Morecambe Offshore Windfarm: Generation Assets

Environmental Statement

Volume 5

Appendix 14.1 Navigation Risk Assessment

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MORECAMBE OFFSHORE WINDFARM: GENERATION ASSETS

Navigation Risk Assessment

Morecambe Offshore Windfarm Ltd

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Abbreviations

Abbreviation	Definition
ABP	Associated British Ports
AC	Alternating Current
AfL	Agreement for Lease
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
AtoN	Aid to Navigation
BAS	Burial Assessment Study
BWEA	British Wind Energy Association (now RenewableUK)
CBRA	Cable Burial Risk Assessment
CCS	Carbon Capture and Storage
CGOC	Coastguard Operations Centre
CHA	Competent Harbour Authority
CO^2	Carbon Dioxide
COLREGs	International Convention for the Prevention of Collision at Sea
CoS	Chamber of Shipping
CPP	Central Processing Platform
CTV	Crew Transfer Vessel
DECC	Department of Energy & Climate Change
Defra	Department for Environment, Food and Rural Affairs
DCO	Development Consent Order
DfT	Department for Transport
DIO	Defence Infrastructure Organisation
DSC	Digital Selective Calling
EIA	Environmental Impact Assessment
ERCOP	Emergency Response and Cooperation Plan
ERRV	Emergency Rescue and Recovery Vessel
FFO	Fixed or Floating Object
FSA	Formal Safety Assessment
GBS	Gravity Based Structures
GLA	General Lighthouse Authority
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HAT	Highest Astronomical Tide

Abbreviation	Definition
HMCG	His Majesty's Coastguard
HSE	Health and Safety Executive
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
ICW	In Collision With
IGOMO	International Guidance for Offshore Marine Operations
IHO	International Hydrographic Office
IMO	International Maritime Organization
IoM	Isle of Man
IoMHC	Isle of Man Harbours and Coastguard
IoMSPC	Isle of Man Steam Packet Company
IPC	International Planning Commission
IPS	Intermediate Peripheral Structure
IWRAP	IALA Waterway Risk Assessment Program
LOA	Length Overall
LPS	Local Port Service
LW	Low Water
MAIB	Marine Accident Investigation Branch
MCA	Maritime and Coastguard Agency
MDS	Maximum Design Scenario
MGN	Marine Guidance Note
MMO	Marine Management Organisation
MoD	Ministry of Defence
MOWL	Morecambe Offshore Wind Limited
MSL	Mean Sea Level
NASH	NASH Maritime Ltd
NPS	National Policy Statement
NRA	Navigation Risk Assessment
NSIP	Nationally Significant Infrastructure Project
O&M	Operation and Maintenance
OREI	Offshore Renewable Energy Installation
OSP	Offshore Substation Platform
OTNR	Offshore Transmission Network Review
OWF	Offshore Windfarm
PEIR	Preliminary Environmental Impact Report
PEXA	Practice and Exercise Area

Abbreviation	Definition
PIANC	World Association for Waterborne Transport Infrastructure
PMSC	Port Marine Safety Code
PPE	Personal Protective Equipment
PLB	Personal Locator Beacons
PSV	Platform Supply Vessel
QHSE	Quality, Health, Safety and Environment
REWS	Radar Early Warning System
REZ	Renewable Energy Zone
RNLI	Royal National Lifeboat Institute
RYA	Royal Yachting Association
SOLAS	Safety of Life at Sea
SAR	Search and Rescue
SBM	Single Buoy Mooring
SHA	Statutory Harbour Authority
SIRA	Simplified IALA Risk Assessment
SPS	Signification Peripheral Structure
SRRA	Search and Rescue Response Assessment
STCW	Standards of Training, Certification and Watchkeeping for Seafarers
TEU	Twenty-foot Equivalent Unit
TH	Trinity House
TSS	Traffic Separation Scheme
UNCLOS	United Nations Convention on the Law of the Sea
UKC	Under Keel Clearance
UKHO	United Kingdom Hydrographic Office
UKSARH	United Kingdom Search and Rescue Helicopter
UXO	Unexploded Ordnance
VHF	Very High Frequency
VMS	Vessel Monitoring System
VTMP	Vessel Traffic Management Plan
VTS	Vessel Traffic Service
WFSV	Windfarm Service Vessel
WODS	West of Duddon Sands
WTG	Wind Turbine Generator

Units

Unit	Definition
kJ	Kilojoule
kt	Knot (unit of speed equal to nautical mile per hour, approximately 1.15 mph)
kV	Kilovolt
M	Metre
m/s	Metres Per Second
MW	Megawatt
nm	Nautical Mile

1. INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1.1.1 NASH Maritime Ltd (NASH) has been commissioned by Morecambe Offshore Windfarm Ltd (MOWL) (the "Applicant") to undertake a Navigation Risk Assessment (NRA) for the Morecambe Offshore Windfarm (OWF) Generation Assets ("the Project"). This NRA presents information on the proposed development relative to the baseline and futurecase navigational activity and forms an annex to Chapter 14 Shipping and Navigation (Document Reference 5.2.14). The windfarm site is located approximately 30km from the Lancashire coast and the Project will comprise of up to 35 fixed bottom foundation wind turbine generators (WTGs), inter-array cabling, and up to two offshore substation platforms (OSP) with possible platform link cables, all of which will be contained within the windfarm site.

