with the Mona Potential Array Area were much improved following the amendments made to the Mona Array Area boundaries.

7.9.8.7 Allision risks with existing oil and gas infrastructure as a result of the presence of the Mona Offshore Wind Project were also highlighted during the hazard workshops. The NRA identified that the relative locations of the Mona Array Area, shipping routes and oil and gas infrastructure was unlikely to have an appreciable effect on this hazard.

7.9.8.8 During construction activities there will be up to 2,055 installation vessel movements. Construction vessels within the Mona Array Area are inherently operating in close proximity to structures and therefore allisions are potentially more likely to occur. Historical incident analysis at other offshore wind farms within the UK demonstrates that these incidents do occur, and that they are more likely during construction than decommissioning (see section 7.5).

7.9.8.9 Analysis of vessel traffic in the shipping and navigation study area (section 7.5) demonstrates that there are fishing and recreational movements. During the construction phase, additional risk controls are proposed to manage navigating within the construction area. These include the use of guard vessels and safety zones which will deter smaller craft such as fishing and recreational vessels from navigating through construction areas. However, given the size of the construction site, it would still be credible that a small craft enters the Mona Array Area and contacts a partially constructed structure.

7.9.8.10 The construction activities will be managed through adopted risk controls listed in Table 7.17, specifically:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the construction area
- Application for safety zones to separate construction activities from vessel traffic
- Guard vessels to manage vessel safety
- Blade clearance of at least 22 m from MHWS to avoid mastheads
- Two lines of orientation and a regular layout of structures
- Wind Turbine spacing will be at least 1,400 m
- Marking and charting of the Mona Array Area on nautical charts to facilitate safe passage planning
- A buoyed construction area and safety zones will offset third party traffic and construction vessels
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- Marine co-ordination will promote best practice during construction activities within the site
- Vessel Traffic Management Plan to manage vessel safety and reduce potential impacts in accordance with the Outline Vessel Traffic Management Plan (Document Reference J14).

7.9.8.11 Given the modelling results and findings of the navigation simulations demonstrating sufficient sea room exists for vessels to avoid the Mona Array Area, the magnitude is therefore, considered to be **low**.

Sensitivity of the receptor

7.9.8.12 There have been few reported allisions between navigating vessels and offshore wind farm structures. Analysis of case studies and academic research within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement reached the following conclusions. Firstly, most allisions within offshore wind farms occur at slow speed, involving project vessels, and result in minor damage to the vessel, the wind turbine and rarely result in injuries or pollution. Secondly, were a large ship to collide with a wind turbine, this would typically be at low speed due to drifting and there would be minimal damage. However, there is the potential for catastrophic wind turbine collapse or holing of the commercial ship below the waterline that results in flooding.

7.9.8.13 During the hazard workshops it was agreed amongst stakeholders that an allision event would carry a lower potential consequence than that of collision. The NRA concluded that a most likely outcome for a ferry or passenger ship would be multiple injuries, moderate damage, minor pollution and widespread adverse publicity, with a worst credible outcome resulting in multiple loss of life. The most likely outcome for small craft was minor injuries, minor damage and no pollution. Less numerous loss of life as compared to ferry allisions was identified as a worst credible outcome for all other vessel types, including small craft. Allision risk involving oil and gas infrastructure was scored more highly than with wind turbines given the greater potential loss of life and pollution.

7.9.8.14 The consequences of an allision during construction activities will be managed through adopted risk controls listed in Table 7.17:

- ERCoP to effectively respond to an incident
- Marine Pollution Contingency Plan

- Periodic exercises and training.

7.9.8.15 The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effect

7.9.8.16 Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement assessed seven allision hazards which occurred during the construction phase of the Mona Offshore Wind Project. All of these hazards were scored as Medium Risk – Tolerable if ALARP. The two highest scoring allision hazards were allisions between navigating ferry/passenger vessels, and fishing vessels with wind turbines or Mona OSPs. The NRA concluded that given the presence of suitable risk controls and the disproportionality of any additional risk controls, where hazards were scored as Medium Risk, they could be defined as ALARP.

7.9.8.17 Overall, 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, which is not significant in EIA terms.

Operations and maintenance phase

Magnitude of impact

7.9.8.18 During the operations and maintenance phase of the Mona Offshore Wind Project, the presence of the fully constructed Mona Array Area exposes large commercial vessels to similar impacts as during the construction phase. However, it is likely that operators will be more familiar to the layout and presence of the Mona Array Area following four years of construction.

7.9.8.19 During the operations and maintenance phase of the Mona Offshore Wind Project, there is likely to be greater small craft traffic navigating through the Mona Array Area than during the construction phase, during which time navigation is more restricted. It is anticipated that some fishing vessels will continue to fish within the Mona Array Area, given at least 1,400 m between wind turbines and a regular layout. This spacing is anticipated to facilitate fishing by small craft without unacceptable increases in risk of allision. However, whilst recreational craft are able to navigate through an operational offshore wind farm, consultation with the RYA suggests that only a minority are choosing to do so at other sites.

7.9.8.20 The most likely allision with a structure is anticipated to involve a fishing boat or a Mona Offshore Wind Project maintenance vessel. Fishing is anticipated to continue to take place between the turbines within the Mona Array Area. There may be up to 849 Mona Offshore Wind Project vessel movements per year which due to proximity in which vessels of this type navigate to structures, and their greater numbers, increases the risk of allision as compared to other vessel types.

7.9.8.21 The operations and maintenance activities will be managed through adopted risk controls listed in Table 7.17:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the Mona Array Area
- Blade clearance of at least 22 m from MHWS to avoid mastheads
- Two lines of orientation and a regular layout of structures
- Wind Turbine spacing will be at least 1,400 m
- Marking and charting of the Mona Array Area on nautical charts to facilitate safe passage planning

- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- Marine co-ordination will promote best practice during operations and maintenance activities within the site
- Vessel Traffic Management Plan to manage vessel safety and reduce potential impacts in accordance with the Outline Vessel Traffic Management Plan (Document Reference J14).

7.9.8.22 The magnitude is therefore, considered to be **low**.

Sensitivity of the receptor

7.9.8.23 The consequences of allision would not be substantially different to those described during construction. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of effect

7.9.8.24 The NRA (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement) assessed seven allision hazards which occurred during the operations and maintenance phase of the Mona Offshore Wind Project. All of these hazards were scored as Medium Risk – Tolerable if ALARP. The two highest scoring allision hazards were allisions between navigating ferry/passenger vessels, and fishing vessels with wind turbines or Mona OSPs. The NRA concluded that given the presence of suitable risk controls and the disproportionality of any additional risk controls, where hazards were scored as Medium Risk, they could be defined as ALARP.

7.9.8.25 Overall, 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, which is not significant in EIA terms.

Decommissioning phase

7.9.8.26 The impacts to allision risk are not anticipated to be substantially different to those during construction. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.9.8.27 Therefore, 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, which is not significant in EIA terms.

7.9.9 Impact on marine navigation, communications and position fixing equipment

7.9.9.1 The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project may lead to impacts on marine navigation, communications and position fixing equipment. The MDS is represented by the maximum extent of the Mona Array Area, the greatest number of structures, the greatest size of structures and the minimum spacing between structures and is summarised in Table 7.16.

Construction phase

Magnitude of impact

7.9.9.2 Offshore wind farms can have adverse effects on shipboard equipment necessary for navigation, communications and position fixing. Several studies have sought to better understand this impact including by QinetiQ (2004) the British Wind Energy Association ((BWEA), 2007) and Ocean Studies Board's Division on Earth and Life Studies (2022). These impacts are also recognised in MGN654.

7.9.9.3 No discernible impact to passing vessels was identified to VHF, AIS, Global Navigation Satellite System (GNSS) or compasses. Nor was the sound generated by wind turbines likely to mask the navigational sound signals made by vessels as per the COLREGs.

7.9.9.4 These studies have identified that wind turbines, like other structures, can result in spurious radar returns such as side lobes, echoes, reflections and blanketing. This can reduce the capability of tracking small vessels when navigating near to offshore wind farms. Given that vessels would pass adjacent to the Mona Array Area, these effects could be experienced.

7.9.9.5 The Mona Offshore Wind Project is outside of any harbour areas and the region is not monitored by Vessel Traffic Services (VTS), and therefore the impacts to shore radar are low.

7.9.9.6 The magnitude is therefore, considered to be **low**.

Sensitivity of the receptor

7.9.9.7 Interference with radar could reduce the effectiveness of collision avoidance, increasing the risk of an incident. MGN654 recognises that these effects are greatest within 0.5 nm of an offshore wind farm but could be experienced up to 1.5 nm from the wind farm boundary. This is closer than most large vessels would pass based on prudent passage planning and therefore minimal effects should be experienced. There may be some reduction in the ability to track small craft within the Mona Array Area, which is discussed in section 7.9.7.

7.9.9.8 Furthermore, these effects are routinely experienced by operators passing the existing Irish Sea offshore wind farms and therefore mariners should be experienced in mitigating their effects.

7.9.9.9 The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.9.9.10 Overall, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given the proximity of large numbers of vessel transits to the Mona Array Area, but the low likelihood that this would result in an incident.

Operation and maintenance phase

7.9.9.11 The impacts to marine navigation, communications and position fixing equipment are not anticipated to be substantially different to those during construction, albeit for a longer duration. The greater extent of structures across the Mona Array Area for a fully constructed offshore wind farm as opposed to a partially constructed one may widen these effects. However, it is not considered that this would increase the significance of this impact.

7.9.9.12 Therefore, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given the proximity of large numbers of vessel transits to the Mona Array Area, but the low likelihood that this would result in an incident.

Decommissioning phase

7.9.9.13 The impacts to marine navigation, communications and position fixing equipment are not anticipated to be substantially different to those during construction. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.9.9.14 Therefore, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given the proximity of large numbers of vessel transits to the Mona Array Area, but the low likelihood that this would result in an incident.

7.9.10 Impact on recreational craft passages and safety

7.9.10.1 The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project may lead to impacts to recreational craft passages and safety. The MDS is represented by the maximum extent of the Mona Array Area, the greatest number of structures, the lowest blade tip height of structures and the minimum spacing between structures and is summarised in Table 7.16.

Construction phase

Magnitude of impact

7.9.10.2 During the construction phase, additional risk controls are proposed to manage navigating within the construction area. These include the use of guard vessels and safety zones which will deter recreational vessels from navigating through the Mona Array Area construction areas.

7.9.10.3 Analysis of vessel traffic (section 7.5) demonstrates that there are few recreational movements through the shipping and navigation study area. During the winter vessel traffic surveys, no recreational craft were detected, and during the summer survey, on average, less than one per day was detected by either AIS or Radar. This suggests that relatively few recreational users would be adversely impacted. It is known that there are occasional regattas or rallies that cross between the UK and the Isle of Man.

7.9.10.4 Inshore, and near to cable landfall, there is a greater density of recreational traffic, between Conwy and Rhyl. During cable laying operations, there may be short term and localised impacts on recreational movements, however there is clear sea room for recreational craft to avoid the cable lay vessel.

7.9.10.5 The construction activities will be managed through adopted risk controls listed in Table 7.17:

- Promulgation of activities through the use of Notice to Mariners will ensure approaching vessels can safely avoid the Mona Array Area
- Blade clearance of at least 22 m from MHWS to avoid mastheads

- Commitments to layout including wind turbine and spacing and lines of orientation to facilitate internal navigation where safe to do so (Document Reference J19)
- Marking and charting of Mona Array Area on nautical charts to facilitate safe passage planning.

7.9.10.6 The magnitude is therefore, considered to be **low**.

Sensitivity of the receptor

7.9.10.7 The most prominent cruising routes identified through analysis of the AIS data and the RYA Coastal Atlas which intersect the Mona Array Area are between Liverpool and Douglas, and between Conwy/Menai Straits and Douglas. Both of these routes would require a minor deviation to pass clear of the Mona Array Area, should the skipper decide not to navigate between the wind turbines.

7.9.10.8 This additional distance would be in the order of less than 2 nm and given the slower speed that yachts travel as compared to commercial vessels, may necessitate an additional 30 minutes of cruising. During consultation, potential impacts on vessel routeing due to tidal gates were discussed which might make any deviations more costly for cruising vessels or else encounter adverse tidal conditions or insufficient water depths. Given the spacing of wind turbines which would support navigation through the Mona Array Area, this could be factored into the cruising passage plan to mitigate its effects.

7.9.10.9 The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.9.10.10 Overall, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given the that whilst the presence of the Mona Offshore Wind Project is not anticipated to have an impact on inshore recreational activity, there will be some effect on offshore recreational cruising.

Operations and maintenance phase

7.9.10.11 During the operations and maintenance phase of the Mona Offshore Wind Project, there is likely to be greater small craft traffic navigating through the Mona Array Area than during the construction phase, during which time navigation is more restricted. Given at least 1,400 m between wind turbines and a regular layout, recreational craft could navigate through the Mona Array Area without unacceptable increases in risk. However, consultation with the RYA suggests that only a minority are choosing to do so at other sites. This may result in greater numbers of recreational craft navigating around the Mona Array Area, increasing transit durations.

7.9.10.12 As a result, these impacts are not anticipated to be substantially different to those during construction, and likely have a lower adverse impact.

7.9.10.13 Therefore, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given the that whilst the presence of the Mona Offshore Wind Project is not anticipated to have an impact on inshore recreational activity, there will be some effect on offshore recreational cruising.

Decommissioning phase

7.9.10.14 The impacts to recreational craft are not anticipated to be substantially different to those during construction. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.9.10.15 Therefore, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given the that whilst the presence of the Mona Offshore Wind Project is not anticipated to have an impact on inshore recreational activity, there will be some effect on offshore recreational cruising.

7.9.11 Impact on snagging risk to vessel anchors and fishing gear

7.9.11.1 The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project may lead to an increased risk of snagging of fishing gear and ship anchors. The MDS is represented by the longest length of cables, minimum cable burial depth and maximum length of cable protection over the greatest duration and is summarised in Table 7.16.

Construction phase

Magnitude of impact

7.9.11.2 The Mona Offshore Cable Corridor route passes south across the TSS before turning southeast towards landfall on the north Welsh coast. The cable is intended to be buried, to a depth of at least 0.5 m. Where burial is not possible, cable protection may be required up to a height of 3 m. A CBRA will be undertaken to determine the appropriate level of protection.

7.9.11.3 Subsea cables are both at risk of anchor or fishing gear strikes and can pose a hazard to navigating vessels were gear attached to the vessel to become snagged. Within the Mona Array Area, with inter array and interconnector cables, the use of Safety Zones and guard vessels will reduce the risk of snagging during the construction phase.

7.9.11.4 An anchorage used by commercial ships is located approximately 4 nm to the west of the Mona Offshore Cable Corridor. During adverse weather with prevailing westerlies it is feasible that ships could drag their anchor across the cable route, albeit there is sufficient separation between the anchorage and cable route to enable remedial action by the ship to take place.

7.9.11.5 Commercial ships may choose to deploy an anchor in an emergency, and whilst uncommon, this could result in cable snagging. The greater ship density across the Mona Offshore Cable Corridor to the west of the Liverpool Bay TSS, would increase the likelihood of occurrence in comparison to the Mona Array Area.

7.9.11.6 Small recreational and fishing boats may choose to anchor near to cable landfall, however, there is limited evidence that this is commonplace. Given adequate protection, it is unlikely that a yacht's anchor would either snag or damage the cable. Limited evidence of fishing activity was identified along the Mona Offshore Cable Corridor.

7.9.11.7 Cable burial would mitigate the risk of snagging, and a CBRA has been committed by the Mona Offshore Wind Project to ensure these risks are adequately addressed for the types of gear used within the shipping and navigation study area. Where the cable

is buried, it will be periodically inspected and where necessary remedial action taken. A Fisheries liaison and coexistence plan (Document Reference J13) will be developed to minimise the risk of gear snagging along the cable route.

7.9.11.8 The construction activities will be managed through adopted risk controls listed in Table 7.17, specifically:

- Promulgation such as Notice to Mariners and site marking and charting issued to warn vessels of the presence of the Mona Offshore Wind Project
- Application for safety zones to separate construction activities and vessel navigation
- Guard Vessels to manage vessel safety
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- Emergency response capabilities including an ERCoP, Marine Pollution Contingency Plan, periodic exercises to minimise the consequences of any incident
- A CBRA will ensure adequate cable burial or protection
- Cable protection shall be designed to minimise snagging hazards, for example by minimising height above seabed, and or using smooth or shallower profiles.

7.9.11.9 The magnitude is therefore, considered to be **low**.

Sensitivity of the receptor

7.9.11.10 Were a fishing vessel to snag the cable, the most likely outcome is loss of gear and potentially minor damage to the cable. A worst credible outcome however is the loss of the fishing vessel as it capsizes, which may also result in potential fatalities.

7.9.11.11 Snagging of commercial vessel anchors is unlikely to result in serious consequences such as fatalities, pollution or serious damage to the vessel but would result in significant damage to the cable or cables. There is the potential for the presence of the cables to influence a master's decision making not to anchor to avoid an incident such as a collision, allision or grounding. However, this is not considered credible as the master would likely act to minimise any risk to the vessel.

7.9.11.12 The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.9.11.13 Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement assessed four snagging hazards which occurred during the construction phase of the Mona Offshore Wind Project. Of these three were scored as Medium Risk – Tolerable if ALARP. Firstly, the risk of snagging of fishing gear and secondly the risk of snagging a commercial ship anchor. The NRA concluded that given the presence of suitable risk controls and the disproportionality of any additional risk controls, where hazards were scored as Medium Risk, they could be defined as ALARP.

7.9.11.14 Overall, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given that whilst the Mona Offshore Wind Project cables will be buried, there is fishing and anchoring activity adjacent to the site.

Operations and maintenance phase

7.9.11.15 The impacts due to the risk of snagging are not anticipated to be substantially different to those during construction, albeit for a longer duration. However, given the removal of restrictions on navigation that are in place during construction, and the wind turbine spacing in excess of 1,400 m between wind turbines, there may be greater fishing activity within the Mona Array Area posing a risk of snagging of inter array cables.

7.9.11.16 Conversely, during the operations and maintenance phase, there should be no partially buried or unprotected infrastructure as might occur temporarily during the construction phase. Furthermore, local fishermen will be more familiar with the site layout and able to avoid fishing in a manner which could lead to a risk of snagging.

7.9.11.17 The risk of snagging during the operations and maintenance phase will be managed through adopted risk controls listed in Table 7.17:

- Promulgation such as Notice to Mariners and site marking and charting issued to warn vessels of the presence of the Mona Offshore Wind Project
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- Emergency response capabilities including an ERCoP, Marine Pollution Contingency Plan, periodic exercises to minimise the consequences of any incident
- A CBRA will ensure adequate cable burial or protection.

7.9.11.18 Overall, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given that whilst the Mona Offshore Wind Project cables will be buried, there is fishing and anchoring activity adjacent to the site.

Decommissioning phase

7.9.11.19 The impacts due to the risk of snagging are not anticipated to be substantially different to those during construction. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.9.11.20 All cables will be removed during decommissioning so as not to leave any snagging hazards on the seabed.

7.9.11.21 Therefore, the magnitude of the impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given that whilst the Mona Offshore Wind Project cables will be buried, there is fishing and anchoring activity adjacent to the site.

7.9.12 Impact on under keel clearance

7.9.12.1 The construction, operations and maintenance, and decommissioning phases of the Mona Offshore Wind Project may lead to an increased risk of grounding due to reduced UKC. The MDS is represented by the longest length of cables, minimum cable burial depth and maximum length of cable protection over the greatest duration and is summarised in Table 7.16.

Construction phase

Magnitude of impact

7.9.12.2 The Mona Offshore Cable Corridor routes to the north Welsh coast and crosses several routes used by both large shipping and small craft. It may be necessary in some locations to use cable protection rather than burial and this may reduce the depth of navigable water that increases the risk of grounding. Given the depths of water, this is likely to occur south of the main shipping routes into Liverpool.

7.9.12.3 Most vessels near to landfall are small and have a shallow draught making them less susceptible to a reduction in depth. However, the approaches to Raynes Jetty are used by deeper draught general cargo vessels up to 100 m in length and therefore an assessment any impact on this route will be required once a detailed cable protection strategy is developed.