1.1.1.1.2 The scope of the assessment and content of this report are provided in **Section 1.2.**

1.1.1.1.3 The Project relates only to the Generation Assets of the Morecambe OWF (i.e. the WTGs, inter-array cables, OSPs, and possible platform link cables). A separate consent for the Transmission Assets associated with the Morecambe OWF and the Morgan Offshore Wind Project (another proposed windfarm to be located in the Irish Sea) is being sought. This follows the UK Government publishing in 2022 the Pathway to 2030 Holistic Network Design documents which set out the approach to connecting 50GW of offshore wind to the UK electricity network. This concluded that Morecambe OWF should work collaboratively with the Morgan Offshore Wind Project in connecting the windfarms to the National Grid at Penwortham in Lancashire. Accordingly, the Transmission Assets, which will enable export of electricity from both the Morecambe OWF and the Morgan Offshore Wind Project to the National Grid connection point, will be subject to consent under a separate Development Consent Order (DCO) application.

1.1.1.1.4 In June 2022, a Scoping Report for the Project was submitted by the Applicant to request a formal Scoping Opinion from the Planning Inspectorate on the information to be included in an Environmental Impact Assessment (EIA). The Scoping Opinion was subsequently provided by the Planning Inspectorate in August 2022. Non-statutory consultation events were held (both in-person and online) in November/December 2022 to help communities and other stakeholders understand the Project proposals.

1.1.1.1.5 The Project Preliminary Environmental Information Report (PEIR) was published for statutory consultation in April - June 2023. As part of the PEIR, an NRA was undertaken for the Project to identify and assess the hazards and risks affecting shipping and navigation. A cumulative regional navigation risk assessment (CRNRA) was also undertaken as part of the PEIR to consider the navigational hazards and risks associated with the proposed Project and the Mona Offshore Wind Project, and Morgan Offshore Wind Project Generation Assets. The PEIR NRA determined that the impacts of the Project individually would result in hazards that are Tolerable if As Low

As Reasonably Practicable (ALARP). Cumulatively, the CRNRA determined that considering the three projects together would result in unacceptable risks to navigation and significant impacts to lifeline ferry schedules.

1.1.1.1.6 Since the publication of the PEIR, all three projects have collectively made a number of changes (including boundary changes) to address these unacceptable cumulative risks. The design commitments made by the Project to reduce these impacts were as follows:

- Realignment of the Project's western boundary extent to minimise course changes (and deviation distance) for vessels navigating north-south between the Project and the Mona Offshore Wind Project, and between the Project and Morgan Offshore Windfarm Generation Assets and existing the Walney Offshore Windfarm
- Commitment to two lines of orientation in the layout of surface structures within the Project's windfarm site

1.1.1.1.7 This document updates the Project NRA and assesses whether all risks have been reduced to either Broadly Acceptable or Tolerable if as Low as Reasonably Practicable (ALARP) based on the additional Project commitments listed above. The CRNRA has also been updated to include the Morgan and Morecambe Offshore Windfarms Transmission Assets and to assess whether all cumulative risks have been reduced to either Broadly Acceptable or Tolerable if ALARP based on the additional commitments (including the boundary changes) of all projects Appendix 14.2 Cumulative Regional Navigational Risk Assessment (Document Reference 5.2.14.2). **Section 10** of this report summarises the outcomes of the updated CRNRA.

1.2 PURPOSE AND SCOPE OF THE NAVIGATION RISK ASSESSMENT

1.2.1.1.1 The Project is seeking a consent application under the Planning Act 2008 (as amended). As the Project is over 100MW capacity it is considered a Nationally Significant Infrastructure Project (NSIP) and will apply for a Development Consent Order (DCO) from the Secretary of State.

1.2.1.1.2 The windfarm site has the potential to impact upon the safety and navigation of vessels transiting through or within the vicinity of the Project development. The NRA is an important requirement for the consent process for OWF developments and identifies the potential effects and impacts of the windfarm site on shipping and navigation.

1.2.1.1.3 The NRA follows the requirements of the Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 654 and accompanying methodology within Annex 1. The scope and objectives of this assessment are as follows:

- Review of relevant policy, guidance and legislation (Section 2)
- Description of the assessment methodology (**Section 3**)
- Description of the Project (**Section 4**)
- Description of the baseline environment (**Section 5**)

- Description of the baseline vessel traffic and risk profile (**Section 6**)
- Determination of the likely future traffic profile (**Section 7**)
- Identification and assessment of the potential impacts of the windfarm site on shipping and navigation (**Section 8**)
- Description of the NRA that identifies and assesses hazards during construction, operation and maintenance, and decommissioning phases of the development (**Section 9**)
- Identification of risk controls in relation to the Project hazards to reduce the risk to ALARP (Section 4.9 and Section 9.8)
- Consideration of the potential cumulative impacts on shipping and navigation (**Section 10**)
- Provide recommendations in relation to the safety of the development and co-existence of users with regards to shipping and navigation (**Section 11**)

2. POLICY, GUIDANCE AND LEGISLATION

2.1 Legislation and national policy

2.1.1 UNCLOS

2.1.1.1.1 The United Nations Convention on the Law of the Sea (UNCLOS) (United Nations, 1982) is an international agreement that establishes a legal framework for all marine and maritime activities. Article 60 of the convention concerns artificial islands, installations and structures in the exclusive economic zone. Article 60(7) states that "Artificial islands, installations and structures and the safety zones around them may not be established where interference may be caused to the use of recognized sea lanes essential to international navigation." As per Article 22(4), "The coastal state shall clearly indicate such sea lanes and traffic separation schemes on charts to which due publicity shall be given".

2.1.1.1.2 The requirement not to interfere with the use of recognised sea lanes essential to international navigation is also contained within S36B of the Electricity Act 1989.

2.1.2 National Policy Statement

2.1.2.1.1 National Policy Statements (NPSs) set out UK Government policy on different types of national infrastructure developments, i.e. NSIPs. This NRA has been undertaken in accordance with the instructions and guidance provided within the NPS for Renewable Energy Infrastructure (EN-3) (Department for Energy Security & Net Zero, 2023). **Table 1** provides a summary of the guidance provided by NPS EN-3 that is relevant to shipping and navigation.

Table 1: Relevant shipping and navigation assessment requirements from NPS EN-3

NPS Requirement	NRA Reference
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 in **Section 8.2** and **Section 8.3** for ferries and other commercial shipping respectively. This includes routeing in typical and adverse weather conditions. Impacts on recreational craft are described throughout **Section 8.4.4** and **Section 8.5.4**.

NPS Requirement	NRA Reference
To ensure safety of shipping applicants should reduce risks to navigational safety to ALARP, as described in Section 2.8.321. **[Paragraph 2.8.179]**	Impacts to navigation are described in **Section 8** and the guidance and process for producing this NRA set out in **Section 9**.
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 2.1**.
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]**	A summary of key legislation and policy is contained in **Section 2.1**. Applied risk controls, including safety zones, are described in **Section 4.9**. Additional risk control options are identified in **Section 9.8**.
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 in **Section 8.2** and **Section 8.3** for ferries and other commercial shipping respectively. This includes routeing in typical and adverse weather conditions. Impacts on recreational craft are described throughout **Section 8.4.4** and **Section 8.5.4**.
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 Secretary of State 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]**	Stakeholder consultation is summarised in **Section 3.5.1**. A Marine Navigation Engagement Forum (MNEF) was established for the three Irish Sea Round 4 offshore wind projects (see **Section 3.5.1**). A hazard workshop was undertaken including stakeholders to inform this

NPS Requirement	NRA Reference
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 MMO or 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 maintenance, and decommissioning phases. **[Paragraph 2.8.184]**	NRA and is described in **Section 9.3**.
Engagement should seek solutions that allow offshore wind farms, offshore transmission and navigation and shipping users of the sea to successfully co-exist. **[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, communications and positioning systems are described in **Section 8.8**.
Prior to undertaking assessments applicants should consider information on internationally recognised sea lanes, which is publicly available. **[Paragraph 2.8.187]**	Location of sea lanes are presented in **Section 5** and impact on vessel routeing measures in **Section 8**.
Applicants should refer in assessments to any relevant, publicly available data available on the Maritime Database. **[Paragraph 2.8.188]**	Datasets used to undertake this assessment are described in **Section 3.5**.
Applicants must undertake a Navigational Risk Assessment (NRA) in accordance with relevant government guidance prepared in consultation with the MCA and the other navigation stakeholders listed above. **[Paragraph 2.8.189]**	The guidance and process followed in producing this NRA is described in **Section 9**.

NPS Requirement	NRA Reference
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** • **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]**	Three 14-day vessel traffic surveys were conducted in compliance with the requirements under MGN654, survey findings are presented in **Section 6.3**. This included a summer, winter and top-up winter survey. The NRA is presented in **Section 9** and has been produced in accordance with MGN654. The cumulative impacts of the Project on vessel routeing, collision and contact, in combination with multiple developments, are examined in **Section 10**.
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 4.9**. Additional risk control options are identified in **Section 9.8**.
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. **[Paragraph 2.8.194]**	

NPS Requirement	NRA Reference
Applicants should undertake a detailed NRA, which includes Search and Rescue Response Assessment and emergency response assessment prior to applying for consent. The specific Search and Rescue requirements will then be discussed and agreed post-consent. **[Paragraph 2.8.195]**	Impacts on Search and Rescue (SAR) are described in **Section 8.6**.
Mitigation measures will include site configuration, lighting and marking of projects to take account of any requirements of the General Lighthouse Authority. **[Paragraph 2.8.259]**	Applied risk controls, are described in **Section 4.9**.