7.9.12.4 MGN654 recommends that water depths are not reduced by more than 5% (referenced to chart datum) as a result of any cable protection. The Mona Offshore Wind Project has committed to no more than 5% reduction in water depth (referenced to Chart Datum) at any point on the cable route without prior written approval from the Licensing Authority in consultation with the MCA.

7.9.12.5 The construction activities will be managed through adopted risk controls listed in Table 7.17, specifically:

- Promulgation such as Notice to Mariners and site marking and charting issued to warn vessels of the presence of the Mona Offshore Wind Project
- Application for safety zones to separate construction activities and vessel navigation
- Guard Vessels to manage vessel safety
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- A CBRA will ensure adequate cable burial or protection.

7.9.12.6 The magnitude is therefore, considered to be **negligible**.

Sensitivity of the receptor

7.9.12.7 Groundings often result in minor damage to the vessel, with minimal pollution, with the most likely outcome being the vessel re-floating on the next high tide. However, were the vessel to be significantly grounded, during adverse weather which can cause more significant damage, there is the potential for loss of life and the loss of the vessel as it breaks up. Given the proximity to shore that these incidents occur, rescue of any casualty would be easier than were it to occur within the Mona Array Area as is the case for other hazards, and so may have a lower consequence.

7.9.12.8 The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.9.12.9 Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement assessed three grounding hazards which occurred during the construction phase of the Mona Offshore Wind Project. These included commercial vessels, fishing and recreational craft. All three of which resulted in Negligible Risk – Broadly Acceptable risk scores.

7.9.12.10 Overall, 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 **negligible adverse** significance, which is not significant in EIA terms. A negligible rather than minor effect has been determined given that suitable mitigations have been identified to ensure UKC is maintained across the Mona Offshore Wind Project.

Operations and maintenance phase

7.9.12.11 The impacts due to the reduced UKC are not anticipated to be substantially different to those during construction, albeit for a longer duration.

7.9.12.12 The risk of grounding during the operations and maintenance phase will be managed through adopted risk controls listed in Table 7.17:

- Promulgation such as Notice to Mariners and site marking and charting issued to warn vessels of the presence of the Mona Offshore Wind Project
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- Emergency response capabilities including an ERCoP, Marine Pollution Contingency Plan, periodic exercises to minimise the consequences of any incident
- A CBRA will ensure adequate cable burial or protection.

7.9.12.13 Overall, 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 **negligible adverse** significance, which is not significant in EIA terms. A negligible rather than minor effect has been determined given that suitable mitigations have been identified to ensure UKC is maintained across the Mona Offshore Wind Project.

Decommissioning phase

7.9.12.14 The impacts due to the reduced UKC are not anticipated to be substantially different to those during construction. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.9.12.15 Therefore, 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 **negligible adverse** significance, which is not significant in EIA terms. A negligible rather than minor effect has been determined given that suitable mitigations have been identified to ensure UKC is maintained across the Mona Offshore Wind Project.

7.9.13 Future monitoring

7.9.13.1 Table 7.27 below outlines the proposed monitoring commitments for shipping and navigation. These monitoring commitments are accepted, industry standard methods by which the impacts to shipping and navigation can be scrutinised and ensure the predictions of the NRA are consistent with the realised impacts and therefore that the risk control options are appropriate and proportionate.

Table 7.27: Monitoring commitments.

Environmental effect	Monitoring commitment	Means of implementation
All impacts on vessel routeing and safety	Preparation and adherence to a navigation monitoring strategy for construction and post-construction monitoring of marine traffic (by AIS) with a report submitted annually to MMO, MCA and Trinity House. The report will assess the extent to which the impacts predicted in the NRA are accurate to ensure adopted risk controls are fit for purpose.	Navigation Monitoring Strategy secured within the deemed marine licence in schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Impact on allision (contact) risk to vessels	Preparation and adherence to an AtoNMP which includes AtoN monitoring to ensure constant functionality through the lifetime of the Mona Offshore Wind Project. Trinity House to be informed of any defects.	AtoNMP secured within the deemed marine licence in schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Impact on snagging risk to vessel anchor and fishing gear	Preparation and adherence to an OCMS which includes details of cable monitoring of cable burial and protection status to ensure specified requirements are met.	OCMS with details of cable monitoring secured within the deemed marine licence in schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Impact on UKC	Bathymetric survey to IHO Order 1a of Mona Array Area and Mona Offshore Cable Corridor. Data to be provided to MCA and UKHO.	Bathymetric surveys are secured within the deemed marine licence in schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence .

7.10 Cumulative effect assessment methodology

7.10.1 Methodology

7.10.1.1 The CEA takes into account the impact associated with the Mona Offshore Wind Project together with other projects and plans. The projects and plans selected as relevant to the CEA presented within this chapter are based upon the results of a screening exercise (see Volume 5, Annex 5.1: Cumulative effects screening matrix of the Environmental Statement). 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.

7.10.1.2 The shipping and navigation CEA methodology has followed the methodology set out in Volume 1, Chapter 5: Environmental Impact Assessment methodology of the Environmental Statement. As part of the assessment, all projects and plans considered alongside the Mona Offshore Wind Project have been allocated into 'tiers' reflecting their current stage within the planning and development process, these are listed below.

7.10.1.3 A tiered approach to the assessment has been adopted, as follows:

- Tier 1
  - Under construction
  - Permitted application

- Submitted application
  - Tier 2
- Scoping report has been submitted and is within the public domain
  - Tier 3
- Scoping report has not been submitted
- Identified in the relevant Development Plan
- Identified in other plans and programmes.

7.10.1.4 This tiered approach is adopted to provide a clear assessment of the Mona Offshore Wind Project alongside other projects, plans and activities.

7.10.1.5 The specific projects, plans and activities scoped into the CEA, are outlined in Table 7.28 and Figure 7.9.

7.10.1.6 Existing navigational activities, such as anchorages, pilot boarding stations and ferry routes are included within the baseline assessment. The baseline assessment also includes the ongoing effect of the existing Irish Sea offshore wind farms on shipping and navigation receptors. There is a recognised potential cumulative impact of the Mona Offshore Wind Project, with existing offshore wind farms in the Irish Sea, and the proposed Morgan Generation Assets Array Area, Morecambe Generation Assets Array Area and Awel y Môr Array Area. In particular, the development of all of these projects will result in constrained routes between them which was raised as a concern by many shipping and navigation consultees.

7.10.1.7 Due to their proximity and expected development timeline, there was a recognised potential for cumulative impacts between the four Round 4 Irish Sea Offshore Wind Farm Projects; Mona Offshore Wind Project, Morgan Offshore Wind Project Generation Assets, Morecambe Offshore Windfarm Generation Assets and Morgan and Morecambe Offshore Wind Farms Transmission Assets (the “Projects”).

7.10.1.8 In light of this, the developers (EnBW, bp, Cobra Instalaciones y Servicios, S.A. (Cobra) and Flotation Energy Ltd) commissioned a joint CRNRA in 2022. The objective of the joint CRNRA was to enable stakeholders to engage with and understand the potential cumulative effects of the Projects. Adopting a regional (co-ordinated) approach to assessment enabled the individual Projects to identify appropriate design mitigation for the cumulative impacts in a coordinated, consistent and efficient manner. This was undertaken at an early stage to ensure that the potential impacts of the four Projects were understood as early in the EIA and design process as possible. The CRNRA is set out within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement.

7.10.1.9 At the time of drafting the CRNRA to inform the PEIR for the Projects, it was noted that an agreement for lease had been awarded to Orsted (subsequently Mooir Vannin Offshore Wind Farm Limited) in 2015 for an area of seabed in Isle of Man territorial waters, approximately 6 nm to the east of the Isle of Man. Whilst some stakeholders had raised concerns during the NRA on the additional cumulative impact with this project, since 2015 no further information was made publicly available nor had a Scoping Report been issued publicly for the proposed development of the wind farm lease area and therefore its status was uncertain. Following the Planning Inspectorate’s Advice Note Seventeen (Planning Inspectorate, 2019), the Mooir Vannin Offshore Wind Farm (OWF) project was incorporated into the shipping and navigation assessments undertaken to inform the PEIR as a Tier 3 Project and

therefore not incorporated into the drafting of the CRNRA undertaken to inform the PEIR as there was insufficient information available.

7.10.1.10 The PEIR response provided by Orsted (Mooir Vannin Offshore Wind Limited) in June 2023 to Morgan Generation Assets (also referred to within Mona Offshore Wind Project and Morecambe Generation Assets PEIR responses) stated that a Scoping Report for the Mooir Vannin OWF would be published in September or October 2023 and that Orsted would supply pre-scoping project details to allow its inclusion in the CRNRA undertaken to inform the Project's Environmental Statements. This information was provided on 01 September 2023. On 18 October 2023, Mooir Vannin Offshore Wind Farm Limited issued a Scoping Report with details of the proposed development of the Mooir Vannin OWF (Mooir Vannin Offshore Wind Farm Limited, 2023) within the agreement for lease area.

7.10.1.11 The project information provided by Orsted on 01 September 2023 has been incorporated into the CRNRA undertaken to inform the Environmental Statement. This included undertaking some navigation simulations with the IoMSPC which included the Projects' Array Areas and the Mooir Vannin OWF agreement for lease area, subsequently presented as the scoping boundary within the Scoping Report (Mooir Vannin Offshore Wind Limited, 2023). Furthermore, the Mooir Vannin OWF agreement for lease area was included within the September 2023 hazard workshop undertaken to inform the Environmental Statement.

7.10.1.12 Following publication of its Scoping Report the Mooir Vannin OWF is now categorised as a Tier 2 Project using the Planning Inspectorate's Advice Note Seventeen (Planning Inspectorate, 2019). A Tier 2 Project is where a Scoping Report has been submitted for a project in the development pipeline. Given the timing of the provision of project information from Orsted and the release of the Mooir Vannin OWF Scoping Report, the assessment of the Mooir Vannin OWF project has been included within an addendum to the CRNRA. This was to ensure that the Mooir Vannin OWF was included within the cumulative assessment in a logical manner prior to Application submission of the Mona Offshore Wind Project.

7.10.1.13 The CRNRA addendum assesses how the development of the Mooir Vannin OWF might impact upon the cumulative risk to vessel traffic identified within the CRNRA undertaken to inform the Environmental Statement.

7.10.1.14 As the Mooir Vannin OWF Scoping Report was issued after the navigation simulations, risk modelling and both hazard workshops informing the CRNRA, the assessment within the addendum is primarily desk based, applying the information contained within the Mooir Vannin OWF Scoping Report to identify any changes to the earlier findings of the CRNRA.

7.10.1.15 A discussion was held with stakeholders during the CRNRA hazard workshop on the 28 September 2023 on the potential impact on navigational safety if Mooir Vannin OWF was included. As the Mooir Vannin OWF Scoping Report had not yet been published this was done on the basis of the agreement for lease area.

7.10.1.16 As described in the Mooir Vannin OWF Scoping Report, it is expected that a CEA (which will include shipping and navigation) will be prepared by Mooir Vannin Offshore Wind Limited on the basis of their proposed development parameters which will accompany their development application to the IoM Government.

7.10.1.17 The assessment on shipping and navigation with Tier 1 projects, principally the Awel y Môr Offshore Wind Farm, did not result in levels of significance that were above those of the Mona Offshore Wind Project individual assessment. The Awel y Môr Project is clear of major shipping routes and there are no routes which intersect both

the Mona and Awel y Môr array areas. Furthermore, cumulative effects on routes into Liverpool between the Mona and Awel y Môr array areas are similar to the cumulative effects on routes into Liverpool between the Mona and Gwynt y Môr array areas. The CEA for shipping and navigation has therefore taken an approach to assessment which considers the cumulative effects with both Tier 1 and Tier 2 projects together.

7.10.1.18 The Morgan Generation Assets, Morecambe Generation Assets and Morgan and Morecambe Offshore Wind Project Transmission Assets all issued PEIRs in 2023. On the 19 September 2023, newsletters were issued by the Morgan Generation Assets (2023) and Morecambe Generation Assets (2023). Within these project updates, amendments to reduce the extent of the array areas were announced for both projects. These changes would have a material impact on the cumulative effects upon shipping and navigation receptors and therefore both the CRNRA and CEA has been undertaken with these revised boundaries.

Table 7.28: List of other projects, plans and activities considered within the CEA.

Project/Plan	Status	Distance from the Mona Array Area (km)	Distance from the Mona offshore/onshore cable corridor (km)	Description of project/plan	Dates of construction (if applicable)	Dates of operation (if applicable)	Overlap with the Mona Offshore Wind Project
Tier 1							
Awel y Môr	Consented	13.4	1.0	Proposed offshore wind farm to the west of Gwynt y Môr. Maximum of 50 wind turbines and array area of 78 km^2.	2025 to 2029	2030	Yes
Tier 2							
Morecambe Offshore Windfarm Generation Assets	Pre-application	10.6	20.1	Proposed offshore wind farm. Maximum of 35 wind turbines and minimum spacing between rows of wind turbines of 1,400 m. Area: 87 km^2.	2026	2030	Yes
Morgan Offshore Wind Project Generation Assets	Pre-application	11.1	31.1	Proposed offshore wind farm. Maximum of 96 wind turbines and four OSPs, with minimum spacing between wind turbines of 1,400 m. Area: 280 km^2.	2026	2030	Yes
Morgan and Morecambe Offshore Wind Transmission Assets	Pre-application	8.7	20.1	Coordinated transmission assets for the Morgan Offshore Wind Project and the Morecambe Offshore Windfarm.	2026	2030	Yes
Mooir Vannin Offshore Wind Farm	Pre-application	34.5	54.6	Proposed offshore wind farm. Maximum of 100 wind turbines. Array area: 253 km^2.	2030	2032	Yes

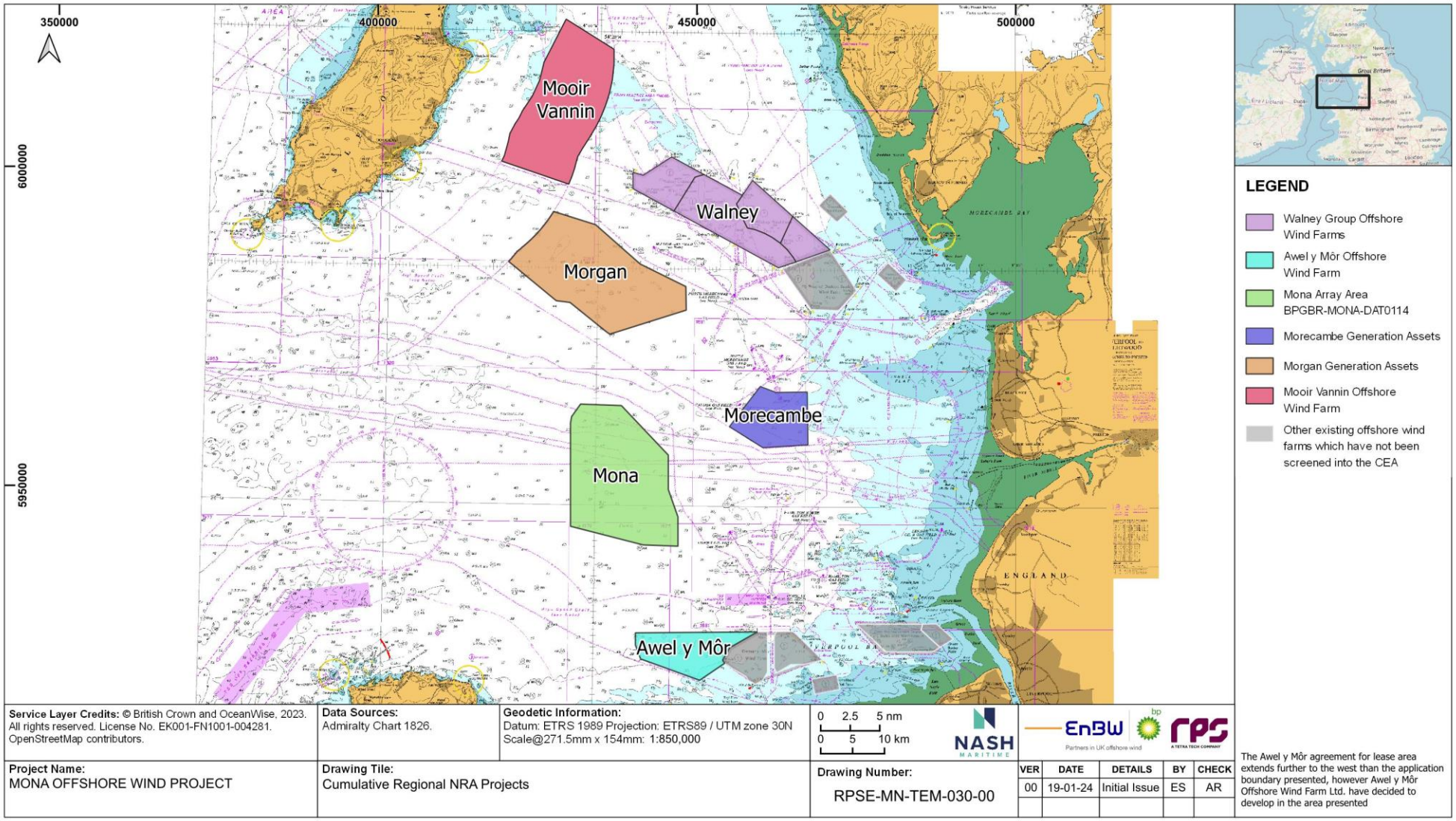

Figure 7.9: Key projects, plans and activities screened into the CEA.

7.10.2 Maximum design scenario

7.10.2.1 The MDSs identified in Table 7.29 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 Project Design Envelope provided in Volume 1, Chapter 3: Project Description, of the Environmental Statement as well as the information available on other projects and plans, in order to inform an MDS. Effects of greater adverse significance are not predicted to arise should any other development scenario, based on details within the Project Design Envelope (e.g. different wind turbine layout), to that assessed here, be taken forward in the final design scheme.

Table 7.29: Maximum design scenario considered for the assessment of potential cumulative effects on shipping and navigation.

[a] C=construction, O=operation and maintenance, D=decommissioning

Potential cumulative effect	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
Impact on recognised sea lanes essential to international navigation	✓	✓	✓	MDS as described for the Mona Offshore Wind Project (Table 7.16) assessed cumulatively with the following other projects/plans: **Tier 1** • Awel y Môr Offshore Wind Farm. **Tier 2** • Morgan Generation Assets • Morecambe Generation Assets • Morgan and Morecambe Transmission Assets • Mooir Vannin Offshore Wind Farm.	Outcome of the CEA will be greatest when the greatest number of other schemes are considered which result in the greatest impact on recognised sea lanes essential to international navigation.
Impact to commercial operators including strategic routes and lifeline ferries.	✓	✓	✓	MDS as described for the Mona Offshore Wind Project (Table 7.16) assessed cumulatively with the following other projects/plans: **Tier 1** • Awel y Môr Offshore Wind Farm. **Tier 2** • Morgan Generation Assets • Morecambe Generation Assets • Morgan and Morecambe Transmission Assets • Mooir Vannin Offshore Wind Farm.	Outcome of the CEA will be greatest when the greatest number of other schemes are considered which result in the greatest impact on commercial operator routes.
Impact to adverse weather routeing.	✓	✓	✓	MDS as described for the Mona Offshore Wind Project (Table 7.16) assessed cumulatively with the following other projects/plans: **Tier 1** • Awel y Môr Offshore Wind Farm.	Outcome of the CEA will be greatest when the greatest number of other schemes are considered which result in the greatest impact on adverse weather routeing.

Potential cumulative effect	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				Tier 2 • Morgan Generation Assets • Morecambe Generation Assets • Morgan and Morecambe Transmission Assets • Mooir Vannin Offshore Wind Farm.	
Impact on access to ports and harbours.	✓	✓	✓	MDS as described for the Mona Offshore Wind Project (Table 7.16) assessed cumulatively with the following other projects/plans: **Tier 1** • Awel y Môr Offshore Wind Farm. **Tier 2** • Morgan Generation Assets • Morecambe Generation Assets • Morgan and Morecambe Transmission Assets • Mooir Vannin Offshore Wind Farm.	Outcome of the CEA will be greatest when the greatest number of other schemes are considered which result in the greatest impact on access to ports and harbours.
Impact on emergency response capability due to increased incident rates and reduced access for SAR responders.	✓	✓	✓	MDS as described for the Mona Offshore Wind Project (Table 7.16) assessed cumulatively with the following other projects/plans: **Tier 1** • Awel y Môr Offshore Wind Farm. **Tier 2** • Morgan Generation Assets • Morecambe Generation Assets • Morgan and Morecambe Transmission Assets • Mooir Vannin Offshore Wind Farm.	Outcome of the CEA will be greatest when the greatest number of other schemes are considered which result in the greatest impact on emergency response capability.

Potential cumulative effect	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
Impact on vessel to vessel collision.	✓	✓	✓	MDS as described for the Mona Offshore Wind Project (Table 7.16) assessed cumulatively with the following other projects/plans: **Tier 1** • Awel y Môr Offshore Wind Farm. **Tier 2** • Morgan Generation Assets • Morecambe Generation Assets • Morgan and Morecambe Transmission Assets • Mooir Vannin Offshore Wind Farm.	Outcome of the CEA will be greatest when the greatest number of other schemes are considered which result in the greatest impact on collision risk.
Impact on allision (contact) risk to vessels.	✓	✓	✓	MDS as described for the Mona Offshore Wind Project (Table 7.16) assessed cumulatively with the following other projects/plans: **Tier 1** • Awel y Môr Offshore Wind Farm. **Tier 2** • Morgan Generation Assets • Morecambe Generation Assets • Morgan and Morecambe Transmission Assets • Mooir Vannin Offshore Wind Farm.	Outcome of the CEA will be greatest when the greatest number of other schemes are considered which result in the greatest impact on allision risk.
Impact on marine navigation, communications and position fixing.	✓	✓	✓	MDS as described for the Mona Offshore Wind Project (Table 7.16) assessed cumulatively with the following other projects/plans: **Tier 1** • Awel y Môr Offshore Wind Farm. **Tier 2** • Morgan Generation Assets	Outcome of the CEA will be greatest when the greatest number of other schemes are considered which result in the greatest impact on marine navigation, communications and position fixing equipment.

Potential cumulative effect	Phase[a]			Maximum Design Scenario	Justification
	C	O	D		
				• Morecambe Generation Assets • Morgan and Morecambe Transmission Assets • Mooir Vannin Offshore Wind Farm.	
Impact on recreational craft passages and safety.	✓	✓	✓	MDS as described for the Mona Offshore Wind Project (Table 7.16) assessed cumulatively with the following other projects/plans: **Tier 1** • Awel y Môr Offshore Wind Farm. **Tier 2** • Morgan Generation Assets • Morecambe Generation Assets • Morgan and Morecambe Transmission Assets • Mooir Vannin Offshore Wind Farm.	Outcome of the CEA will be greatest when the greatest number of other schemes are considered which result in the greatest impact on recreational craft.
Impact on snagging risk to vessel anchor and fishing gear.	✓	✓	✓	MDS as described for the Mona Offshore Wind Project (Table 7.16) assessed cumulatively with the following other projects/plans: **Tier 1** • Awel y Môr Offshore Wind Farm. **Tier 2** • Morgan Generation Assets • Morecambe Generation Assets • Morgan and Morecambe Transmission Assets • Mooir Vannin Offshore Wind Farm.	Outcome of the CEA will be greatest when the greatest number of other schemes are considered which result in the greatest impact on snagging of fishing gear or ship anchors.

7.11 Cumulative effects assessment

7.11.1 Overview

7.11.1.1 A description of the significance of cumulative effects upon shipping and navigation receptors arising from each identified cumulative impact is given below.

7.11.2 Impact on recognised sea lanes essential to international navigation

Construction phase

7.11.2.1 The construction of the Mona Offshore Wind Project, in combination with the construction or operation of the Awel y Môr Offshore Wind Farm and existing operational windfarms could have a cumulative impact on recognised sea lanes essential to international navigation.

7.11.2.2 Other Tier 2 cumulative projects have substantial spatial separation from the TSS with very few vessels intersecting them whilst navigating using the schemes. Therefore, there would be a negligible impact associated with them upon these sea lanes.

Magnitude of impact

7.11.2.3 The Mona Array Area and Awel y Môr/Gwynt y Môr array areas are located more than 7 nm apart with the Liverpool Bay TSS and its approaches located directly between them. Within this route, approximately 10,000 commercial ships would pass each year in addition to the potential for construction vessel movements associated with the offshore wind farms.

7.11.2.4 The majority of vessel traffic using the TSS passes directly east-west to the Off Skerries TSS or the wider Irish Sea and therefore passes clear of the wind farms. Vessel traffic approaching from the northwest can continue to do so having deviated to pass to the southwest of the Mona Array Area. Vessel traffic approaching from the anchorage to the east of Anglesey can continue to do so having deviated to pass to the northwest of the Awel y Môr array area.

7.11.2.5 The installation of the export cable would pass through the approaches to the TSS, but there is no anticipated cumulative impact above that of the Mona Offshore Wind Project in isolation.

7.11.2.6 The magnitude of the cumulative effect of Tier 1 and Tier 2 projects is similar to that of the Mona individual assessment and is considered to be **medium**.

Sensitivity of the receptor

7.11.2.7 Given that the presence of these projects does not prevent access into Liverpool through the TSS, it is considered that the requirements of safeguarding sea lanes essential to international navigation would not be breached.

7.11.2.8 The sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

7.11.2.9 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Operations and maintenance phase

7.11.2.10 During the operations and maintenance phase of the cumulative projects, large commercial ships would not transit through the array areas due to the proximity of structures and would be required to route around the array areas. The impact on vessel routeing would therefore be similar to the latter stages of construction where vessels are displaced by construction buoyage, safety zones and the presence of structures. Furthermore, during the operations and maintenance phase, mariners will be more familiar with the presence of the cumulative projects and able to make more effective routeing decisions. As a result, the cumulative impacts to recognised sea lanes essential to international navigation during operations and maintenance are not anticipated to be substantially different to those during construction.

7.11.2.11 Therefore, the magnitude of the cumulative impact is deemed to be **medium** and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Decommissioning phase

7.11.2.12 The cumulative impacts to recognised sea lanes essential to international navigation during decommissioning are not anticipated to be substantially different to those during construction. During both the construction and the decommissioning phases of the cumulative projects, large commercial ships will not be able to transit through the array areas, whether through the presence of decommissioning buoyage or structures and therefore the cumulative impact on vessel routeing will be the same. However, it should be noted that the cumulative impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.11.2.13 The magnitude of the cumulative impact is, therefore, deemed to be **medium** and the sensitivity of the receptor is considered to be **low**. The cumulative effect will be of **minor adverse** significance, which is not significant in EIA terms.

7.11.3 Impact to commercial operators including strategic routes and lifeline ferries

Construction phase

7.11.3.1 The construction of the Mona Offshore Wind Project, in combination with the construction and operation of the Awel y Môr Offshore Wind Farm, Morgan Generation Assets, Morecambe Generation Assets and Mooir Vannin Offshore Wind Farm has the potential for a cumulative impact to commercial operators including strategic routes and lifeline ferries (as described in NPS EN-3 Paragraph 2.8.328).

Magnitude of impact

7.11.3.2 During construction, vessel traffic would be displaced from the Mona Array Area and Tier 1 and Tier 2 projects due to the presence of construction buoyage and safety zones around fixed structures which are under construction. It is anticipated that mariners would also maintain a safe passing distance of at least 1 nm from navigational hazards.

7.11.3.3 The analysis of vessel routes in section 7.5 shows that several ferry and other commercial shipping routes would need to deviate around existing offshore wind farms and the cumulative project's array (see Table 7.18 and Table 7.19, and Figure 7.10and Figure 7.11 respectively). The revised passage plans were developed by the NASH project team, including master mariners, and account for existing decision-making

principles that were obtained during consultation with operators and during the navigation simulation sessions (for example, passing at least 1.5 nm from a wind turbine). The revised passage plans do not consider the presence of Mooir Vannin Offshore Wind Farm as the Scoping report had not been submitted at the time these were developed.

7.11.3.4 Each of the vessel routes presented in section 7.5 are potentially impacted by one or more array areas. Where vessel routes do not directly intersect the Mona Array Area but do intersect the Morgan Generation Assets and Morecambe Generation Assets Array Areas, they have been included within the cumulative assessment as there are cumulative impacts upon operators/ports with multiple routes. Furthermore, the presence of all cumulative projects will indirectly affect the master decision making and passage planning.

7.11.3.5 The Liverpool to Dublin route previously operated by P&O ceased operation in December 2023 and therefore there are no impacts to P&O routes or operations.

7.11.3.6 It was noted by stakeholders during the navigation simulations and hazard workshop undertaken to inform the Environmental Statement that the changes made to the boundaries of the Mona, Morgan and Morecambe Potential Array Areas had reduced the impact to ferry routes by increasing the sea room between each development.

7.11.3.7 The construction activities will be managed through adopted risk controls listed in Table 7.17, specifically:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the construction area
- Marking and charting of the Mona Array Area on nautical charts to facilitate safe passage planning
- Vessel Traffic Management Plan to manage vessel safety and reduce potential impacts in accordance with the Outline Vessel Traffic Management Plan (Document Reference J14).

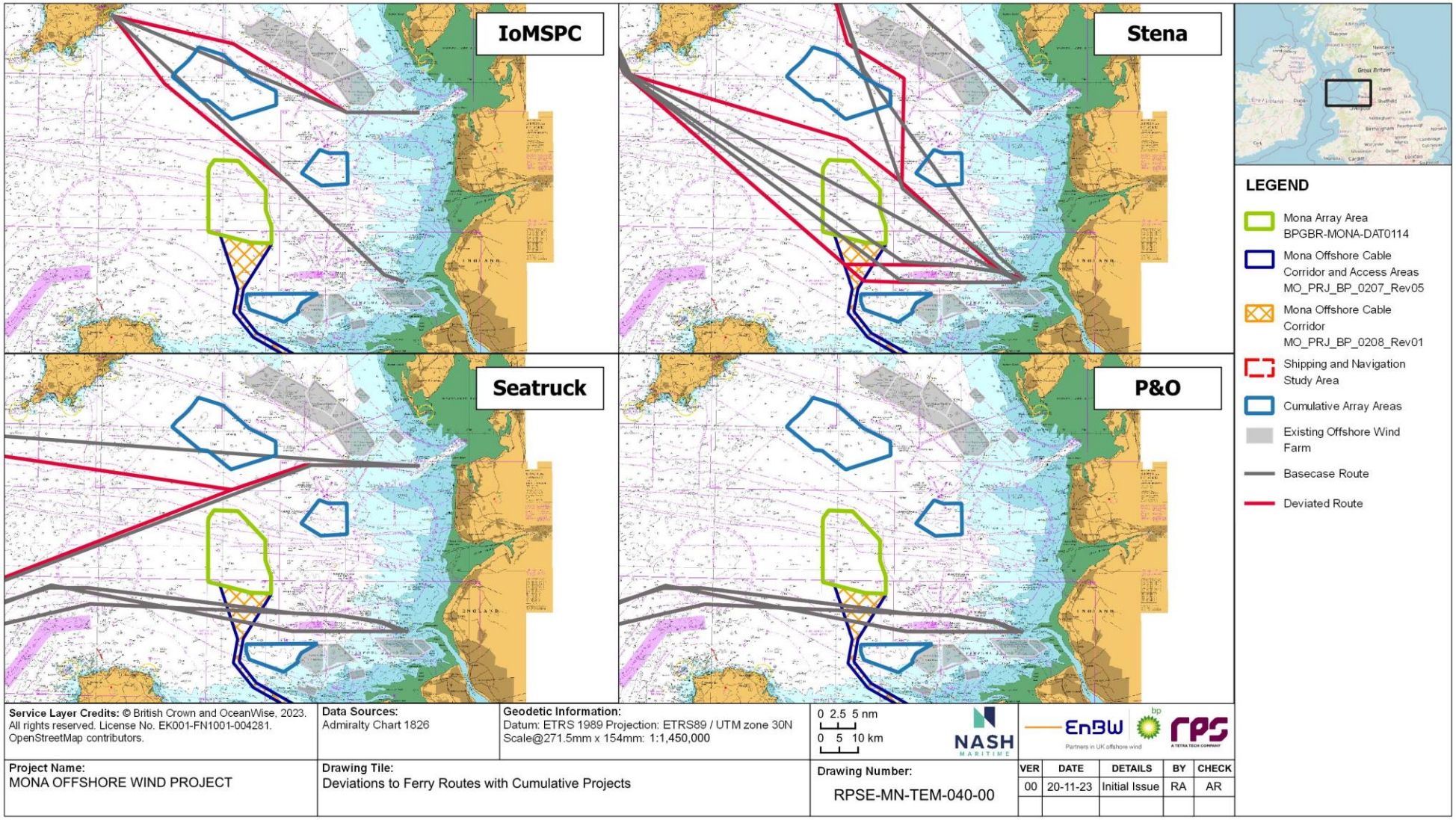

Figure 7.10: Deviations to ferry routes with cumulative projects (excluding the Mooir Vannin Offshore Wind Farm).

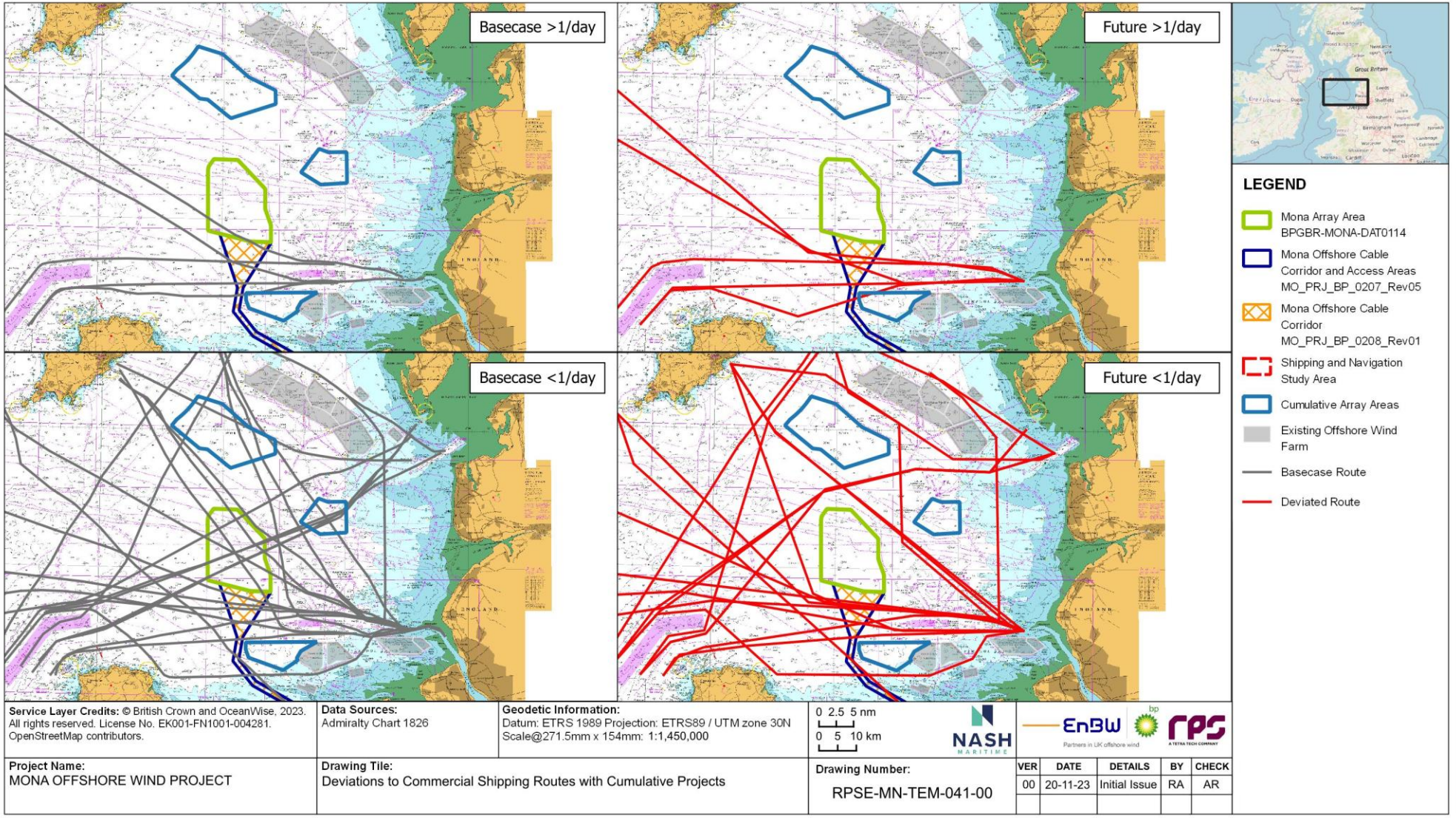

Figure 7.11: Deviations to commercial shipping routes with cumulative projects (excluding Mooir Vannin Offshore Wind Farm).

Table 7.30: Impact on ferry routeing with Tier 1 and Tier 2 cumulative projects (excluding Mooir Vannin Offshore Wind Farm).

Operators	Routes	Example Vessels	Approximate Annual Crossings (2022)	Baseline Distance (nm)	Baseline Time (Minutes)	Service Speed (Knots)	Project Distance (nm)	Additional Project Distance (nm)	Additional Project Time (Minutes)
IoMSPC	HEY - DOUG	Arrow	107	46.8	225	13.2	47.3	+0.5	+2.1
		Ben My Chree	1,275			17.2			+1.6
		Manannan	69			28.8			+1.0
	LIV - DOUG	Manannan	590	56.9	165	28.8	57.2	+0.3	+0.5
		Ben My Chree	3			17.2			+0.8
Stena	LIV - BEL W of IOM & No TSS	Stena Edda/Stena Embla/Stena Estrid/Stena Horizon/Stena Lagan/Stena Mersey/Stena Forecaster/Stena Forerunner/Stena Foreteller	1,098	113.3	480	18.7	114.7	+1.4	+4.5
	LIV - BEL W of IOM & East TSS		226	115.9			117.1	+1.2	+3.9
	LIV - BEL W of IOM & West TSS		166	115.2			117.3	+2.1	+6.8
	LIV - BEL E of IOM (E of Calder)		196	113.9			118.9	+5.0	+16.0
	LIV - BEL E of IOM (W of Calder)		194	114.9			118.9	+4.0	+12.7
	HEY – BEL (E of IOM)	Stena Hibernia/Stena Scotia	1,094	*No Change*					
Seatruck	HEY - WAR	Seatruck Performance/Seatruck Precision	1,099*	100.3	480	15.4	101.4	+1.1	+4.3
	HEY - DUB	Seatruck Pace/Seatruck Panorama	606**	109.3	480	15.0	109.4	+0.1	+0.3
	LIV - DUB	Clipper Pennant/Seatruck Pace/Seatruck Power Clipper (Seatruck) Progress Seatruck Panorama (2019 Only)	2,091	*No Change*					
P&O	LIV - DUB	Mistral/Norbank/Norbay	1,162						

Table 7.31: Increase in distance for impacted cargo/tanker routes with Tier 1 and Tier 2 cumulative projects (excluding Mooir Vannin Offshore Wind Farm).

Route	Approximate Annual Crossings (2022)	Baseline Distance (nm)	Deviated Distance	Additional Deviated Distance (nm)	Total Additional Distance/Year (nm)
Off Skerries TSS to Heysham (east)	23	59.9	64.7	4.8	110.4
Barrow (E) to Off Skerries TSS	4	72.7	73.9	1.2	4.8
Heysham to Off Skerries TSS (west)	7	62.0	64.9	2.9	20.3
Liverpool Bay TSS to W IoM (west)	533	67.6	69.7	2.1	1,119.3
Liverpool to E IoM - west	10	83.6	87.1	3.5	35
Liverpool to E IoM - central	54	77.3	78.0	0.7	37.8
Liverpool to E IoM - east	14	75.9	78.0	2.1	29.4
Douglas to Heysham	6	45.4	46.1	0.7	4.2
Liverpool to west IoM	153	66.3	69.0	2.7	413.1
Douglas to Liverpool Bay TSS (east)	9	67.4	73.9	6.5	58.5
Off Skerries TSS to Solway Firth	42	73.2	74.3	1.1	46.2
Douglas to Liverpool Bay TSS	8	59.8	60.2	0.4	3.2
Liverpool Bay TSS to Northern Irish Sea (W)	55	65.2	65.9	0.7	38.5
Douglas to Liverpool	6	58.9	58.3	-0.6	-3.6

Isle of Man Steam Packet Company

7.11.3.8 The IoMSPC route between Douglas and Liverpool with approximately 625 movements per year would need to deviate to the east of the Mona Array Area and to the west of the Morgan Generation Assets Array Area. The additional distance and service speed for the Manannan would result in approximately 0.3 nm/0.5 minutes of additional transit time.