Table 2: Relevant shipping and navigation International Planning Commission (IPC) decision making requirements from NPS EN-3

NPS Requirement	NRA Reference
The Secretary of State 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 Traffic Separation Scheme (TSS), are considered in relation to the Project and presented in **Section 5.3.3**.
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 1982** **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 Secretary of State 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 described in **Section 8.2** and **Section 8.3** for ferries and other commercial shipping respectively. This includes routeing in typical and adverse weather conditions.
Where after carrying out a site selection, a proposed development is likely to adversely affect major commercial navigation routes, for instance by causing appreciably longer transit times, the Secretary of State 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 Secretary of State should take a pragmatic approach to considering proposals to minimise negative impacts. **[Paragraph 2.8.330]**	
The Secretary of State 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	Impacts to navigation are described in **Section 8** and the guidance and process for producing this NRA set out in **Section 9**. The

NPS Requirement	NRA Reference
unacceptable risks to navigational safety after mitigation measures have been adopted. **[Paragraph 2.8.331]**	cumulative impacts of the Project are examined in **Section 10.** It is demonstrated that there are no unacceptable risks to navigation.
The Secretary of State 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 throughout **Section 8.4.4** and **Section 8.5.4**.
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 Secretary of State should weigh the harm caused with the benefits of the scheme. **[Paragraph 2.8.333]**	
The Secretary of State should make use of advice from the MCA, who will use the NRA described in paragraphs 2.8.179 and 2.8.180 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 3.5.1**. An MNEF was established (see **Section 3.5.1**). A hazard workshop was undertaken and is described in **Section 9.3**. Impacts to navigation are described in **Section 8** and the guidance and process for producing this NRA set out in **Section 9**.
The Secretary of State 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	Impacts to navigation are described in **Section 8** and the guidance and process for producing this NRA set out in **Section 9**.

NPS Requirement	NRA Reference
farm, and what requirements to include in such a consent. **[Paragraph 2.8.335]**	
The Secretary of State 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 4.9**. Additional risk control options are identified in **Section 9.8**.
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** **Are exercisable subject to such restrictions or conditions, or both, as are set out in the DCO.** **[Paragraph 2.8.337]**	
The Secretary of State 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]**	
The Secretary of State 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 Secretary of State 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 Secretary of State 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 2.8.330]**	

2.1.3 North West Inshore and North West Offshore Marine Plan

2.1.3.1.1 NPS EN-3 indicates that the decision-maker should take account of the policies and plans in the area, as relevant. The North West Marine Plan, published by the Department for Environment, Food and Rural Affairs (Defra) in 2021, has been considered in this assessment.

2.1.3.1.2 **Table 3** provides a summary of the key guidance from the North West Marine Plan relevant to shipping and navigation.

Table 3: North West Inshore and North West Offshore Marine Plan guidance relevant to shipping and navigation

Policy Code	Key Provisions	NRA Reference
NW-DD-1	In line with the NPS for Ports, sustainable port and harbour development should be supported. 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 (PMSC), 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: ▪ avoid ▪ minimise ▪ 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 commercial vessel routes into ports and harbours is assessed throughout **Section 8**.
NW-DD-2	Proposals that require static sea surface infrastructure, or that significantly reduce under-keel clearance, must not be authorised within, or encroaching upon, International Maritime Organization (IMO) routeing systems, unless there are exceptional circumstances.	Location of IMO adopted routeing measures outlined in **Section 5.3.3** and impacts on vessel traffic routeing in **Section 8.2** and **Section 8.3**.
NW-DD-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	Impacts on ferry traffic routeing in **Section 8.2**.

Policy Code	Key Provisions	NRA Reference
	routes, or that pose a risk to the viability of passenger services, must not be authorised, unless there are exceptional circumstances.	
NW-DD-4	Proposals promoting or facilitating sustainable coastal and/or short sea shipping, as an alternative to road, rail or air transport, will be supported, where appropriate.	Future case traffic profile presented in **Section 7**.

2.2 PRIMARY GUIDANCE

2.2.1 MGN 654

2.2.1.1.1 The principal guidance document for a NRA is the MCA's MGN 654 (2021a). MGN 654 describes the potential shipping and navigation issues which should be considered by developers when proposing offshore renewable energy installations (OREIs). Annex 1 (2021b) of the MGN provides a detailed methodology for assessing the marine navigational safety risks of OREIs. In particular, by following the methodology, the NRA should be:

- Proportionate to the scale of the development and magnitude of risks
- Based on the risk assessment approach of the Formal Safety Assessment (FSA)
- Capable of utilising techniques and methods which produce results which are acceptable to the Government
- Compare the base case and future case risks in the study area, before predicting the impacts of the OREIs on that risk, through a hazard log
- Determine which risk controls should be put in place to minimise the risks to ALARP

2.2.1.1.2 Several annexes are associated with MGN 654 and have been utilised to support this NRA:

- Annex 1 provides a standardised format of submission, which is described in **Table 4**
- Annex 2 provides guidance on windfarm shipping route interactions
- Annex 3 provides guidance on Under Keel Clearance (UKC)
- Annex 4 provides hydrography guidelines
- Annex 5 contains guidance on requirements, guidance and operational considerations for search and rescue and emergency response (MCA, 2021c)
- An MGN 654 checklist is provided in Annex 6, which is included as **Appendix A**.

Table 4: MGN 654 Annex 1 Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations

The following content is included:	Compliant	The following content is included:
A risk claim is included supported by a reasoned argument and evidence	Yes	The risk assessment conducted in **Section 9** and is supported by: ▪ Data analysis (**Section 6**) ▪ Consultation (**Section 3.5.1**) ▪ Review and discussion of impacts (**Section 8**) Therefore, a risk claim is made in **Section 11.**
Description of the marine environment	Yes	A description of the baseline marine environment is provided in **Section 5.**
Description of the OREI development and how it changes the marine environment	Yes	A description of the OREI development is provided in **Section 4**. Potential impacts are described in **Section 8**.
Analysis of the Marine Traffic	Yes	A detailed analysis of the baseline vessel traffic is provided in **Section 6.4**. **Section 7** presents the future baseline traffic profile. The impacts of the OREIs on that traffic is contained within **Section 8**.
Status of the hazard log	Yes	The NRA is provided in **Section 9**. The hazard log is provided in **Appendix D.**
Navigation Risk Assessment	Yes	The NRA is provided in **Section 9**.
Search and Rescue overview and assessment **Emergency Response Overview and Assessment**	Yes	Existing Search and Rescue (SAR) provision is described in **Section 5.6**. An assessment of impacts of the windfarm site to SAR and emergency response is provided in **Section 8.6**.
Status of Risk control log	Yes	Embedded mitigation is contained within **Section 4.9**. Additional risk controls are provided in **Section 9.8**.
Major Hazards Summary	Yes	A summary of the principal impacts of the Project are contained within **Section 8** and an NRA reported in **Section 9**.
Statement of Limitation	Yes	Any limitations or assumptions of this assessment are reported in their relevant sections.
Through Life Safety Management	Yes	Embedded mitigation is contained within **Section 4.9**. Additional risk controls are provided in **Section 9.8**.

2.2.2 Formal Safety Assessment process and methodology

2.2.2.1.1 The IMO Formal Safety Assessment (FSA) process has been applied within this NRA. The guidelines for FSA were approved in 2002 and were most recently amended in 2018 by MSC-MEPC.2/Circ.12/Rev.2.

2.2.2.1.2 The FSA is a structured and systematic methodology, aimed at enhancing maritime safety, including protection of life, health, the marine environment and property, by using risk analysis and, if appropriate, cost-benefit assessment. The IMO FSA guidance defines a hazard as "a potential to threaten human life, health, property or the environment", the realisation of which results in an incident or accident. The potential for a hazard to be realised (i.e. likelihood) can be combined with an estimated, or known, consequence of outcome and this combination is termed "risk". There are five steps within the FSA process.

- Step 1: Identification of hazards
- Step 2: Risk analysis
- Step 3: Risk control options
- Step 4: Cost-benefit assessment (if applicable)
- Step 5: Recommendations for decision making

2.3 ADDITIONAL GUIDANCE AND LESSONS LEARNT

2.3.1.1.1 Additional guidance is available and has been used to inform this NRA, which is summarised in **Table 5** and **Table 6**.

Table 5: Summary of additional relevant guidance

Guidance	Description
MGN 372: OREIs: Guidance to Mariners Operating in the Vicinity of UK OREIs (MCA, 2008).	Issues to be taken into account when planning and undertaking voyages near offshore renewable energy installations off the UK coast.
International Association of Lighthouse Authorities (IALA) G1162 The Marking of Offshore Man-Made Structures (IALA, 2021).	Guidance on the lighting and marking arrangements for OWFs.
RYA Position of Offshore Renewable Energy Developments: Wind Energy (RYA, 2019).	Describes key impacts of OWFs on recreational activities.
World Association for Waterborne Transport Infrastructure (PIANC) WG161 Interaction Between Offshore Windfarms and Maritime Navigation (PIANC, 2018).	Provides guidelines and recommendations on impacts on mitigations for shipping routes near OWFs.

Guidance	Description
Nautical Institute (2013) The Shipping Industry and Marine Spatial Planning	Guidance on benefits and risks of marine spatial planning for shipping and navigation.
G+ IOER (2019) Good practice guidelines for offshore renewable energy developments	Guidance on emergency response for OWFs.

Table 6: Lessons learnt and supporting studies

Guidance	Description
MCA and QinetiQ (2004) Results of the electromagnetic investigations and assessments of marine radar, communications and positioning systems undertaken at the North Hoyle windfarm by QinetiQ and the Maritime and Coastguard Agency	Reporting of trial on impacts of OWF on shipboard equipment.
MCA (2005) Offshore Windfarm Helicopter Search and Rescue Trials Undertaken at the North Hoyle Wind Farm Reporting of trial on impacts of OWF on SAR equipment and activities.	Reporting of trial on impacts of OWF on SAR equipment and activities.
British Wind Energy Association (BWEA) (2007). Investigation of Technical and Operational Effects on Marine Radar Close to Kentish Flats Offshore Windfarm	Reporting of trial on impacts of OWF on shipboard equipment.
MCA (2019) MCA report following aviation trials and exercises in relation to offshore windfarms	Reporting of trial on impacts of OWF on SAR equipment and activities and the implications on OWF design.
Rawson and Brito (2021) Assessing the validity of navigation risk assessments: a study of offshore windfarms in the UK	Analysis of historical incidents in UK OWFs.
Ocean Studies Board's Division on Earth and Life Studies (2022). Wind Turbine Generator Impacts to Marine Vessel Radar	Review of impacts of OWFs on marine radar.
Walney Extension Offshore Windfarm Application (c.2013)	Documents associated with application for Walney Extension offshore windfarm.
Rhiannon Offshore Windfarm Scoping Report (2012).	Documents associated with application for Rhiannon offshore windfarm.
Awel Y Mor Offshore Windfarm Application (c. 2021)	Documents associated with application for Awel Y Mor offshore windfarm.