7.11.3.9 The IoMSPC route between Heysham and Douglas with approximately 1,300 movements per year would need to deviate around the Morgan Generation Assets Array Area and pass west of the Walney Offshore Wind Farm. The additional distance and service speed would result in approximately 0.5 nm/1.6 minutes of additional transit time.

7.11.3.10 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), the

IoMSPC Heysham to Douglas would be further affected. The Heysham to Douglas route would be further constrained when passing between the Morgan Generation Assets Array Area and the boundary of Mooir Vannin Offshore Wind Farm, due to the narrow width which may cause congestion and a reduction in speed.

7.11.3.11 As daily services of IoMSPC ferries would be impacted, the magnitude is therefore, considered to be **high**.

Stena Line

7.11.3.12 The Stena route between Liverpool and Belfast to the west of the Isle of Man with approximately 1,500 movements per year directly intersects the Mona Array Area. A revised passage plan was developed which assumed these vessels would navigate between the Morecambe Generation Assets Array Area and the Mona Array Area, pass between the Mona and Morgan Generation Assets Array Areas and alter course to pass to the southwest of the Isle of Man. The additional distance and service speed would result in approximately 1.4 nm/4.5 minutes of additional transit time.

7.11.3.13 The Stena route between Liverpool and Belfast to the east of the Isle of Man with approximately 350 movements per year intersects the Morecambe and Morgan Generation Assets Array Areas. The revised passage plan passes to the west of the Morecambe Generation Assets Array Area, before turning north and then west between the Morgan Generation Assets Array Area and Walney Offshore Wind Farm. The additional distance and service speed would result in approximately 4 nm to 5 nm/13 to 16 minutes of additional transit time dependent on which route through the Morecambe gas field was taken.

7.11.3.14 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), the Stena Liverpool to Belfast (east of the Isle of Man) would be further affected. The Stena route would necessarily deviate further northeast to pass between the Walney Extension and the boundary of Mooir Vannin Offshore Wind Farm. This could increase journey times by a further 20 minutes in addition to the aforementioned 13 to 16 minutes caused by the Mona Array Area, Morecambe Generation Assets Array Area and Morgan Generation Assets Array Area.

7.11.3.15 As daily services of Stena Line ferries would be impacted, the magnitude is therefore, considered to be **high**.

Seatruck Ferries

7.11.3.16 The Seatruck route between Heysham and Warrenpoint with approximately 1,100 movements per year passes through the south boundary of the Morgan Generation Assets Array Area. Vessels would depart Heysham as they currently do, passing north of the South Morecambe Gas Field but deviating southwest to pass between the Mona and Morgan Generation Assets Array Areas before turning westward towards Carlingford Lough. This would necessitate an additional 1.1 nm/4.3 minutes of steaming time per trip.

7.11.3.17 The Seatruck route between Heysham and Dublin with approximately 600 movements per year passes through the north boundary of the Mona Array Area. Vessels would depart Heysham as they currently do, passing north of the South Morecambe Gas Field but deviating to pass between the Mona and Morgan Generation Assets Array Areas, before turning southwest towards Dublin. This would necessitate an additional 0.1 nm/0.3 minutes of steaming time per trip.

7.11.3.18 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), there would be no direct impact on these routes.

7.11.3.19 As daily services of Seatruck Ferries would be impacted, the magnitude is therefore, considered to be **high**.

Commercial cargo/tanker operators

7.11.3.20 One cargo/tanker route with more than one movement per day would be directly impacted by the Mona Array Area, namely through the Liverpool Bay TSS to the northwest. The required deviation to pass clear of the Mona Array Area is approximately 2 nm and is unaffected by the cumulative projects.

7.11.3.21 A further 13 cargo/tanker shipping routes were identified which would be deviated around the cumulative projects, including routes into Douglas, Heysham and Barrow. The majority of these minor routes have less than one vessel transit per week but have relatively greater deviations.

7.11.3.22 The most impacted route is between Off Skerries TSS and Heysham with an additional 4.8 nm of steaming above 72.7 nm. However, less than one vessel per month utilises this route. The majority of other deviated routes have relatively few transits and are anticipated to pass between the Mona and Morgan Generation Assets Array Areas or deviate to the southwest of Mona Array Area. Some routes have minor reductions in distance where deviated routes are more direct than are currently taken. This necessitates greater course changes to pass between the array areas, or in some cases, necessitates not utilising the Liverpool Bay TSS when previously this would have been used.

7.11.3.23 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), some commercial routes would be further affected. In particular, a cumulative impact on the Silver River regular trade between Ramsey and Glasson would be experienced by the presence of the Mooir Vannin Offshore Wind Farm which would be similar to that in isolation.

7.11.3.24 As daily services of strategically important routes would be impacted, the magnitude is therefore, considered to be **high**.

Sensitivity of the receptor

Isle of Man Steam Packet Company

7.11.3.25 The IoMSPC route between Douglas and Liverpool with approximately 625 movements per year will require thirty seconds of additional transit duration. On a three hour service, which has greater existing variation in transit duration and turn around time, this is not anticipated to impose significant operational impacts.

7.11.3.26 The IoMSPC route between Douglas and Heysham with approximately 1,300 movements per year will require less than two minutes of additional transit duration. On a four hour service, which has greater existing variation in transit duration and turn around time, this is not anticipated to impose significant operational impacts.

7.11.3.27 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), the Douglas to Heysham route would have a further minor increase in delays.

7.11.3.28 The sensitivity of this receptor is therefore, considered to be **low**. It is, however, recognised that any additional transit time will necessitate additional fuel cost, emissions and potential operating constraints on the operators.

Stena Line

7.11.3.29 The Stena route between Liverpool and Belfast to the west of the Isle of Man with approximately 1,500 movements per year would necessitate an additional 4.5 minutes of steaming time per trip. The route to the east of the Isle of Man would necessitate between a 13 and 16 minutes increase in steaming time per trip. On an eight hour service, which has greater existing variation in transit duration and turn around time, this is not anticipated to impose significant operational impacts.

7.11.3.30 With the addition of Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Scoping Report see Mooir Vannin Offshore Wind Limited, 2023), the additional transit time for the Stena Line route east of the Isle of Man could make such a route unviable and all future Stena traffic may need to pass west of the Isle of Man, posing a greater operational constraint. Similarly, the narrow width of the route between the Morgan Generation Assets Array Area and Mooir Vannin Offshore Wind Farm could cause delays as vessels must slow down to avoid other traffic more regularly.

7.11.3.31 The sensitivity of this receptor is therefore, considered to be **medium**.

Seatruck Ferries

7.11.3.32 The Seatruck routes between Heysham and Dublin and Heysham and Warrenpoint will require an additional 0.3 and 4.3 minutes of steaming time per trip respectively. On an eight hour service, which has greater existing variation in transit duration and turn around time, this is not anticipated to impose significant operational impacts.

7.11.3.33 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), there would be no direct impact on these routes.

7.11.3.34 The sensitivity of this receptor is therefore, considered to be **low**. It is, however, recognised that any additional transit time will necessitate additional fuel cost, emissions and potential operating constraints on the operators.

Commercial cargo/tanker operators

7.11.3.35 For cargo/tanker routes, the principal routes with more than one vessel transit per day would need approximately 2 nm of deviation to pass clear of the Mona Array Area and would be unaffected by the addition of the Tier 1 and Tier 2 projects. This increase is minor considering the length of journeys taken by cargo/tanker vessels between international ports which are likely to be hundreds or thousands of miles. It is, therefore, not anticipated to have any material impact upon the viability of these routes into Liverpool.

7.11.3.36 The majority of minor routes have less than one vessel transit per week but would require greater deviations to their routes. The route which has the most impacted are between the Off Skerries TSS and Heysham (4.8 nm). Given the length of the journeys and the speed of transit, this is not anticipated to have any significant impacts upon the viability of these routes.

7.11.3.37 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report),

there would be a direct impact on the MV Silver River route between Ramsey and Glasson that may necessitate potentially significant deviations around the Mooir Vannin Offshore Wind Farm. Given the constraints on both Ramsey and Glasson and the additional distance this may cause more significant operational challenges. Furthermore, routes used by small coastal traffic to the east of the Isle of Man could have substantial additional deviations.

7.11.3.38 Given the accumulation of impacts and deviations to multiple routes and the loss of the viability of some route options, the sensitivity of the receptor is considered to be **medium**.

Significance of the effect

7.11.3.39 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.32: Magnitude, sensitivity and impact significance relating to cumulative impact to commercial operators including strategic routes and lifeline ferries during construction of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.
Stena Line	High	Medium	Moderate which is significant in EIA terms. A moderate rather than major effect has been determined given the optionality to route west of the Isle of Man.
Seatruck Ferries	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.
Commercial cargo/tanker	High	Medium	Moderate which is significant in EIA terms. A moderate rather than major effect has been determined given that the principal shipping routes within the Irish Sea are not significantly affected.

7.11.3.40 Following the identification of significant effects on commercial operators including strategic routes and lifeline ferries within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.3.41 As the predicted moderate impact results from the addition of Mooir Vannin OWF, no further mitigation is proposed by the Applicant. It is noted in Mooir Vannin Offshore Wind Farm Limited (2023) that the Shipping and Navigation impact assessment will be undertaken in line with the MCA MGN654 and its ‘Methodology for Assessing Marine

Navigational Safety and Emergency Response Risks'. It is therefore assumed that, in line with accepted EIA practice, that potential cumulative impacts will be considered by Mooir Vannin Offshore Wind Farm in its assessment and through the planning process.

Operations and maintenance phase

7.11.3.42 During the operations and maintenance phase of the cumulative projects, large commercial ships would not transit through the array areas due to the proximity of structures and would be required to route around the array areas. The impact on vessel routeing would therefore be similar to the latter stages of construction where vessels are displaced by construction buoyage, safety zones and the presence of structures. The operations and maintenance phase would be longer than other phases at up to 35 years compared to up to four years for the construction phase. During operations and maintenance, there would be far less Mona Offshore Wind Project vessels operating within and around the Mona Array Area interacting with other passing vessels. As a result, the cumulative impacts to commercial operators including strategic routes and lifeline ferries during operations and maintenance are not anticipated to be substantially different to those during construction.

7.11.3.43 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.33: Magnitude, sensitivity and impact significance relating to cumulative impact to commercial operators including strategic routes and lifeline ferries during operations and maintenance of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.
Stena Line	High	Medium	Moderate which is significant in EIA terms. A moderate rather than major effect has been determined given the optionality to route west of the Isle of Man.
Seatruck Ferries	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.
Commercial cargo/tanker	High	Medium	Moderate which is significant in EIA terms. A moderate rather than major effect has been determined given that the principal shipping routes within the Irish Sea are not significantly affected.

7.11.3.44 Following the identification of significant effects on commercial operators including strategic routes and lifeline ferries within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area

and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.3.45 As the predicted moderate impact results from the addition of Mooir Vannin OWF, no further mitigation is proposed by the Applicant. It is noted in Mooir Vannin Offshore Wind Farm Limited (2023) that the Shipping and Navigation impact assessment will be undertaken in line with the MCA MGN654 and its 'Methodology for Assessing Marine Navigational Safety and Emergency Response Risks'. It is therefore assumed that, in line with accepted EIA practice, that potential cumulative impacts will be considered by Mooir Vannin Offshore Wind Farm in its assessment and through the planning process.

Decommissioning phase

7.11.3.46 The cumulative impacts to commercial operators including strategic routes and lifeline ferries during decommissioning are not anticipated to be substantially different to those during construction. During both the construction and the decommissioning phases of the cumulative projects, large commercial ships will not be able to transit through the array areas, whether through the presence of decommissioning buoyage or structures. The cumulative impact on vessel routeing will, therefore, be the same. However, it should be noted that the cumulative impacts will reduce as decommissioning progresses and the number of structures within the Mona Array Area reduces.

7.11.3.47 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.34: Magnitude, sensitivity and impact significance relating to cumulative impact to commercial operators including strategic routes and lifeline ferries during decommissioning of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.
Stena Line	High	Medium	Moderate which is significant in EIA terms. A moderate rather than major effect has been determined given the optionality to route west of the Isle of Man.
Seatruck Ferries	High	Low	Minor which is not significant in EIA terms. A minor rather than moderate effect has been determined given the minimal increase in journey times which are within the existing natural variation of operator schedules.
Commercial cargo/tanker	High	Medium	Moderate which is significant in EIA terms. A moderate rather than major effect has been determined given that the principal shipping routes within the Irish Sea are not significantly affected.

7.11.3.48 Following the identification of significant effects on commercial operators including strategic routes and lifeline ferries within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.3.49 As the predicted moderate impact results from the addition of Mooir Vannin OWF, no further mitigation is proposed by the Applicant. It is noted in Mooir Vannin Offshore Wind Farm Limited (2023) that the Shipping and Navigation impact assessment will be undertaken in line with the MCA MGN654 and its 'Methodology for Assessing Marine Navigational Safety and Emergency Response Risks'. It is therefore assumed that, in line with accepted EIA practice, that potential cumulative impacts will be considered by Mooir Vannin Offshore Wind Farm in its assessment and through the planning process.

7.11.4 Impact on adverse weather routeing

Construction phase

7.11.4.1 The construction of the Mona Offshore Wind Project, in combination with the construction or operation of the Awel y Môr Offshore Wind Farm, Morgan Generation Assets, Morecambe Generation Assets and Mooir Vannin Offshore Wind Farm has a potential cumulative impact on adverse weather routes. During significant wind and wave conditions, it can be hazardous for ferries to navigate beam on to the prevailing conditions, which can cause excessive roll that may result in cargo shift or injuries to passengers.

7.11.4.2 Where significant adverse weather is encountered, standard operating practices would be for the master to advise passengers to remain seated and for vessels to take less direct routes to take advantage of lees from land masses, avoid dangerous sea states or minimise the motions onboard. The navigation simulations (see Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement) demonstrated that without being able to adequately weather route, excessive roll was experienced that reduced control and would be both uncomfortable or dangerous to passengers and cargo.

7.11.4.3 This impact within the shipping and navigation chapter of the Environmental Statement has been limited to the impact on the ferry route. Ferry services in the shipping and navigation study area are important for facilitating trade, tourism and other important functions. In particular, consultees emphasised that services between the Isle of Man and the UK are lifeline services which carry food, medical supplies and goods which are crucial in a just-in-time economy. The socio-economics approach for considering potential impacts of the Mona Offshore Wind Project on the IoM is set out within Volume 4, Chapter 3: Socio-economics chapter of the Environmental Statement.

Magnitude of impact

7.11.4.4 During construction, vessel traffic would be displaced from the Mona Array Area and Tier 1 and Tier 2 projects due to the presence of construction buoyage and safety zones around fixed structures which are under construction. It is anticipated that mariners would also maintain safe passing distance of at least 1 nm from navigational hazards, likely greater in adverse weather.

7.11.4.5 Where vessel routes do not directly intersect the Mona Array Area but do intersect the Morgan or Morecambe Generation Assets Array Areas, they have been included within

the cumulative assessment as there are cumulative impacts upon operators/ports with multiple routes. Furthermore, the presence of all cumulative projects will indirectly affect the master decision making and passage planning.

7.11.4.6 During adverse weather, some sailings are delayed or inevitably cancelled irrespective of the presence of the cumulative projects. However, with the presence of the cumulative projects, where sailings are safe to take place, they may be required to route a greater distance and duration. Over the course of a day, the accumulation of these delays could result in the potential for additional sailings to be cancelled where constraints such as hours of rest are exceeded. Such effects are already experienced by operators, but the presence of the cumulative projects may exacerbate this.

7.11.4.7 During consultation and navigational simulations, the conditions in which adverse weather routes would be taken, or services cancelled, was shown to be dependent on many different factors including route, vessel, wind/wave directions, wind speed and wave height. Figure 7.12 shows that several adverse weather routes either intersect or pass immediately adjacent to the cumulative projects.

7.11.4.8 The construction activities will be managed through adopted risk controls listed in Table 7.17:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the construction area
- Marking and charting of the Mona Array Area on nautical charts to facilitate safe passage planning
- Vessel Traffic Management Plan to manage vessel safety and reduce potential impacts in accordance with the Outline Vessel Traffic Management Plan (Document Reference J14).

Table 7.35: Impact on ferry routeing in adverse weather with Tier 1 and Tier 2 cumulative projects (excluding Mooir Vannin Offshore Wind Farm).

Operator	Route	Example Vessels (2019 to 2022)	Approximate Annual Crossings Effected	Baseline Distance (nm)	Baseline Time (Minutes)	Total Delay Basecase (Minutes)	Future case Distance (nm)	Additional Project Delays on Basecase (Minutes)	Total Delay with Projects Will be at Least (Minutes)
IoMSPC	HEY – DOUG	Ben-my-Chree	17-21	50.1	225	+10 to +23	56.4	+24	+34 to +47
	LIV – DOUG	Manannan	31-34	61.2	165	+10 to +33	66.6	+13	+23 to +46
Stena Line	LIV – BEL W	Stena Edda Stena Embla Stena Mersey	15-20	121.2	480	+20 to +60	121.2	+0	+20 to +60
	LIV – BEL E (W of Calder)	Stena Horizon Stena Lagan Stena Forecaster Stena Forerunner	8-13	114.0	480	+0 to +30	134.8	+70	+70 to +100
	HEY – BEL	Stena Hibernia Stena Scotia	24-69	106.9	480	+40 to +70	123.8	+63	+103 to +133
Seatruck	HEY – WAR	Seatruck Performance Seatruck Precision	38-44	102.0	480	+27	102.2	+1	+28
	HEY – DUB	Seatruck Pace Seatruck Panorama	25-27	110.8	480	+28	110.8	+0	+28

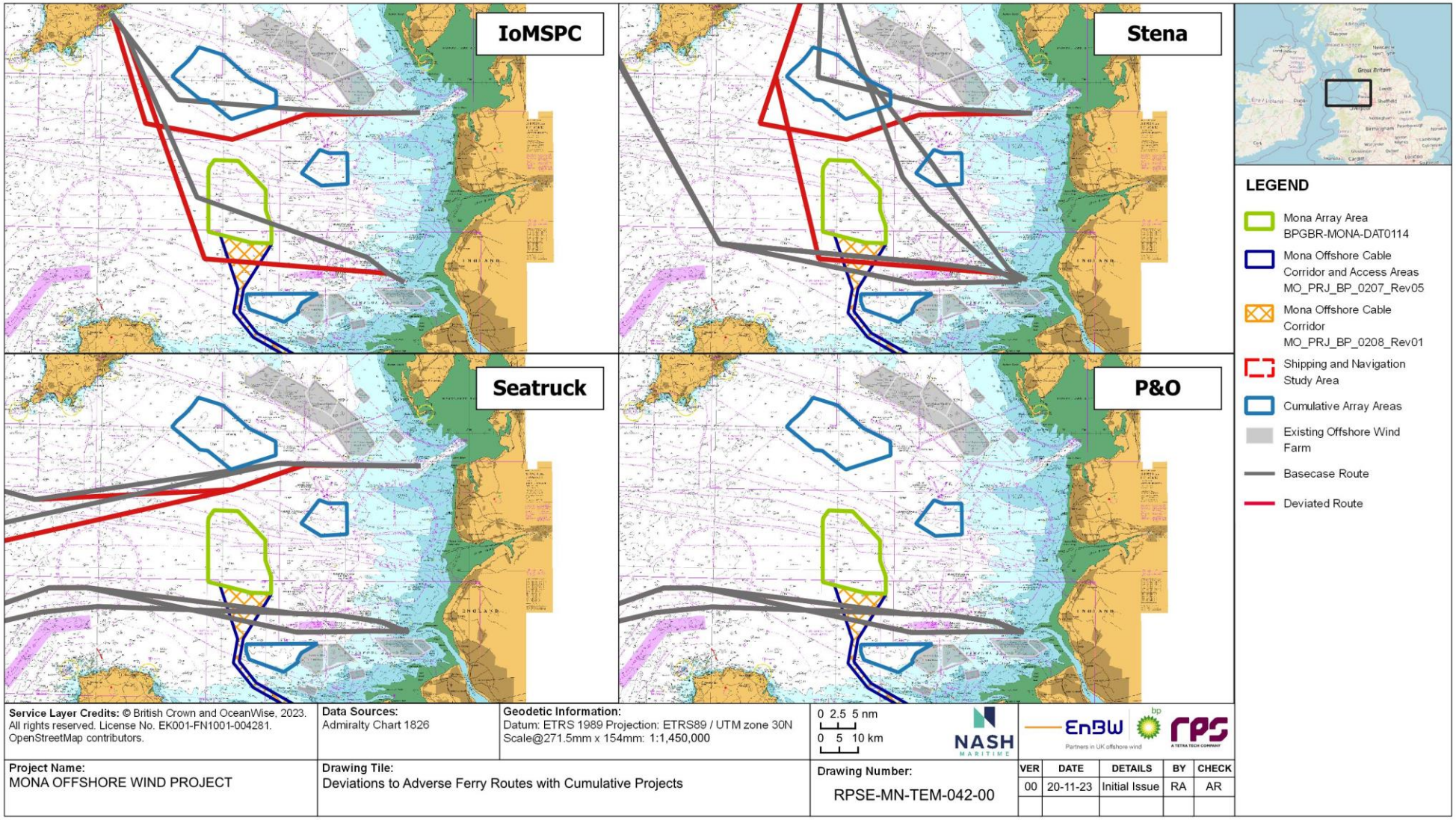

Figure 7.12: Deviations to adverse ferry routes with cumulative projects (excluding Mooir Vannin Offshore Wind Farm).