Guidance	Description
Anatec (2016). Influence of UK Offshore Windfarm Installation on Commercial Vessel Navigation	Analysis of impact of offshore windfarms on ship routes from historical data.
Mona Offshore Wind Project PEIR (2023)	Preliminary findings of the impacts of the projects and how they could be mitigated
Morgan Offshore Wind Project Generation Assets PEIR (2023)	
Morgan and Morecambe OWFs: Transmission Assets PEIR (2023)	

3. NRA METHODOLOGY AND DATA SOURCES

3.1 METHODOLOGY

3.1.1.1.1 The NRA has been produced in accordance with MGN 654 (see **Section 2.2.1**) and follows the IMO's FSA approach (**Section 2.2.2**). This assessment considers all identified impacts of the Project on shipping and navigation receptors. **Figure 2** provides a workflow of the FSA approach as is applied within this NRA. The FSA defines a risk as "the combination of frequency and the severity of the consequence" (IMO, 2018). Therefore, the likelihood and consequence of these impacts are assessed through the collection of significant datasets and consultation. Details on the risk criteria and matrix methodology are contained within **Section 9**.

3.2 DEFINITION OF STUDY AREA

3.2.1.1.1 The study area for the NRA is defined as an area 10 nautical miles (nm) around the windfarm site and presented in **Figure 1**. The proposed study area is industry best practice for shipping and navigation assessment chapters.