Isle of Man Steam Packet Company

7.11.4.9 During the navigation simulations, it was determined that the IoMSPC service between Liverpool and Douglas (Manannan) would be impacted at between 2.0 m and 2.5 m H_s. This equates to greater than a Force 5 occurring approximately fortnightly. Based on a review of AIS data for 2022, it was estimated that the Manannan makes significant adverse weather routeing on at least 30 occasions per year of a total of 600 crossings. However, it was noted that the Manannan would more likely reduce speed before choosing to weather route. The Manannan is restricted to sailing in conditions where the significant wave height is less than 3.5 m as it is more susceptible to weather than other vessel designs.

7.11.4.10 The IoMSPC service between Heysham and Douglas (Ben My Chree) would be impacted at a significant wave height of between 2.5 m and 3.0 m. This equates to greater than a Force 6 occurring at least monthly in summer and winter. Based on a review of AIS data for 2022, it was estimated that the Ben My Chree makes significant adverse weather routeing on at least 20 occasions per year of a total of 1,300 crossings.

7.11.4.11 It was noted that masters may be more precautionary in weather routeing and less likely to choose to route either east of the Mona Array Area or between the Morgan Generation Assets Array Area and the Walney offshore wind farms as they would have reduced optionality should conditions deteriorate and they need to turn towards the southwest to minimise the motion of the vessel. Therefore, the presence of the cumulative projects could increase the number of occasions during which adverse weather routes are taken.

7.11.4.12 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), the sea room available for transit east of the Morgan Generation Assets Array Area would be substantially reduced. Therefore, it is likely that the metocean thresholds for which masters would navigate this route would be further reduced and a greater number of adverse weather passages would be taken with the inclusion of the Mooir Vannin Offshore Wind Farm.

7.11.4.13 Given that the adverse weather routeing of a ferry service is anticipated to be impacted infrequently, but multiple times per year, the magnitude is considered to be **medium**.

Stena Line

7.11.4.14 During the navigation simulations, it was determined that the Stena route between Liverpool and Belfast would be impacted at 3.0 m H_s. This equates to greater than a Force 7 occurring at least monthly in winter. Based on a review of AIS data for 2022, it was estimated that Stena ferries make significant adverse weather routeing on at least 20 occasions per year of a total of 1,500 crossings.

7.11.4.15 The Stena route between Heysham and Belfast would be impacted at 3.0 m H_s. This equates to greater than a Force 7 occurring at least monthly in winter. Based on a review of AIS data for 2022, it was estimated that Stena ferries make significant adverse weather routeing on at least 50 occasions per year of a total of 1,100 crossings.

7.11.4.16 It was noted that masters may be more precautionary in weather routeing and less likely to choose to route either east of the Mona Array Area or between the Morgan Generation Assets Array Area and the Walney offshore wind farms as they would have reduced optionality should conditions deteriorate and they need to turn towards the

southwest to minimise the motion of the vessel. Therefore, the presence of the cumulative projects could increase the number of occasions during which adverse weather routes are taken.

7.11.4.17 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), it is likely that the route east of the Isle of Man used by both the Heysham to Belfast and Liverpool to Belfast routes would no longer be realistic. In particular, this would require multiple, substantial alterations of course and constrained passages when passing around the Mooir Vannin Offshore Wind Farm.

7.11.4.18 Given that the adverse weather routeing of a ferry service is anticipated to be impacted infrequently, but multiple times per year, the magnitude is considered to be **medium**.

Seatruck Ferries

7.11.4.19 The Seatruck routes between Heysham and Ireland exhibit adverse weather routeing further west and therefore the impact on their routes is not dissimilar between the normal conditions and adverse conditions in proximity of the cumulative projects. The most extreme passage plans to the southwest provided by Seatruck would necessitate a deviation to the north around the Mona Array Area, but relatively few transits were identified taking these routes in either 2019 or 2022.

7.11.4.20 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), there would be no additional direct impact on these routes.

7.11.4.21 Given that the adverse weather routeing of a ferry service is anticipated to be impacted rarely, the magnitude is considered to be **low**.

Commercial cargo/tanker operators

7.11.4.22 Analysis of cargo/tanker vessel traffic in adverse weather events did not identify any appreciable changes in vessel routes. During Met Office named storm events, with gale/storm force winds, there was a greater use of the anchorage to the east of Anglesey.

7.11.4.23 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), the relatively few cargo/tanker vessels passing to the east of the Isle of Man will be more restricted in marginal weather conditions due to the reduced sea room between the Morgan Array Area and Mooir Vannin Offshore Wind Farm.

7.11.4.24 The magnitude of the receptor is therefore, considered to be **low**.

Sensitivity of the receptor

7.11.4.25 Figure 7.12 shows anticipated adverse weather routeing with and without the cumulative projects. The 2022 AIS data has been used to estimate the cumulative impact on vessel routes in adverse weather. Each revised passage plan was developed by the NASH project team, including master mariners. These passage plans are based on existing passage plans provided by operators during consultation (such as passing at least 1.5 nm from a wind turbine) and informed by the results of the navigation simulation sessions (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement).

7.11.4.26 During the most severe weather, some services may be cancelled, irrespective of the cumulative projects. However, on some occasions the existing delays due to

deviations in adverse weather may result in sailings to be cancelled where hours of rest or schedule constraints are exceeded.

7.11.4.27 During adverse weather, cargo shift as a result of reduced optionality on vessel heading could cause minor injuries and property damage.

Isle of Man Steam Packet Company

7.11.4.28 The 2022 AIS data shows that the IoMSPC Liverpool to Douglas adverse weather routeing accounts for an additional 10 to 33 minutes of journey time, on a 165 minute journey. These transits tend to trend to the southwest of their typical passage plans and therefore it has been assumed that vessels would pass to the south and west of the Mona Array Area. This would lead to a further increase in transit times of 13 minutes, giving a total delay of at least 23 minutes when compared to the normal route. This cumulative impact would be the same as it is for the individual Mona Offshore Wind Project assessment, however, masters may more regularly choose this route than to pass between the Mona, Morgan and Morecambe Array Areas.

7.11.4.29 The 2022 AIS data shows that the IoMSPC Heysham to Douglas adverse weather routeing accounts for an additional 10 to 23 minutes of journey time. Whilst the route between the Walney offshore wind farm and Morgan Generation Assets Array Areas is wider than that assessed during the PEIR, there remains a weather threshold on safe transit and therefore masters would choose to pass between the Mona and Morgan Generation Assets Array Areas, before transiting to the west of the Morgan Generation Assets Array Area. This would lead to a further increase in transit time of 24 minutes, giving a total delay of at least 34 minutes when compared to the normal route.

7.11.4.30 Constraints on manning levels are likely to be far greater for the IoMSPC than other operators as have a single bridge team who do not live aboard the vessel. The Maritime Labour Conventions sets out requirements for minimum hours of rest and existing schedules and crew rosters are designed around these requirements. Existing deviations, in combination with the additional deviations due to the cumulative projects would accumulate for each sailing during a prolonged period of adverse weather. Due to the complexity of operator schedules and the interrelationship between metocean conditions and operational impacts the effects of this would vary each day, but it is credible that services could be cancelled more frequently.

7.11.4.31 With the addition of Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Scoping report), there are additional impacts on the IoMSPC route between Heysham and Douglas. The width between the Scoping boundary of Mooir Vannin Offshore Wind Farm and the Morgan Generation Assets Array Area is 2.5 nm which is deemed to be insufficient for safe navigation in adverse weather. This would likely require more frequent adverse weather routeing than just with the presence of the Morgan Generation Assets Array Area which could exacerbate operational impacts such as delays and cancellations.

7.11.4.32 On the basis that some services of a ferry could be cancelled more frequently, the sensitivity of the receptor is therefore, considered to be **medium**.

Stena Line

7.11.4.33 Crews operating the Stena Heysham to Belfast route may choose not to transit between Barrow and the West of Duddon Sands offshore wind farm and instead pass to the west of the offshore wind farm. Within the 2022 data, vessels choosing to take this route incurred an additional 40 to 70 minutes of transit time. With the cumulative

array areas in place, (and should the route between Morgan Generation Assets Array Area and Walney array area be deemed unnavigable in adverse weather) vessels would pass to the west of the Morgan Generation Assets Array Area before proceeding north (to the east of the Isle of Man). This is estimated to incur a further increase in transit times of 63 minutes, giving a total delay of at least 103 minutes when compared with the normal route. Alternatively, vessels may elect to continue further west and pass to the west of the Isle of Man.

7.11.4.34 Stena's Liverpool to Belfast adverse weather routes tend to trend to the southwest of their typical passage plans, towards the prevailing conditions. Within the 2022 data, this accounted for an additional 15 to 20 minutes of transit time. The footprint of the Mona Array Area is clear of the key adverse weather routes taken by Stena Line, however, the presence of the Projects may require Stena Line to more frequently take this adverse weather route, increasing journey times. Whilst distances are provided in Table 7.35 for increased transit distance for an east of Isle of Man route, the reduced sea room and frequent course changes may make this unattractive.

7.11.4.35 With the addition of Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Scoping report), there are additional impacts on the Stena route between Liverpool and Belfast. The width between the Scoping boundary of Mooir Vannin Offshore Wind Farm and the Morgan Generation Assets Array Area is 2.5 nm which is deemed to be insufficient for safe navigation in adverse weather. This would likely require more frequent adverse weather routeing than just with the presence of the Morgan Generation Assets Array Area. Similarly, where Stena Line vessels choose to navigate east of the Isle of Man in adverse weather, the additional distance as a result of the presence of Mooir Vannin Offshore Wind Farm could make this adverse weather route unviable.

7.11.4.36 The sensitivity of this receptor is therefore, considered to be **medium**.

Seatruck Ferries

7.11.4.37 The presence of the both the Mona and Morgan Generation Assets Array Areas constrains the weather routeing optionality for Seatruck ferries operating to and from Heysham. However, there is minimal deviation from typical routes in these areas.

7.11.4.38 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), there would be no additional direct impact on these routes.

7.11.4.39 As the majority of Seatruck adverse weather routes are clear of the cumulative projects, the sensitivity is considered to be **low**.

Commercial cargo/tanker operators

7.11.4.40 With the addition of Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Scoping report), there are additional impacts on cargo/tanker routes. The width between the Scoping boundary of Mooir Vannin Offshore Wind Farm and the Morgan Generation Assets Array Area is 2.5 nm which is deemed to be insufficient for safe navigation in adverse weather. This would likely require more frequent adverse weather routeing than with other Tier 1 and Tier 2 projects.

7.11.4.41 With the addition of the Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Offshore Wind Farm Scoping report), there may be an increase in delays and cancellations for less time sensitive cargo/tanker services.

7.11.4.42 As there is little evidence of major adverse weather routeing near to the cumulative projects, the sensitivity is considered to be **medium**.

Significance of the effect

7.11.4.43 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.36: Magnitude, sensitivity and impact significance relating to cumulative impact to adverse weather routeing during construction of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	Medium	Medium	Moderate which is significant in EIA terms
Stena Line	Medium	Medium	Moderate which is significant in EIA terms
Seatruck Ferries	Low	Low	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given that infrequent conditions may be encountered for which the preferred adverse weather route is disrupted.
Commercial cargo/tanker	Low	Medium	Minor which is not significant in EIA terms

7.11.4.44 Following the identification of significant effects on adverse weather routeing within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.4.45 The Applicant has committed to engaging with affected stakeholders. The Applicant will seek to continue this engagement beyond submission of the application and run in parallel with the application determination process.

Operations and maintenance phase

7.11.4.46 During the operations and maintenance phase of the cumulative projects, large commercial ships would not transit through the array areas due to the proximity of structures and would be required to route around the array areas. The impact on vessel routeing would therefore be similar to the latter stages of construction where vessels are displaced by construction buoyage, safety zones and the presence of structures. The operations and maintenance phase would be longer than other phases at up to 35 years compared to up to four years for the construction phase. During operations and maintenance, there would be far less Mona Offshore Wind Project vessels operating within and around the Mona Array Area interacting with other passing vessels. As a result, the cumulative impacts to adverse weather routeing during operations and maintenance are not anticipated to be substantially different to those during construction.

7.11.4.47 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.37: Magnitude, sensitivity and impact significance relating to cumulative impact to adverse weather routeing during operations and maintenance of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	Medium	Medium	Moderate which is significant in EIA terms
Stena Line	Medium	Medium	Moderate which is significant in EIA terms
Seatruck Ferries	Low	Low	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given that infrequent conditions may be encountered for which the preferred adverse weather route is disrupted.
Commercial cargo/tanker	Low	Medium	Minor which is not significant in EIA terms

7.11.4.48 Following the identification of significant effects on adverse weather routeing within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.4.49 The Applicant has committed to engaging with affected stakeholders. The Applicant will seek to continue this engagement beyond submission of the application and run in parallel with the application determination process.

Decommissioning phase

7.11.4.50 The cumulative impacts to adverse weather routeing during decommissioning are not anticipated to be substantially different to those during construction. During both the construction and the decommissioning phases of the cumulative projects, large commercial ships will not be able to transit through the array areas, whether through the presence of decommissioning buoyage or structures. The cumulative impact on vessel routeing will, therefore, be the same for the decommissioning phase. However, it should be noted that the cumulative impacts will reduce as decommissioning progresses and the number of structures within the Mona Array Area reduces.

7.11.4.51 A summary of the impact magnitude, sensitivity and overall effect significance is provided in Table 7.20.

Table 7.38: Magnitude, sensitivity and impact significance relating to cumulative impact to adverse weather routeing during decommissioning of the Mona Offshore Wind Project.

Operator	Magnitude	Sensitivity	Significance
IoMSPC	Medium	Medium	Moderate which is significant in EIA terms
Stena Line	Medium	Medium	Moderate which is significant in EIA terms

Operator	Magnitude	Sensitivity	Significance
Seatruck Ferries	Low	Low	Minor which is not significant in EIA terms. A minor rather than negligible effect has been determined given that infrequent conditions may be encountered for which the preferred adverse weather route is disrupted.
Commercial cargo/tanker	Low	Medium	Minor which is not significant in EIA terms

7.11.4.52 Following the identification of significant effects on adverse weather routeing within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.4.53 The Applicant has committed to engaging with affected stakeholders. The Applicant will seek to continue this engagement beyond submission of the application and run in parallel with the application determination process.

7.11.5 Impact on access to ports and harbours

Construction phase

7.11.5.1 The construction of the Mona Offshore Wind Project, in combination with the construction or operation of the Awel y Môr Offshore Wind Farm, Morgan Generation Assets, Morecambe Generation Assets, Mooir Vannin Offshore Wind Farm and existing projects could have a cumulative impact on access to ports and harbours.

7.11.5.2 Following determination of the construction bases for all cumulative projects, this cumulative impact should be reviewed to ensure that appropriate risk controls are in place.

Magnitude of impact

7.11.5.3 The location of all Tier 1 and 2 project array areas are outside of the Statutory or Competent Harbour Authority Areas of any port or harbour in the Irish Sea.

7.11.5.4 The array areas would result in deviation of both ferry and other commercial shipping routes, particularly to Liverpool, Douglas and Heysham. These cumulative impacts are assessed in sections 7.11.2, 7.11.3 and 7.11.4, but are not anticipated to have substantial cumulative impacts on any of the ports or harbours in the shipping and navigation study area.

7.11.5.5 There could be overlap of Tier 1 and Tier 2 project construction schedules that would require a significant number of additional movements each year in the Irish Sea between ports/harbours and construction sites.

7.11.5.6 The construction base, or bases, for Awel y Môr and Tier 2 projects are not yet determined. There is the potential for cumulative impacts on port access where the same port or harbour is used to support both projects. This could result in congestion and additional risks in navigational channels and greater burden on port operations due to the increase in movements. Previous offshore wind projects elsewhere in the UK have successfully mitigated these operational challenges, particularly through marine coordination of construction activities and liaison with ports and harbours.

7.11.5.7 The laying of offshore export cables will necessitate an advisory exclusion area around the cable laying vessel of up to 500 m could impede navigation of other vessels. In particular, this may cause disruption to port and harbour approach channels, however landfalls between the respective offshore wind farms are far apart and there would be limited cumulative impact.

7.11.5.8 The magnitude is therefore, considered to be **medium**.

Sensitivity of the receptor

7.11.5.9 Any potential cumulative impacts during cable laying are likely to be short term and localised and are not expected to be any greater than for the Mona Offshore Wind Project alone.

7.11.5.10 Given the cumulative impacts to ports and harbours during construction are assumed to be manageable, the sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.11.5.11 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Operations and maintenance phase

Magnitude of impact

7.11.5.12 During operations and maintenance of the Mona Offshore Wind Project, there could be overlap with the operations and maintenance phases of other Tier 1 and Tier 2 projects which would a significant number of additional movements each year in the Irish Sea between ports/harbours and construction sites.

7.11.5.13 These additional movements could lead to congestion or operational challenges in ports and harbours through which they transit. The operations and maintenance base or bases for all Tier 1 and Tier 2 projects are not yet determined, but previous offshore wind projects elsewhere in the UK have successfully mitigated these operational challenges, particularly through marine coordination of operations and maintenance activities and liaison with ports and harbours.

7.11.5.14 The magnitude is therefore, considered to be **medium**.

Sensitivity of the receptor

7.11.5.15 Given the cumulative impacts to ports and harbours during operations and maintenance are assumed to be manageable, the sensitivity of the receptor is therefore, considered to be **low**.

Significance of effect

7.11.5.16 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Decommissioning phase

7.11.5.17 The cumulative impacts to reduced access to ports and harbours during decommissioning are not anticipated to be substantially different to those during construction. However, it should be noted that the cumulative impacts will reduce as decommissioning progresses and the number of structures within the Mona Array Area reduce.

7.11.5.18 Therefore, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

7.11.6 Impact on emergency response capability due to increased incident rates and reduced access for SAR responders

Construction phase

7.11.6.1 The construction of the Mona Offshore Wind Project, in combination with the construction or operation of the Awel y Môr Offshore Wind Farm, Morgan Generation Assets, Morecambe Generation Assets, Mooir Vannin Offshore Wind Farm and existing projects could have a cumulative impact on emergency response capability due to increased incident rates and reduced access for SAR responders.

Magnitude of impact

7.11.6.2 Historical incident data within the Irish Sea suggests that most incidents occur inshore or in the approaches to ports and harbours. As demonstrated within Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement, the construction activities of offshore wind farms can lead to an increase in incidents involving construction vessels, but this is infrequent.

7.11.6.3 It should be noted that often incidents within or adjacent to offshore wind farms are responded to by CTVs before conventional SAR assets (such as helicopters or lifeboats) are able to reach the casualty, providing a beneficial effect. The nearest SAR helicopter base at HMCG Caernafron would have an estimated response time of 45 minutes and the nearest lifeboat station at Moelfre could take between 80 and 90 minutes to be on scene.

7.11.6.4 The likely route taken by SAR assets to the Mona Offshore Wind Project would likely be clear of other offshore wind farms, with the possible exception of the Awel y Môr project, but suitable spacings in the wind turbine arrangement would enable lifeboats to transit through the array area.

7.11.6.5 In the unlikely event of an incident, SAR assets are required to access a site or surrounding area without risk to themselves. In particular, wind turbines can pose a hazard to SAR helicopters and the wind farm should be designed to enable helicopter access and therefore safeguard HMCG obligations to SAR within the UK SAR Region. Several trials have been conducted by HMCG and MCA in SAR at offshore wind farms (see MCA, 2005; 2019) to establish best practice.

7.11.6.6 Emergencies on board, particularly fire or a man overboard, require immediate action by the bridge teams. For example, during fire, it may be necessary to turn the vessel into the wind such that the smoke does not blow across the passenger decks. Consultation has identified that these incidents do infrequently occur on board ferries in the east Irish Sea (in the order of less than once a year).

7.11.6.7 Whilst the cumulative projects do not necessarily impact upon the likelihood that fire may occur, its presence would constrict the sea room to perform these manoeuvres and may increase the resulting consequences.

- For medical evacuations, during the navigation simulations with the ferry companies, it was concluded that the likely response time of a SAR asset exceeds the transit time in proximity to the cumulative projects and that the master would likely make for the nearest port, having sufficient sea room when required to undertake such manoeuvres

- For fires or other serious incidents, during the navigation simulations it was shown that there was sufficient sea room to manoeuvre the vessel to avoid the effects of smoke across the passenger decks and minimise roll motion to aid the onboard response. Furthermore, it was noted that the probability of the incident occurring whilst transiting close to the cumulative projects and the conditions being such that the presence of the turbines effected the necessary actions was remote.

7.11.6.8 Incidents within the shipping and navigation study area are relatively infrequent and therefore the risk of occurrence cumulatively with Tier 1 and Tier 2 projects is considered to be low. As noted above, the increased presence of CTVs and construction vessels increases the SAR capability that enables a timelier incident response.

7.11.6.9 The Mona Offshore Wind Project, Morgan Generation Assets and Morecambe Generation Assets have committed to two lines of orientation with wind turbine spacing that is in excess of the minimum guidance in MGN654. Therefore, SAR access to any of the array areas should be maintained.

7.11.6.10 MGN654 Annex 5 (MCA, 2021) notes that windfarms which are adjacent or constructed close to one another should have harmonised layouts with the same general orientation. All Tier 1 and Tier 2 array areas are more than 4 nm from one another and there is the option to realign SAR search patterns if required. Furthermore, there is sufficient space to meet requirements for helicopter refuge areas between the array areas of more than 1 nm.

7.11.6.11 Several key risk controls are committed to in order to reduce the impact on emergency response during construction:

- An ERCoP will be developed to facilitate information sharing regarding the offshore wind farm and SAR organisations
- Periodic exercises will be undertaken at the site to prepare for incident response
- The Mona Offshore Wind Project, Morgan Generation Assets and Morecambe Generation Assets have committed to two lines of orientation to facilitate SAR access
- Wind turbine spacing will exceed SAR requirements of 500 m
- A Design Plan, which includes a plan of the Mona Array Area, will be prepared and submitted to NRW for approval in consultation with MCA and Trinity House prior to commencement of construction
- Furthermore, a buoyed construction area, AtoNs and promulgation measures will reduce the likelihood of third party vessels being involving in an incident within the shipping and navigation study area.

7.11.6.12 The magnitude is therefore, considered to be **low**.

Sensitivity of the receptor

7.11.6.13 Whilst reduction in SAR capability could impact the likelihood of a successful rescue, and could therefore have potentially high consequences, compliance with guidance and best practice would mitigate this impact.

7.11.6.14 The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.11.6.15 Overall, the magnitude of the cumulative impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given that the presence of the structures will have an adverse impact on SAR capability as opposed to open sea, albeit projects will follow best practice to minimise this impact.

Operations and maintenance phase

7.11.6.16 The presence of infrastructure within the array areas, whether under construction or operational, will have a similar cumulative effect on SAR. During construction, there may be partially constructed wind turbines, an irregular development site or the presence of jack ups which pose additional hazards. There would however be a greater duration of cumulative impacts during the operations and maintenance phase than the construction phase. Therefore, the cumulative impacts to emergency response during operations and maintenance phase are not anticipated to be substantially different to those during construction.

7.11.6.17 The magnitude of the cumulative impact is, therefore, deemed to be **low** and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given that the presence of the structures will have an adverse impact on SAR capability as opposed to open sea, albeit projects will follow best practice to minimise this impact.

Decommissioning phase

7.11.6.18 The cumulative impacts to emergency response during decommissioning are not anticipated to be substantially different to those during construction. However, it should be noted that the impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.11.6.19 Therefore, the magnitude of the cumulative impact is deemed to be **low**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms. A minor rather than negligible effect has been determined given that the presence of the structures will have an adverse impact on SAR capability as opposed to open sea, albeit projects will follow best practice to minimise this impact.

7.11.7 Impact on vessel to vessel collision risk

7.11.7.1 The assessment of collision risk has assumed that all vessels will comply with their obligations under the COLREGs, SOLAS and undertake prudent passage planning.

Construction phase

7.11.7.2 The construction of the Mona Offshore Wind Project, in combination with the construction or operation of the Awel y Môr Offshore Wind Farm, Morgan Generation Assets, Morecambe Generation Assets and Mooir Vannin Offshore Wind Farm could have a cumulative impact on vessel to vessel collision risk.

Magnitude of impact

7.11.7.3 During construction, vessel traffic would be displaced from the Tier 1 and Tier 2 offshore wind farm project array areas due to the presence of construction buoyage and safety zones around fixed structures which are under construction. It is anticipated that mariners would also maintain a safe passing distance of at least 1 nm from navigational hazards. Section 7.11.3 identifies that both cargo/tanker and ferry vessel routes will be deviated which could result in a convergence of vessels within routes between Tier 1 and Tier 2 projects.

7.11.7.4 The Awel y Môr Array Area is located south of the approaches to the Liverpool Bay TSS and there would, therefore, be limited impact on vessel transits. The majority of vessels approaching the route between the Mona and Awel y Môr offshore wind farms would originate from the west and transited via the Off Skerries TSS. A minority of vessels approaching the TSS from the anchorage to the east of Anglesey would have a minor deviation to the north and there would be some increase in density and vessel interactions, potentially increasing collision risk.

7.11.7.5 The impacts described in section 7.9.7 which relate to collision risk to the south and southwest of the Mona Array Area would also occur with the Tier 1 and Tier 2 offshore wind farm project array areas. As a result of Tier 1 and Tier 2 projects, routes would be formed which are described below (see Figure 7.9) with characteristics described below and identified in Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement. Vessel traffic projections are based on a review of both 2022 AIS data and 2021/2022 vessel traffic surveys.

7.11.7.6 Each of these routes are impacted by one or more array areas. Where vessel routes do not directly intersect the Mona Array Area but do intersect the Morgan or Morecambe Generation Assets Array Areas, they have been included within the cumulative assessment as there are cumulative impacts upon operators/ports with multiple routes. Furthermore, the presence of all cumulative projects will indirectly affect the master decision making and passage planning.

7.11.7.7 The route between the Mona and Morgan Generation Assets Array Areas has the following characteristics:

- Width of 6 nm with 3,600 vessel movements per year. An average vessel size of 155 m and a maximum vessel size of 289 m
- 9 to 16 ferry and 0.4 cargo/tanker ship movements anticipated per day through the route. There is potential for up to one recreational craft, two fishing boats and one service vessel in the route per day
- Meets MGN654 20-degree rule guidance and PIANC WG161 width guidance
- Modelling suggests that it is unlikely that two large commercial ships would meet between the Mona to Morgan Generation Assets Array Areas (probability of 2.4%).

7.11.7.8 The route between Mona and Morecambe Generation Assets Array Areas has the following characteristics:

- Width of at least 5.7 nm and a length of 5.0 nm with 2,300 vessel movements per year. An average vessel size of 173 m and a maximum vessel size of 289 m
- Six to 10 ferry and 0.4 cargo/tanker ship movements are anticipated per day through the route. Potential for up to two recreational craft, two fishing boats and one service vessel in route per day
- Meets MGN654 20-degree rule guidance and PIANC WG161 width guidance

- Modelling suggests that it is unlikely that two large commercial ships would meet between the Mona to Morecambe Generation Assets Array Areas (probability of 0.6%).

7.11.7.9 The route between the Morgan Generation Assets Array Area and Walney Offshore Wind Farm has the following characteristics:

- Width of at least 4.5 nm and a length of 11.5 nm with 2,100 vessel movements per year. An average vessel size of 132 m and a maximum vessel size of 215 m
- Anticipated five to 11 ferry and 0.5 cargo/tanker ship movements per day through route. Potential for up to two recreational craft, two fishing boats and one service vessel in route per day
- Meets MGN654 20-degree rule guidance and PIANC WG161 width guidance
- Modelling suggests that it is unlikely that two large commercial ships would meet between the Walney Offshore Wind Farm and Morgan Generation Assets Array Areas (probability of 0.6%).

7.11.7.10 During construction it is likely that recreational craft on passage will avoid the Mona Array Area. This will offset their transits into adjacent waters. However, analysis of recreational activity in section 7.5 demonstrated relatively few movements through the Mona Array Area and therefore are unlikely to be involved in a collision.

7.11.7.11 Large parts of the Irish Sea are fished and during construction there is potential that fishing activity might be displaced into adjacent waters. This is referred to as Spatial Squeeze, for which the NFFO and Scottish Fishermen's Federation recently published a report (NFFO, 2022), and has the potential to increase the risk of collision. This would be greater with Tier 1 and Tier 2 projects given the greater extent of obstructions which could concentrate vessels into commercial routes with an increased collision risk.

7.11.7.12 The confluence of traffic in these regions will inevitably increase vessel encounters and therefore potential collision situations. Modelling undertaken within the CRNRA (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement) suggested that there would be a 15% increase in the number of encounters involving ferries and other large commercial vessels and an 8% increase in encounters between cargo/tanker vessels but that there would be a decrease in encounters between large commercial vessels and small craft. Whilst it is unlikely that most of these situations will result in a collision, there will be some residual increase in risk.

7.11.7.13 During full bridge simulations with ferry operators, collision situations were tested in normal and adverse weather conditions around the cumulative projects. It was demonstrated that the revised boundaries enabled the bridge teams to take appropriate action as required by the COLREGs for complex, realistic traffic situations where they were a give way vessel, maintaining a desired CPA of at least 1.0 nm from other vessels and structures. It was noted that with the presence of the offshore wind farms, the master may be more frequently called to the bridge than at present to support the bridge team in managing these situations. Furthermore, it was noted that what were challenging situations and failed runs with the PEIR boundaries were much improved following the amendments made to the Mona, Morgan and Morecambe Potential Array Areas.

7.11.7.14 Quantitative risk modelling using IWRAP was undertaken within the CRNRA for large commercial vessels (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement). With an estimated 15% increase in vessel traffic, the collision risk modelling estimated an increase in collision risk between ferries increasing from once in 243 years (base case without cumulative projects) to once in

173 years (future case with cumulative projects). For cargo/tanker vessels in collision with ferries, this increase was from once in 187 to once in 163 years respectively. For cargo/tanker vessels in collision with other cargo/tanker vessels, this increase was from once in 1,267 to once in 933 years respectively.

7.11.7.15 The construction base or bases for the Tier 1 and Tier 2 projects are not yet determined, but there is potential for construction vessels in transit to Tier 1 and Tier 2 projects to be involved in a collision. The cumulative risks to construction vessels operating within Tier 1 and Tier 2 project sites would not be greater than each project in isolation (section 7.9.7).

7.11.7.16 The presence of the wind turbines may block or hinder the view of other vessels, resulting in “blind spots” which could increase the risk of collision by reducing the capability for early and effective collision avoidance. Vessels may be visually less distinct amongst the wind turbines and less prominent through radar, particularly at night and in poor visibility. The minimum spacing of 1,400 m makes such situations unlikely, particularly when compared to other offshore wind farms in the Irish Sea. As part of the navigation simulations, night navigation was also tested and it was concluded that the presence of the offshore wind farms did not interfere with the normal ability to safely determine the nature and aspect of other traffic at night.

7.11.7.17 Most commercial ships would transit at least 1 nm from an offshore wind farm. For a fishing boat or recreational craft emerging from the boundary of a wind farm array area at six Knots, it would take 10 minutes to intersect the commercial ships path. For a CTV at 25 Knots, this is reduced to 2.4 minutes, albeit these vessels would carry AIS so would be more identifiable to passing vessels. Such challenges currently exist for the established Irish Sea offshore wind farms but are being successfully managed with no reported collisions as a direct result of reduced visibility of emerging vessels.

7.11.7.18 With the addition of Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Scoping report), a 2.5 nm wide route is formed with the Morgan Generation Assets Array Area. As some of the vessels using this route are affected by the Mona Array Area and these aforementioned projects, the cumulative effects on collision risk are considered. The 2.5 nm width is insufficient to maintain adequate CPA from other vessels which might be encountered, and this was confirmed during the navigation simulations and hazard workshops undertaken to inform the Environmental Statement. Therefore, an unacceptably high collision risk would result, considering likely meeting situations between ferries and small craft.

7.11.7.19 The construction activities will be managed through adopted risk controls listed in Table 7.17, specifically:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the construction area
- Marking and charting of Mona Array Area on nautical charts to facilitate safe passage planning
- Two lines of orientation and a regular layout of structures
- Wind turbine spacing will be at least 1,400 m
- A buoyed construction area and safety zones will offset third party traffic and construction vessels
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)

- Marine co-ordination will promote best practice during construction activities within the site
- Vessel Traffic Management Plan to manage vessel safety and reduce potential impacts in accordance with the Outline Vessel Traffic Management Plan (Document Reference J14).

7.11.7.20 The magnitude is therefore, considered to be **medium**.

Sensitivity of the receptor

7.11.7.21 The sensitivity of collisions as a result of the cumulative impacts of Tier 1 and Tier 2 projects would not be substantially different to those described for the impact of the Mona Offshore Wind Project in isolation (section 7.9.7). Based on the evidence, literature and consultation, the NRA concluded that a most likely outcome for a ferry or passenger ship would be multiple injuries, moderate damage, minor pollution and widespread adverse publicity, with a worst credible outcome resulting in multiple loss of life. The most likely outcome for small craft was minor injuries, minor damage and no pollution. Loss of life was identified as a worst credible outcome for all other vessel types. Stakeholders advised that the worst credible outcome for a large vessel in collision with a small vessel would be multiple loss of life and the risk assessment was amended to reflect this.

7.11.7.22 The consequences of a collision during construction activities will be managed through adopted risk controls listed in Table 7.17:

- ERCoP to effectively respond to an incident
- Marine Pollution Contingency Plan
- Periodic exercises and training.

7.11.7.23 The sensitivity of the receptor is therefore, considered to be **high**.

Significance of the effect

7.11.7.24 The CRNRA (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement) assessed 20 collision hazards which occurred during the construction or operations and maintenance phase of the projects cumulatively. At the hazard workshop undertaken to inform the Environmental Statement, a consensus was reached with stakeholders that all of these would be Medium Risk – Tolerable if ALARP and that all previously High Risk hazards at PEIR had been successfully mitigated through boundary changes. The CRNRA concluded that given the presence of suitable risk controls and the disproportionality of any additional risk controls, where hazards were scored as Medium Risk, they could be defined as ALARP.

7.11.7.25 However, with the inclusion of Mooir Vannin Offshore Wind Farm as a Tier 2 project, and the insufficient sea room with the Morgan Generation Assets Array Area, it is likely that High Risk – Unacceptable collision risks would exist for this route.

7.11.7.26 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **high**. The cumulative effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms. A moderate rather than major effect has been determined given that the collision risk would only be High Risk – Unacceptable for the route between the Morgan Generation Assets Array Area and the Mooir Vannin array boundary, as presented within the Mooir Vannin Scoping report.

7.11.7.27 Following the identification of significant effects on collision risk within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a

reduction to the Mona Array Area and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.7.28 As the predicted moderate impact results from the addition of Mooir Vannin OWF, no further mitigation is proposed by the Applicant. It is noted in Mooir Vannin Offshore Wind Farm Limited (2023) that the Shipping and Navigation impact assessment will be undertaken in line with the MCA MGN654 and its 'Methodology for Assessing Marine Navigational Safety and Emergency Response Risks'. It is therefore assumed that, in line with accepted EIA practice, that potential cumulative impacts will be considered by Mooir Vannin Offshore Wind Farm in its assessment and through the planning process.

Operations and maintenance phase

7.11.7.29 The operations and maintenance phase will be managed through adopted risk controls listed in Table 7.17:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the Mona Array Area
- Two lines of orientation and a regular layout of structures
- Wind Turbine spacing will be at least 1,400 m
- Marking and charting of the Mona Array Area on nautical charts to facilitate safe passage planning
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- Marine co-ordination will promote best practice during maintenance activities within the site.

7.11.7.30 The cumulative impacts to vessel to vessel collision risk during operations and maintenance of Tier 1 and Tier 2 projects are not anticipated to be substantially different to those during construction. During both the construction and the operations and maintenance phases of the cumulative projects, large commercial ships will not be able to transit through the array areas, and there may be small craft emerging from the construction site or operational array area, posing similar collision risks. The magnitude is therefore, considered to be **medium**.

7.11.7.31 The consequences of collision would not be substantially different to those described during construction. The sensitivity of the receptor is therefore, considered to be **high**.

7.11.7.32 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **high**. The cumulative effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms. A moderate rather than major effect has been determined given that the collision risk would only be High Risk – Unacceptable for the route between the Morgan Generation Assets Array Area and the Mooir Vannin array boundary, as presented within the Mooir Vannin Scoping report.

7.11.7.33 Following the identification of significant effects on collision risk within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.7.34 As the predicted moderate impact results from the addition of Mooir Vannin OWF, no further mitigation is proposed by the Applicant. It is noted in Mooir Vannin Offshore Wind Farm Limited (2023) that the Shipping and Navigation impact assessment will be undertaken in line with the MCA MGN654 and its 'Methodology for Assessing Marine Navigational Safety and Emergency Response Risks'. It is therefore assumed that, in line with accepted EIA practice, that potential cumulative impacts will be considered by Mooir Vannin Offshore Wind Farm in its assessment and through the planning process.

Decommissioning phase

7.11.7.35 The cumulative impacts to vessel to vessel collision risk are not anticipated to be substantially different to those during construction. However, it should be noted that the cumulative impacts will reduce as decommissioning progresses and the number of structures within the Mona Array Area reduce.

7.11.7.36 Therefore, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **high**. The cumulative effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms. A moderate rather than major effect has been determined given that the collision risk would only be High Risk – Unacceptable for the route between the Morgan Generation Assets Array Area and the Mooir Vannin array boundary, as presented within the Mooir Vannin Scoping report.

7.11.7.37 Following the identification of significant effects on collision risk within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.7.38 As the predicted moderate impact results from the addition of Mooir Vannin OWF, no further mitigation is proposed by the Applicant. It is noted in Mooir Vannin Offshore Wind Farm Limited (2023) that the Shipping and Navigation impact assessment will be undertaken in line with the MCA MGN654 and its 'Methodology for Assessing Marine Navigational Safety and Emergency Response Risks'. It is therefore assumed that, in line with accepted EIA practice, that potential cumulative impacts will be considered by Mooir Vannin Offshore Wind Farm in its assessment and through the planning process.