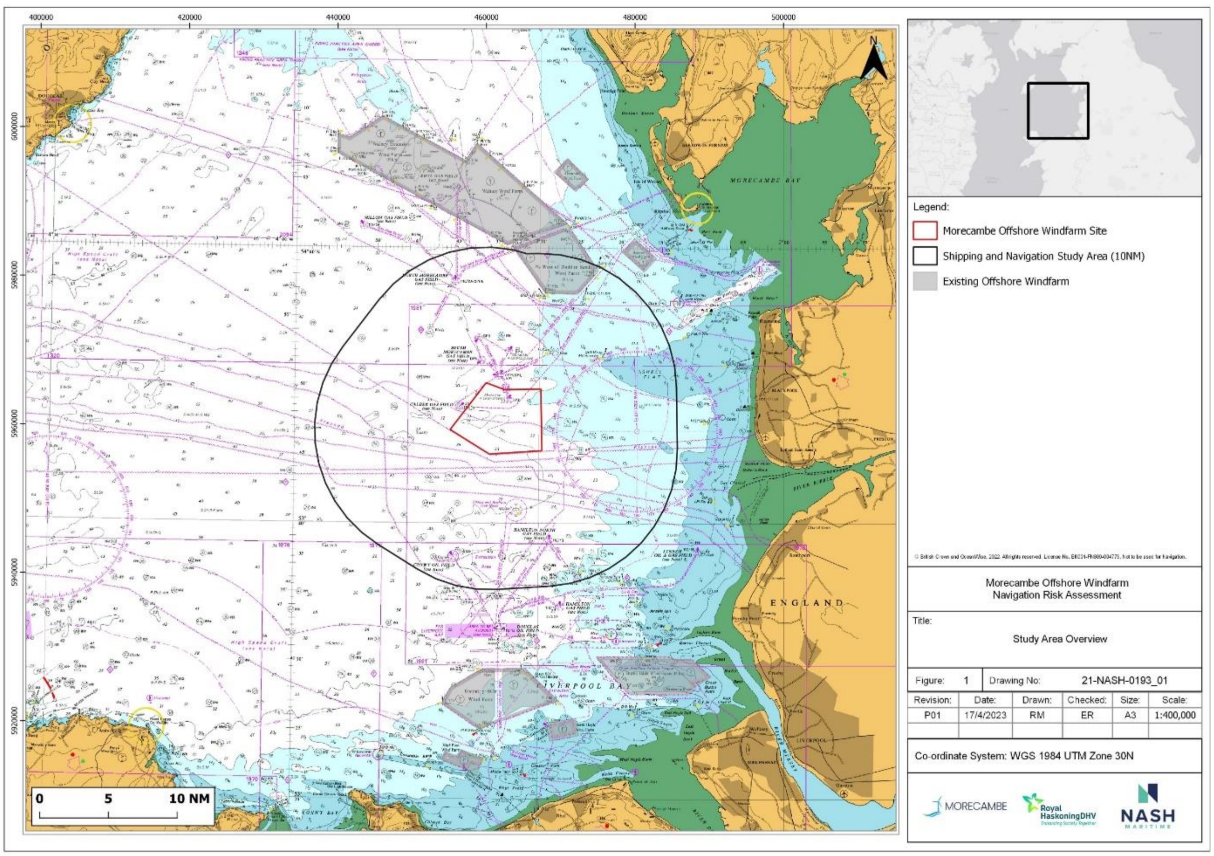


Figure 1: Study area

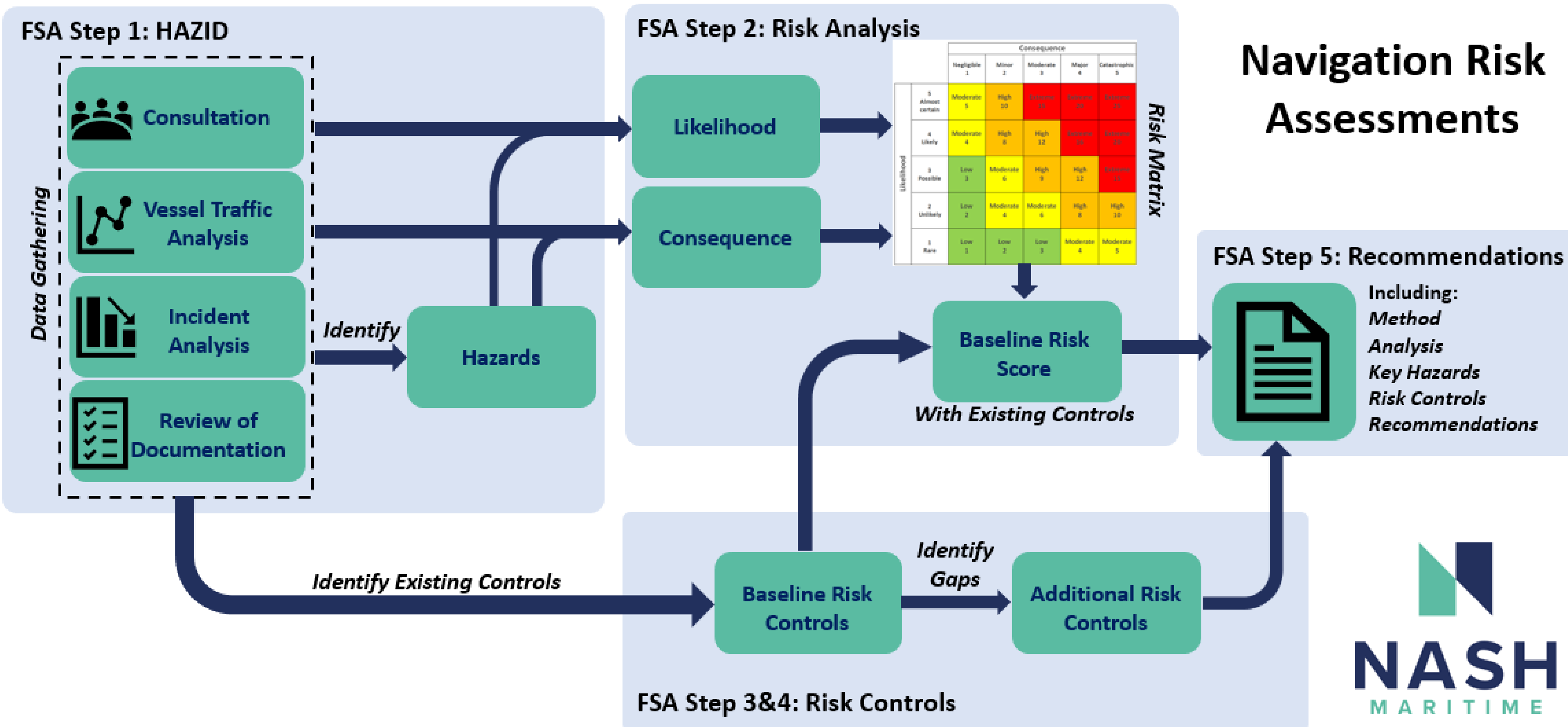


Figure 2: NRA methodology

3.3 IALA RISK MANAGEMENT TOOLS

3.3.1 Qualitative risk assessment – SIRA

3.3.1.1.1 The IALA Simplified IALA Risk Assessment method (SIRA) follows the FSA process and allows Competent Authorities (and other organisations) to assess maritime and navigation risk in their waters, so that they can meet their obligations for the management of navigation safety (e.g. obligations under international conventions such as SOLAS, national domestic legislation, etc.).

3.3.1.1.2 Details of the overarching methodology are provided in the following IALA Guidance:

- Guideline 1018 - Risk Management
- Guideline 1138 - The Use Of The Simplified IALA Risk Assessment Method

3.3.2 Quantitative risk modelling - IWRAP

3.3.2.1.1 The IALA Waterway Risk Assessment Program (IWRAP Mk II) is a quantitative tool for calculating the frequency of collisions, groundings and allisions for navigating vessels in a given waterway. The tool was developed by IALA to support coastal states in conducting risk assessments to address obligations under Safety of Life at Sea (SOLAS) Chapter V. The tool has been presented at the IMO (e.g. NAV 52/17/2 and SN.1/Circ.296) and used by Coastal States (including UK, Denmark and Sweden) to support the assessment of new routeing measures (e.g. NCSR 5/INF.3). The tool has also had widespread use in assessing risk for OREI, both in the UK, Norway and elsewhere.

3.3.2.1.2 IALA (2017) Guideline G1123 contains guidance on implementing the tool and the underlying mechanics are presented in Friis-Hansen (2008).