7.11.8 Impact on allision (contact) risk to vessels

Construction phase

7.11.8.1 The construction of the Mona Offshore Wind Project, in combination with the construction or operation of the Awel y Môr Offshore Wind Farm, Morgan Generation Assets, Morecambe Generation Assets and Mooir Vannin could have a cumulative impact on allision (contact) risk.

Magnitude of impact

7.11.8.2 The construction of additional structures within the shipping and navigation study area increases the likelihood that navigating vessels will have a contact with them, with contact most likely to occur through human error or mechanical failure. During construction, this is exacerbated by the partially constructed nature of the sites.

7.11.8.3 As noted in section 7.11.3, Tier 1 and Tier 2 projects would create routes between the array areas which reduce the navigable width available to vessels. Firstly, the Mona to

Morgan Generation Assets Array Areas at 6 nm in width with 3,600 vessel movements per year. Secondly, the Mona Array Area to Morecambe Generation Assets Array Area at least 5.7 nm in width with 2,300 movements per year. Thirdly, the Morgan Generation Assets Array Area to Walney Offshore Wind Farm array area at least 4.5 nm in width with 2,100 vessel movements per year. Fourthly, the Mona Array Area to the Awel y Môr Offshore Wind Farm array area at 6.8 nm and 10,000 vessel transits per year.

7.11.8.4 When navigating these routes, engine failure could cause vessels to drift and allide with a structure, or human error or steering failure could lead to a powered allision with a wind turbine or OSPs. Furthermore, given the increased vessel encounters within each route, as described in section 7.11.7, the likelihood of collision avoidance actions being taken by vessels forcing them out of the centre of the routes and closer to wind turbines is increased. This potentially increases the risk of allision.

7.11.8.5 Where conditions are extreme, vessels may choose to avoid navigating between the array areas or services may be cancelled (section 7.11.4). However, in less severe adverse weather conditions vessels may be required to navigate between the Tier 1 and Tier 2 array areas. With prevailing conditions beam-on to the vessel, a vessel may be offset from its track and manoeuvring may be more challenging. Furthermore, action to avoid cargo shift due to excessive roll may take vessels closer to wind turbines than they would otherwise choose. This would increase the risk of allision.

7.11.8.6 Quantitative risk modelling using IWRAP was undertaken within the NRA for large commercial vessels (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement). The modelling results were that the risk of allision with the cumulative projects, accounting for a 15% increase in traffic, would be once in 91 years for cargo/tanker shipping and once in 203 years for ferries. Whilst the number of movements for ferries and cargo/tanker movements are similar, the significant proximity of large cargo/tanker vessels close to the array areas and the high redundancy of passenger vessels modelling in IWRAP have resulted in lower ferry allision scores.

7.11.8.7 The addition of the cumulative projects shows that the most southerly wind turbines of the Mona Array Area, adjacent to the main shipping routes have the greatest likelihood of allision. Furthermore, wind turbines at the periphery of the southern extent of the Morgan Generation Assets Array Area, and western extent of the Morecambe Generation Assets Array Area have relatively higher allision scores. The rerouting of traffic between the Morgan Generation Assets Array Area and Walney have also resulted in higher risks with turbines at West of Duddon Sands and Walney Extension. It is also evident that the future case scenario shows lower allision scores for Millom West and the Morecambe Gas Field platforms due to reorientation of the existing shipping routes away from these structures.

7.11.8.8 During full bridge simulations with ferry operators (see Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement) several runs tested the safety of navigating adjacent to the cumulative projects in both complex, realistic traffic scenarios and adverse weather. In all completed runs, it was demonstrated that the bridge teams were able to successfully respond to the situations whilst maintaining adequate CPA from other vessels and structures. It was noted that with the presence of the Mona Array Area, the master may be more frequently called to the bridge than at present to support the bridge team in managing these situations. Furthermore, it was noted that what were challenging situations and failed runs with the PEIR boundaries were much improved following the amendments made to the Mona, Morgan and Morecambe Potential Array Areas.

7.11.8.9 Other risks of allision for vessels navigating elsewhere in the shipping and navigation study area, and for small craft including construction vessels, would be consistent as assessed for the Mona Offshore Wind Project in isolation (see section 7.9.8).

7.11.8.10 With the addition of Mooir Vannin Offshore Wind Farm (based on the array boundary presented within the Mooir Vannin Scoping report), a 2.5 nm wide route is formed with the Morgan Generation Assets Array Area. As some of the vessels using this route are affected by the Mona Array Area and these aforementioned projects, the cumulative effects on collision risk are considered. The 2.5 nm width is insufficient to maintain adequate CPA from other vessels which might be encountered, and this was confirmed during the navigation simulations and hazard workshop undertaken to inform the Environmental Statement. Therefore, an unacceptably high allision risk would result, considering likely meeting situations and susceptibility to adverse weather on this route.

7.11.8.11 The construction activities will be managed through adopted risk controls listed in Table 7.17, specifically:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the construction area
- Application for safety zones to separate construction activities and vessel navigation
- Guard vessels to manage vessel safety
- Blade clearance of at least 22 m from MHWS to avoid mastheads
- Two lines of orientation and a regular layout of structures
- Wind Turbine spacing will be at least 1,400 m
- Marking and charting of the Mona Array Area on nautical charts to facilitate safe passage planning
- A buoyed construction area and safety zones will offset third party traffic and construction vessels
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- Marine co-ordination will promote best practice during construction activities within the site
- Vessel Traffic Management Plan to manage vessel safety and reduce potential impacts in accordance with the Outline Vessel Traffic Management Plan (Document Reference J14).

7.11.8.12 The magnitude is therefore, considered to be **medium**.

Sensitivity of the receptor

7.11.8.13 The sensitivity of allisions as a result of the cumulative impacts of Tier 1 and Tier 2 projects would not be substantially different to those described for the impact of the Mona Offshore Wind Project in isolation as described in section 7.9.8. Based on the evidence, literature and consultation, the NRA concluded that a most likely outcome for a ferry or passenger ship would be multiple injuries, moderate damage, minor pollution and widespread adverse publicity, with a worst credible outcome resulting in multiple loss of life. The most likely outcome for small craft was minor injuries, minor damage and no pollution. Less numerous losses of life as compared to ferry allisions

was identified as a worst credible outcome for all other vessel types, including small craft.

7.11.8.14 The consequences of a collision during construction activities will be managed through adopted risk controls listed in Table 7.17, specifically:

- ERCoP to effectively respond to an incident
- Marine Pollution Contingency Plan
- Periodic exercises and training.

7.11.8.15 The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of the effect

7.11.8.16 The CRNRA (Volume 6, Annex 7.1: Navigational risk assessment of the Environmental Statement) assessed 28 allision hazards which occurred during the construction or operations and maintenance phase of the projects cumulatively. At the hazard workshop undertaken to inform the Environmental Statement, a consensus was reached with stakeholders that all of these would be Medium Risk – Tolerable if ALARP. The NRA concluded that given the presence of suitable risk controls and the disproportionality of any additional risk controls, where hazards were scored as Medium Risk, they could be defined as ALARP.

7.11.8.17 However, with the inclusion of Mooir Vannin Offshore Wind Farm as a Tier 2 project (based on the array boundary presented within the Mooir Vannin Scoping report) and the insufficient sea room with the Morgan Generation Assets Array Area, it is likely that High Risk – Unacceptable allision risks would exist for this route.

7.11.8.18 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **medium**. The cumulative effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.

7.11.8.19 Following the identification of significant effects on allision risk within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.8.20 As the predicted moderate impact results from the addition of Mooir Vannin OWF, no further mitigation is proposed by the Applicant. It is noted in Mooir Vannin Offshore Wind Farm Limited (2023) that the Shipping and Navigation impact assessment will be undertaken in line with the MCA MGN654 and its 'Methodology for Assessing Marine Navigational Safety and Emergency Response Risks'. It is therefore assumed that, in line with accepted EIA practice, that potential cumulative impacts will be considered by Mooir Vannin Offshore Wind Farm in its assessment and through the planning process.

Operations and maintenance phase

Magnitude of impact

7.11.8.21 During the operations and maintenance phase of the Tier 1 and Tier 2 projects, the presence of the fully constructed array areas exposes large commercial vessels to similar cumulative impacts as during the construction phase, albeit for a longer duration. However, it is likely that operators will be more familiar to the layout and presence of the Mona Array Area in combination with other cumulative projects following four years of construction.

7.11.8.22 Other risks of allision for vessels navigating elsewhere in the shipping and navigation study area, and for small craft including construction vessels, would be consistent as assessed for the Mona Offshore Wind Project in isolation (see section 7.9.8).

7.11.8.23 The operations and maintenance activities will be managed through adopted risk controls listed in Table 7.17:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the Mona Array Area
- Blade clearance of at least 22 m from MHWS
- Two lines of orientation and a regular layout of structures
- Wind Turbine spacing will be at least 1,400 m
- Marking and charting of Mona Array Area on nautical charts to facilitate safe passage planning
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- Marine co-ordination will promote best practice during operations and maintenance activities within the site.

7.11.8.24 The magnitude is therefore, considered to be **medium**.

Sensitivity of the receptor

7.11.8.25 The consequences of allision would not be substantially different to those described during construction. The sensitivity of the receptor is therefore, considered to be **medium**.

Significance of effect

7.11.8.26 The cumulative impacts to allision risk are not anticipated to be substantially different to those during construction.

7.11.8.27 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **medium**. The cumulative effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.

7.11.8.28 Following the identification of significant effects on allision risk within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.8.29 As the predicted moderate impact results from the addition of Mooir Vannin OWF, no further mitigation is proposed by the Applicant. It is noted in Mooir Vannin Offshore Wind Farm Limited (2023) that the Shipping and Navigation impact assessment will be undertaken in line with the MCA MGN654 and its 'Methodology for Assessing Marine Navigational Safety and Emergency Response Risks'. It is therefore assumed that, in line with accepted EIA practice, that potential cumulative impacts will be considered by Mooir Vannin Offshore Wind Farm in its assessment and through the planning process.

Decommissioning phase

7.11.8.30 The cumulative impacts to allision risk are not anticipated to be substantially different to those during construction. However, it should be noted that the cumulative impacts

will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.11.8.31 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **medium**. The cumulative effect will, therefore, be of **moderate adverse** significance, which is significant in EIA terms.

7.11.8.32 Following the identification of significant effects on allision risk within the PEIR, the Applicant has made substantial commitments to reduce these effects, including a reduction to the Mona Array Area and additional control measures. Similar commitments made by the Morgan Generation Assets and Morecambe Generation Assets have further contributed to a reduction in this impact.

7.11.8.33 As the predicted moderate impact results from the addition of Mooir Vannin OWF, no further mitigation is proposed by the Applicant. It is noted in Mooir Vannin Offshore Wind Farm Limited (2023) that the Shipping and Navigation impact assessment will be undertaken in line with the MCA MGN654 and its 'Methodology for Assessing Marine Navigational Safety and Emergency Response Risks'. It is therefore assumed that, in line with accepted EIA practice, that potential cumulative impacts will be considered by Mooir Vannin Offshore Wind Farm in its assessment and through the planning process.

7.11.9 Impact on marine navigation, communications and position fixing equipment

Construction phase

7.11.9.1 The construction of the Mona Offshore Wind Project, in combination with the construction or operation of the Awel y Môr Offshore Wind Farm, Morgan Generation Assets, Morecambe Generation Assets and Mooir Vannin Offshore Wind Farm could have a cumulative impact on marine navigation, communications and position fixing equipment.

Magnitude of impact

7.11.9.2 Section 7.9.9 demonstrates that previous studies have shown that offshore wind farms have no discernible impact to VHF, AIS, GNSS or compasses used by passing ships. Nor was the sound generated by wind turbines likely to mask the navigational sound signals made by vessels as per the COLREGs. An impact on marine radars could be experienced when navigating in close proximity to wind turbines.

7.11.9.3 The combination of Tier 1 and Tier 2 projects greatly increases the area through which these cumulative effects might be experienced when navigating in the Irish Sea. In particular, when navigating between the Mona, Morgan and Morecambe Array Areas, the width of this route could result in adverse radar effects to be experienced.

7.11.9.4 The Tier 1 and Tier 2 array areas are outside of any harbour areas and the region is not monitored by VTS. The cumulative impacts to shore radar are, therefore, considered to be low.

7.11.9.5 The magnitude is therefore, considered to be **medium**.

Sensitivity of the receptor

7.11.9.6 Interference with radar could reduce the effectiveness of collision avoidance, increasing the risk of an incident. MGN654 recognises that these effects are greatest within 0.5 nm of an offshore wind farm but could be experienced up to 1.5 nm from the wind farm boundary. This is closer than most large vessels would pass based on

prudent passage planning and, therefore, minimal effects should be experienced. There may be some reduction in the ability to track small craft within Tier 1 and Tier 2 array areas.

7.11.9.7 Furthermore, these effects are routinely experienced by operators passing the existing Irish Sea offshore wind farms and therefore mariners should be experienced in mitigating their effects.

7.11.9.8 The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.11.9.9 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Operations and maintenance phase

7.11.9.10 The cumulative impacts to marine navigation, communications and position fixing equipment are not anticipated to be substantially different to those during construction. The greater extent of structures across the Tier 1 and Tier 2 projects for a fully constructed offshore wind farms as opposed to a partially constructed one may widen these cumulative effects. However, it is not considered that this would increase the significance of this cumulative impact.

7.11.9.11 Therefore, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Decommissioning phase

7.11.9.12 The cumulative impacts to marine navigation, communications and position fixing equipment are not anticipated to be substantially different to those during construction. However, it should be noted that the cumulative impacts will reduce as decommissioning progresses and the extent of structures within the Mona Array Area reduces.

7.11.9.13 Therefore, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

7.11.10 Impact on recreational craft passages and safety

Construction phase

7.11.10.1 The construction of the Mona Offshore Wind Project, in combination with the construction or operation of the Awel y Môr Offshore Wind Farm, Morgan Generation Assets, Morecambe Generation Assets and Mooir Vannin Offshore Wind Farm could have a cumulative impact on recreational craft passages and safety.

Magnitude of impact

7.11.10.2 The presence of multiple offshore wind farms within the Irish Sea has a greater impact on recreational passages than each project in isolation.

7.11.10.3 Analysis of vessel traffic in the shipping and navigation study area (section 7.5) demonstrates that there are few recreational movements through the shipping and navigation study area. During the winter vessel traffic surveys, no recreational craft

were detected, and on average, less than one per day was detected by either AIS or Radar. This suggests that relatively few recreational users would be adversely impacted.

7.11.10.4 Of the three major Irish Sea offshore cruising routes, all three pass adjacent to the Mona Array Area and the Tier 1 and Tier 2 projects. It is known that there are occasional regattas or rallies that cross between the UK and the Isle of Man, particularly the Liverpool to Douglas race held each summer.

7.11.10.5 The Awel y Môr offshore wind farm array area might impact upon recreational navigation to the south of the shipping routes into Liverpool, however, the existing presence of the Gwynt y Môr offshore wind farm already impacts these routes.

7.11.10.6 During the construction phase of an offshore wind farm, additional risk controls are used to manage navigating within the construction area. These include the use of guard vessels and safety zones which will deter recreational vessels from navigating through the offshore wind farm. These controls will be adopted by the Mona Offshore Wind Project.

7.11.10.7 The construction activities will be managed through adopted risk controls listed in Table 7.17:

- Promulgation of activities through the use of Notice to Mariners to ensure approaching vessels can safely avoid the Mona Array Area
- Blade clearance of at least 22 m from MHWS to avoid mastheads
- Two lines of orientation and a regular layout of structures
- Wind Turbine spacing will be at least 1,400 m
- Marking and charting of the Mona Array Area on nautical charts to facilitate safe passage planning.

7.11.10.8 The magnitude is therefore, considered to be **medium**.

Sensitivity of the receptor

7.11.10.9 The cumulative impacts to offshore cruising routes between the UK and Isle of Man would not be substantially adversely impacted as opposed to the Mona Offshore Wind Project in isolation.

7.11.10.10 The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.11.10.11 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Operations and maintenance phase

7.11.10.12 During the operational phase of the Tier 1 and Tier 2 offshore wind farms, there is likely to be greater small craft traffic navigating through the array areas than during the construction phase, during which time navigation is more restricted. Given spacing between wind turbines in excess of 1,400 m and a regular layout, recreational craft could navigate through the Mona Array Area without unacceptable increases in the risk of allision. However, consultation with the RYA suggests that only a minority are choosing to do so at other sites. This may result in greater numbers of recreational craft navigating around the Mona Array Area, increasing transit durations and encountering other large traffic.

7.11.10.13 As a result, these cumulative impacts are not anticipated to be substantially different to those during construction, and likely have a lower adverse impact.

7.11.10.14 Therefore, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Decommissioning phase

7.11.10.15 The cumulative impacts to recreational craft are not anticipated to be substantially different to those during construction. However, it should be noted that the cumulative impacts will reduce as decommissioning progresses and the number of structures within the Mona Array Area reduces.

7.11.10.16 Therefore, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

7.11.11 Impact on snagging risk to vessel anchors and fishing gear

Construction phase

7.11.11.1 The construction of the Mona Offshore Wind Project, in combination with the construction or operation of the Awel y Môr Offshore Wind Farm, Morgan Generation Assets, Morecambe Generation Assets, Mooir Vannin Offshore Wind Farm and Morgan and Morecambe Offshore Wind Farms Transmission Assets could have a cumulative impact on the risk of anchor and gear snagging for fishing vessels.

Magnitude of impact

7.11.11.2 Subsea cables are both at risk of anchor or fishing gear strikes and can pose a hazard to navigating vessels if gear attached to the vessel becomes snagged. Whilst snagging risks are localised to individual projects, the assessment of cumulative effects considers a greater extent of subsea infrastructure across the Irish Sea.

7.11.11.3 Both the Mona Offshore Wind Project and Awel y Môr Offshore Wind Farm offshore cable corridors route to the south, making landfall on the Welsh coast. During construction, controls will be in place to minimise the risk of snagging within the project array areas.

7.11.11.4 The construction activities will be managed through adopted risk controls listed in Table 7.17:

- Promulgation such as Notice to Mariners and site marking and charting issued to warn vessels of the presence of the Mona Offshore Wind Project
- Application for safety zones to separate construction activities and vessel navigation
- Guard Vessels to manage vessel safety
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- Emergency response capabilities including an ERCoP, Marine Pollution Contingency Plan, periodic exercises to minimise the consequences of any incident
- A CBRA

- Cable protection shall be designed to minimise snagging hazards, for example by minimising height above seabed, and or using smooth or shallower profiles.

7.11.11.5 The magnitude is therefore, considered to be **medium**.

Sensitivity of the receptor

7.11.11.6 Were a fishing vessel to snag the cable, the most likely outcome is loss of gear and potentially minor damage to the cable. A worst case outcome, however, is the loss of the fishing vessel if it capsizes, and potential fatalities, but this is very unlikely.

7.11.11.7 Snagging of commercial vessel anchors is unlikely to result in serious consequences such as fatalities or pollution from the vessel but could result in significant damage to the cable or cables. There is the potential for the presence of the cables to influence a master's decision making on whether to anchor to avoid an incident such as a collision, allision or grounding; however, this is not considered a likely option as the master would more likely act to minimise any risk to the vessel.

7.11.11.8 The sensitivity of the receptor is therefore, considered to be **low**.

Significance of the effect

7.11.11.9 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Operation and maintenance phase

7.11.11.10 The cumulative impacts due to the risk of snagging are not anticipated to be substantially different to those during construction, albeit for a longer duration. However, given the removal of restrictions on navigation that are in place during construction, and the wind turbine spacing in excess of 1,400 m, there may be greater fishing activity within the Tier 1 and Tier 2 array areas posing a risk of snagging of inter array cables.

7.11.11.11 Conversely, during the operations and maintenance phase, there should be no partially buried or unprotected infrastructure as might occur temporarily during the construction phase. Furthermore, local fishermen will be more familiar with the site layout and able to avoid fishing in a manner which could lead to a risk of snagging.

7.11.11.12 The risk of snagging during the operations and maintenance phase will be managed through adopted risk controls listed in Table 7.17:

- Promulgation such as Notice to Mariners and site marking and charting issued to warn vessels of the presence of the Mona Offshore Wind Project
- FLCP to reduce interactions between fishing vessels and the Mona Offshore Wind Project in accordance with the Outline FLCP (Document Reference J13)
- Emergency response capabilities including an ERCoP, Marine Pollution Contingency Plan, periodic exercises to minimise the consequences of any incident
- A CBRA.

7.11.11.13 Overall, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor adverse** significance, which is not significant in EIA terms.

Decommissioning phase

7.11.11.14 The cumulative impacts due to the risk of snagging are not anticipated to be substantially different to those during construction. However, it should be noted that the cumulative impacts will reduce as decommissioning progresses and the number of structures within the Mona Array Area reduces.

7.11.11.15 All cables will be removed during decommissioning so as not to leave any snagging hazards on the seabed.

7.11.11.16 Therefore, the magnitude of the cumulative impact is deemed to be **medium**, and the sensitivity of the receptor is considered to be **low**. The cumulative effect will, therefore, be of **minor** adverse significance, which is not significant in EIA terms.

7.11.12 Future monitoring

7.11.12.1 Table 7.39 below outlines the proposed monitoring commitments for shipping and navigation to address cumulative effects. These monitoring commitments are accepted, industry standard methods by which the cumulative impacts to shipping and navigation can be monitored and ensure the predictions of the NRA are consistent with the realised impacts and therefore that the risk control options are appropriate.

Table 7.39: Monitoring commitments.

Environmental effect	Monitoring commitment	Means of implementation
All impacts on vessel routeing and safety	Preparation and adherence to a navigation monitoring strategy for construction and post-construction monitoring of marine traffic (by AIS) with a report submitted annually to MMO, MCA and Trinity House. The report will assess the extent to which the impacts predicted in the NRA are accurate to ensure adopted risk controls are fit for purpose.	Navigation Monitoring Strategy secured within the deemed marine licence in schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Impact on allision (contact) risk to vessels	Preparation and adherence to an AtoNMP which includes AtoN monitoring to ensure constant functionality through the lifetime of the Mona Offshore Wind Project. Trinity House to be informed of any defects.	AtoNMP secured within the deemed marine licence in schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.
Impact on snagging risk to vessel anchors and fishing gear	Preparation and adherence to an OCMS which includes details of cable monitoring of cable burial and protection status to ensure specified requirements are met.	OCMS with details of cable monitoring secured within the deemed marine licence in schedule 14 of the draft DCO and expected to be secured within the standalone NRW marine licence.

7.12 Transboundary effects

7.12.1.1 A screening of transboundary impacts has been carried out and any potential for significant transboundary effects with regard to shipping and navigation from the Mona Offshore Wind Project upon the interests of other states has been assessed as part of this Environmental Statement. 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, NRA and CRNRA. Therefore, no additional transboundary impacts are anticipated.

7.13 Inter-related effects

7.13.1.1 Inter-relationships are considered to be the impacts and associated effects of different aspects of the proposal on the same receptor. These are considered to be:

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the Mona Offshore Wind Project (construction, operations and maintenance, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three phases (e.g. subsea noise effects from piling, operational wind turbines, vessels and decommissioning)
- Receptor led effects: Assessment of the scope for all effects to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on shipping and navigation such as impact on ferry routes may interact to produce a different, or greater effect on this receptor than when the effects are considered in isolation. Receptor-led effects may be short term, temporary or transient effects, or incorporate longer term effects.

7.13.1.2 A description of the likely interactive effects arising from the Mona Offshore Wind Project on shipping and navigation is provided in Volume 2, Chapter 11: Inter-related effects – Offshore of the Environmental Statement.

7.14 Summary of impacts, mitigation measures and monitoring

7.14.1.1 Information on shipping and navigation within the shipping and navigation study area was collected through consultation with stakeholders, analysis of historical vessel traffic and incident data, two hazard workshops and full bridge simulations.

7.14.1.2 Table 7.40 presents a summary of the potential impacts, measures adopted as part of the project and residual effects in respect to shipping and navigation. The impacts assessed include impacts to vessel routeing, impacts to port operations, impacts to navigational safety and impacts to emergency response. Overall it is concluded that there will be significant effects arising from the Mona Offshore Wind Project during the construction, operations and maintenance and decommissioning phases:

- Impact on adverse weather routeing

7.14.1.3 Table 7.41 presents a summary of the potential cumulative impacts, mitigation measures and residual effects. The cumulative impacts assessed include impacts to vessel routeing, impacts to port operations, impacts to navigational safety and impacts to emergency response. Overall it is concluded that there will be the following significant cumulative effects from the Mona Offshore Wind Project alongside other projects/plans:

- Impact to commercial operators including strategic routes and lifeline ferries
- Impact on adverse weather routeing
- Impacts on vessel to vessel collision risk
- Impact on allision (contact) risk to vessels

7.14.1.4 The Applicant has committed to engaging with affected stakeholders. The Applicant will seek to continue this engagement beyond submission of the application and run in parallel with the application determination process.

7.14.1.5 No additional potential transboundary impacts have been identified in regard to effects of the Mona Offshore Wind Project.

Table 7.40: Summary of potential effects, mitigation and monitoring.

[a] C=construction, O=operations and maintenance, D=decommissioning

Description of impact	Phase[a]			Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
Impact on recognised sea lanes essential to international navigation.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting. Vessel Traffic Management Plan. Boundary changes.	C: Medium O: Medium D: Medium	C: Low O: Low D: Low	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Construction/post-construction monitoring.
Impact to commercial operators including strategic routes and lifeline ferries.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting. Vessel Traffic Management Plan. Boundary changes.	IoMSPC C: Low O: Low D: Low Stena Line C: High O: High D: High Seatruck C: High O: High D: High Cargo/tanker C: High O: High D: High	IoMSPC C: Negligible O: Negligible D: Negligible Stena Line C: Low O: Low D: Low Seatruck C: Low O: Low D: Low Cargo/tanker C: Low O: Low D: Low	IoMSPC C: Minor O: Minor D: Minor Stena Line C: Minor O: Minor D: Minor Seatruck C: Minor O: Minor D: Minor Cargo/tanker C: Minor O: Minor D: Minor		IoMSPC C: Minor O: Minor D: Minor Stena Line C: Minor O: Minor D: Minor Seatruck C: Minor O: Minor D: Minor Cargo/tanker C: Minor O: Minor D: Minor	Construction/post-construction monitoring.
Impact to adverse weather routeing.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting.	IoMSPC C: Medium O: Medium D: Medium	IoMSPC C: Medium O: Medium D: Medium	IoMSPC C: Moderate O: Moderate D: Moderate		IoMSPC C: Moderate O: Moderate D: Moderate	Construction/post-construction monitoring.

Description of impact	Phase[a] C	O	D	Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
				Vessel Traffic Management Plan. Boundary changes.	Stena Line C: Medium O: Medium D: Medium Seatruck C: Low O: Low D: Low Cargo/tanker C: High O: High D: High	Stena Line C: Low O: Low D: Low Seatruck C: Negligible O: Negligible D: Negligible Cargo/tanker C: Negligible O: Negligible D: Negligible	Stena Line C: Minor O: Minor D: Minor Seatruck C: Minor O: Minor D: Minor Cargo/tanker C: Minor O: Minor D: Minor		Stena Line C: Minor O: Minor D: Minor Seatruck C: Minor O: Minor D: Minor Cargo/tanker C: Minor O: Minor D: Minor	
Impact on access to ports and harbours.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting. Vessel Traffic Management Plan. Cable burial risk assessment. Boundary changes.	C: Medium O: Low D: Medium	C: Low O: Low D: Low	C: Minor O: Negligible D: Minor		C: Minor O: Negligible D: Minor	Construction/post-construction monitoring.
Impact on emergency response capability due to increased incident rates and reduced access for SAR responders.	✓	✓	✓	ERCoP/Marine Pollution Plan/exercises. Lines of orientation. Wind turbine spacing. Layout plan. Buoyed construction area. Boundary changes.	C: Low O: Low D: Low	C: Low O: Low D: Low	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Construction/post-construction monitoring.

Description of impact	Phase[a]			Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
Impact on vessel to vessel collision risk.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting. Buoyed construction area. Safety zones. Guard vessels. Fisheries liaison. ERCoP/Marine Pollution Plan/exercises. Lines of orientation. Wind turbine spacing. Vessel Traffic Management Plan. Boundary changes.	C: Low O: Low D: Low	C: High O: High D: High	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Construction/post-construction monitoring.
Impact on allision (contact) risk to vessels.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting. Buoyed construction area. Blade clearance. Safety zones. Fisheries liaison. ERCoP/Marine Pollution Plan/exercises. Lines of orientation. Wind turbine spacing. Vessel Traffic Management Plan. Boundary changes.	C: Low O: Low D: Low	C: Medium O: Medium D: Medium	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Construction/post-construction monitoring.

Description of impact	Phase[a]			Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
Impact on marine navigation, communications and position fixing equipment.	✓	✓	✓	Lines of orientation. Wind turbine spacing. Buoyed construction area. Boundary changes.	C: Low O: Low D: Low	C: Low O: Low D: Low	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Construction/post-construction monitoring.
Impact on recreational craft passages and safety.	✓	✓	✓	Promulgation (including Notice to Mariners). Blade clearance. Lines of orientation. Wind turbine spacing. Boundary changes.	C: Low O: Low D: Low	C: Low O: Low D: Low	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Construction/post-construction monitoring.
Impact on snagging risk to vessel anchors and fishing gear.	✓	✓	✓	Promulgation (including Notice to Mariners). Safety zones. Guard vessels. Fisheries liaison. ERCoP/Marine Pollution Plan/exercises. CBRA. Boundary changes.	C: Low O: Low D: Low	C: Low O: Low D: Low	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Periodic validation surveys of cables.
Impact on UKC.	✓	✓	✓	Promulgation (including Notice to Mariners). Fisheries liaison. ERCoP/Marine Pollution Plan/exercises. CBRA.	C: Negligible O: Negligible D: Negligible	C: Low O: Low D: Low	C: Negligible O: Negligible D: Negligible		C: Negligible O: Negligible D: Negligible	Bathymetric surveys.

Table 7.41: Summary of potential cumulative effects, mitigation and monitoring.

[a] C=construction, O=operations and maintenance, D=decommissioning

Description of effect	Phase[a]			Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
Tier 1 and 2										
Impact on recognised sea lanes essential to international navigation.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting. Vessel Traffic Management Plan. Boundary changes.	C: Medium O: Medium D: Medium	C: Low O: Low D: Low	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Construction/post-construction monitoring.
Impact to commercial operators including strategic routes and lifeline ferries.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting. Vessel Traffic Management Plan. Boundary changes.	IoMSPC C: High O: High D: High Stena Line C: High O: High D: High Seatruck C: High O: High D: High Cargo/tanker C: High	IoMSPC C: Low O: Low D: Low Stena Line C: Medium O: Medium D: Medium Seatruck C: Low O: Low D: Low Cargo/tanker C: Medium	IoMSPC C: Minor O: Minor D: Minor Stena Line C: Moderate O: Moderate D: Moderate Seatruck C: Minor O: Minor D: Minor Cargo/tanker C: Moderate		IoMSPC C: Minor O: Minor D: Minor Stena Line C: Moderate O: Moderate D: Moderate Seatruck C: Minor O: Minor D: Minor Cargo/tanker C: Moderate	Construction/post-construction monitoring.

Description of effect	Phase[a] C	O	D	Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
					O: High D: High	O: Medium D: Medium	O: Moderate D: Moderate		O: Moderate D: Moderate	
Impact to adverse weather routeing.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting. Vessel Traffic Management Plan. Boundary changes.	IoMSPC C: Medium O: Medium D: Medium Stena Line C: Medium O: Medium D: Medium Seatruck C: Low O: Low D: Low Cargo/tanker C: Low O: Low D: Low	IoMSPC C: Medium O: Medium D: Medium Stena Line C: Medium O: Medium D: Medium Seatruck C: Low O: Low D: Low Cargo/tanker C: Medium O: Medium D: Medium	IoMSPC C: Moderate O: Moderate D: Moderate Stena Line C: Moderate O: Moderate D: Moderate Seatruck C: Minor O: Minor D: Minor Cargo/tanker C: Minor O: Minor D: Minor		IoMSPC C: Moderate O: Moderate D: Moderate Stena Line C: Moderate O: Moderate D: Moderate Seatruck C: Minor O: Minor D: Minor Cargo/tanker C: Minor O: Minor D: Minor	Construction/post-construction monitoring.
Impact on access to ports and harbours.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting. Vessel Traffic Management Plan.	C: Medium O: Medium D: Medium	C: Low O: Low D: Low	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Construction/post-construction monitoring.

Description of effect	Phase[a] C	O	D	Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
				Cable burial risk assessment. Boundary changes.						
Impact on emergency response capability due to increased incident rates and reduced access for SAR responders.	✓	✓	✓	ERCoP/Marine Pollution Plan/exercises. Lines of orientation. Wind turbine spacing. Layout plan. Buoyed construction area. Boundary changes.	C: Low O: Low D: Low	C: Low O: Low D: Low	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Construction/post-construction monitoring.
Impact on vessel to vessel collision risk.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting. Buoyed construction area. Safety zones. Guard vessels. Fisheries liaison.	C: Medium O: Medium D: Medium	C: High O: High D: High	C: Moderate O: Moderate D: Moderate		C: Moderate O: Moderate D: Moderate	Construction/post-construction monitoring.

Description of effect	Phase[a] C	O	D	Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
				ERCoP/Marine Pollution Plan/exercises. Lines of orientation. Wind turbine spacing. Vessel Traffic Management Plan. Boundary changes.						
Impact on allision (contact) risk to vessels.	✓	✓	✓	Promulgation (including Notice to Mariners). Marking and charting. Buoyed construction area. Blade clearance. Guard vessels. Safety zones. Fisheries liaison. ERCoP/Marine Pollution Plan/exercises.	C: Medium O: Medium D: Medium	C: Medium O: Medium D: Medium	C: Moderate O: Moderate D: Moderate		C: Moderate O: Moderate D: Moderate	Construction/post-construction monitoring.

Description of effect	Phase[a]			Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
				Lines of orientation. Wind turbine spacing. Vessel Traffic Management Plan. Boundary changes.						
Impact on marine navigation, communications and position fixing equipment.	✓	✓	✓	Lines of orientation. Wind turbine spacing. Buoyed construction area. Boundary changes.	C: Medium O: Medium D: Medium	C: Low O: Low D: Low	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Construction/post-construction monitoring.
Impact on recreational craft passages and safety.	✓	✓	✓	Promulgation (including Notice to Mariners). Blade clearance. Lines of orientation. Wind turbine spacing. Boundary changes.	C: Medium O: Medium D: Medium	C: Low O: Low D: Low	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Construction/post-construction monitoring.

Description of effect	Phase[a]			Measures adopted as part of the project	Magnitude of impact	Sensitivity of the receptor	Significance of effect	Further mitigation	Residual effect	Proposed monitoring
	C	O	D							
Impact on snagging risk to vessel anchors and fishing gear.	✓	✓	✓	Promulgation (including Notice to Mariners). Safety zones. Guard vessels. Fisheries liaison. ERCoP/Marine Pollution Plan/exercises. CBRA. Boundary changes.	C: Medium O: Medium D: Medium	C: Low O: Low D: Low	C: Minor O: Minor D: Minor		C: Minor O: Minor D: Minor	Periodic validation surveys of cables.

7.15 References

Admiralty (2022). Sailing Directions NP40.

BWEA (2007). Investigation of Technical and Operational Effects on Marine Radar Close to Kentish Flats Offshore Wind Farm.

Department for Energy Security & Net Zero (2024a) Overarching National Policy Statement for Energy (NPS EN-1). Available: https://assets.publishing.service.gov.uk/media/65a7864e96a5ec0013731a93/overarching-nps-for-energy-en1.pdf. Accessed February 2024.

Department for Energy Security & Net Zero (2024b) National Policy Statement for Renewable Energy Infrastructure (NPS EN-3). Available: https://assets.publishing.service.gov.uk/media/65a7889996a5ec000d731aba/nps-renewable-energy-infrastructure-en3.pdf. Accessed February 2024.

Department for Energy Security & Net Zero (2024c) National Policy Statements for Electricity Networks Infrastructure (NPS EN-5). Available: https://assets.publishing.service.gov.uk/media/65a78a5496a5ec000d731abb/nps-electricity-networks-infrastructure-en5.pdf. Accessed February 2024.

DfT (2019). UK Port Freight Traffic Forecasts.

G+ IOER (2019). Good Practice Guidelines for Offshore Renewable Energy Developments.

IALA (2017). G1138: The Use of the Simplified IALA Risk Assessment Method (SIRA).

IALA (2021). G1162: The Marking of Offshore Man-Made Structures.

IALA (2022). G1018: Risk Management.

IEMA (2016) Environmental Impact Assessment. Guide to Delivering Quality Development. Available: https://www.iema.net/download-document/7014. Accessed October 2022.

IMO (2018). Formal Safety Assessment. MSC-MEPC.2/Circ.12/Rev.2.

Isle of Man Government (2018). Technical Information on Harbours Strategy. Available: https://www.gov.im/media/1365944/harbours-strategy-gd-2018-0011.pdf. Accessed December 2023.

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 Maritime and Coastguard Agency.

MCA (2005). Offshore Wind Farm Helicopter Search and Rescue Trials Undertaken at the North Hoyle Wind Farm

MCA (2017). The National Contingency Plan. Available: https://www.gov.uk/government/publications/national-contingency-planncp. Accessed December 2023.

MCA (2019). MCA report following aviation trials and exercises in relation to offshore windfarms

MCA (2021). MGN654. Available: https://www.gov.uk/guidance/offshore-renewable-energy-installations-impact-on-shipping. Accessed November 2023.

MCA (2022). MGN372: Guidance to Mariners Operating in the Vicinity of UK OREIs. Available at: https://www.gov.uk/guidance/offshore-renewable-energy-installations-impact-on-shipping. Accessed November 2023.

MMO, 2021, North West Inshore and North West Offshore Marine Plan, June 2021.

Mooir Vannin Offshore Wind Farm Limited (2023). Scoping Report. Available at: https://orsted.im/mooirvannin/document-library. Accessed December 2023.

Morecambe Offshore Windfarm (2023). Project update: Autumn 2023. Available at: https://morecambeoffshorewind.com/wp-content/uploads/2023/09/Morecambe-Offshore-Windfarm-September-2023-newsletter.pdf. Accessed December 2023.

Morgan Offshore Wind Project (2023). Project update: Autumn 2023. Available at: https://bp-mmt.s3.eu-west-2.amazonaws.com/morgan/MORGAN_GEN_Newsletter.pdf. Accessed December 2023.

Nautical Institute (2013). The Shipping Industry and Marine Spatial Planning.

NFFO (2022). Spatial Squeeze in Fisheries.

Ocean Studies Board's Division on Earth and Life Studies (2022). Wind Turbine Generator Impacts to Marine Vessel Radar.

PIANC (2018). WG161: Interaction between Offshore Wind Farms and Maritime Navigation.

Planning Inspectorate (2019). Advice Note Seventeen: Cumulative effects assessments relevant to nationally significant infrastructure projects. Available at: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/advice-note-17/. Accessed December 2023.

Rawson, A. and Brito, M. (2022). Assessing the validity of navigation risk assessments: a study of offshore wind farms in the UK. Ocean and Coastal Management, 219.

RYA (2019). RYA Position of Offshore Renewable Developments: Wind Energy.

Spirit Energy (2019). South Morecambe DP3-DP4 Decommissioning Programmes. Available: https://assets.publishing.service.gov.uk/media/5d8dacac40f0b65e66718acf/South_Morecambe_DP3-DP4_Decommissioning_Programmes.pdf. Accessed: December 2023.

Thanet Extension (2019). Examining Authority's Report of Findings and Conclusions and Recommendation to the Secretary of State for Business, Energy & Industrial Strategy.

UN (1982). UN Convention on the Law of the Sea.

Welsh Government (2019) Welsh National Marine Plan, November 2019. Available https://gov.wales/marine-planning. Accessed November 2023.