3.4 CUMULATIVE NRA APPROACH

3.4.1.1.1 A separate cumulative regional NRA (CRNRA) has been produced in collaboration between the developers of the Morgan Offshore Wind Project Generation Assets, Mona Offshore Wind Project, Morecambe Offshore Windfarm Generation Assets, and Morgan and Morecambe Offshore Windfarms Transmission Assets. The purpose of this collaborative approach is to assess the relevant potential cumulative effects of the infrastructure of all four Projects on shipping and navigation receptors. The objectives are to provide a focused assessment of the key cumulative effects associated with the four Projects, and in particular, the safety of navigation through the routes formed between and around them and other surface piercing structures (principally existing OWFs and oil and gas platforms) during the operational and maintenance phase of the projects. The focus of the CRNRA was to enable a detailed assessment of the key concerns of stakeholders, principally the formation of routes between the windfarm sites.

3.4.1.1.2 This assessment dovetails with the individual NRAs undertaken for each of the four offshore windfarm projects. The findings of the CRNRA are summarised in **Section 10** and the full report available in Appendix 14.2 Cumulative Regional Navigational Risk Assessment (Document Reference 5.2.14.2).

3.5 SUMMARY OF DATA SOURCES AND INFORMATION GATHERED

3.5.1 Consultation and engagement

3.5.1.1.1 Consultation meetings were undertaken prior to, and during, the NRA to interface with stakeholders at an early stage and as part of assessing risk during the NRA.

3.5.1.1.2 **Table 7** summarises consultation undertaken as part of the NRA, which has included a range of forums and stakeholder responses to submissions. These were:

- MNEF (2021-2024), a shipping and navigation engagement forum was established in 2021. The purpose was to enable developers to regularly update stakeholders on plans and progress of the Morecambe Offshore Windfarm and the Morgan and Mona Offshore Wind Projects, and for stakeholders to express views or concern on the impacts of the projects for discussion and, where possible, resolution (**Appendix B**).
- Consultation with stakeholders between February 2022 and April 2022 to introduce the Project, and for stakeholders to express views or concern on the impacts of the Project.
- Hazard workshops held in Liverpool on 11 October 2022 and 29 September 2023 (details of which are summarised in **Section 9.3**).
- Full bridge simulator sessions conducted with ferry operators at HR Wallingford throughout 2022 and 2023 (details of which are contained in Appendix E of Appendix 14.2 Cumulative Regional Navigational Risk Assessment (Document Reference 5.2.14.2).
- Scoping Opinion responses (details of which are summarised in Chapter 14 Shipping and Navigation).
- Section 42 [of Planning Act, 2008] consultation responses (details of which are summarised in Chapter 14 Shipping and Navigation).

Table 7: Consultation summary

Date	Consultees	Source	Purpose and Issues Raised	Response to Issues within this NRA
2021 - 2024	MNEF Consultees (see **Appendix B**)	Engagement Meeting Forum	To disseminate information regarding the Morecambe, Morgan and Mona projects within a wide stakeholder forum and to identify and discuss any key navigational concerns.	Issues raised associated with cumulative risk were addressed by undertaking a detailed CRNRA (**Section 10**).
07-Feb-22	Seatruck Ferries Stena Line Isle of Man Steam Packet Company (IoMSPC)	Meeting	Initial meeting with ferry companies to provide an overview of the Project and identify key impacts. All ferry operators agreed that the cumulative impact of the developments was the most significant issue, especially in relation to Morgan/ Mona sites. Ferry operators were keen to be seen as a body of stakeholders, not individual companies as the Project progresses.	Issues raised associated with cumulative risk were addressed by undertaking a detailed CRNRA (**Section 10**). Further consultation with ferry operators was undertaken as a group with the Morgan and Mona projects.
09-Feb-22	Chamber of Shipping (CoS) IoMSPC	Meeting	Initial meeting to provide an overview of the Project and identify key impacts. CoS questioned how an NRA will be delivered with so many other projects running concurrently and that it is not a project that can be assessed in isolation. Other concerns were raised over scheduling and timetabling of ferries and other logistics, time commitment and expenditure for consultation, and scheduling of HAZID workshops prior to completion of the summer vessel traffic survey. CoS suggested that analysis of Automated Information Systems (AIS) data would aid the identification of regular users of the area as key consultees.	Issues raised associated with cumulative risk posed by multiple projects were addressed by undertaking a detailed CRNRA with Morgan, Mona and Morecambe OWFs (**Section 10**). Impacts to scheduling and timetabling of ferries and other vessels is contained within **Section 8.2.3**. The hazard workshops were rescheduled to enable inclusion

Date	Consultees	Source	Purpose and Issues Raised	Response to Issues within this NRA
				of the summer vessel traffic data. Detailed analysis of full fidelity AIS data was undertaken and shared with stakeholders.
03-Mar-22	MCA	Meeting	Initial meeting to provide an overview of the Project and identify key impacts. MCA noted if Morgan, Mona and Morecambe projects are to go ahead, there will need to be changes to the Red Line Boundaries, commenting although MCA appreciate the windfarm site needs to consider capacity, all projects are concerning to the ferry companies.	Issues raised associated with cumulative risk posed by multiple projects were addressed by undertaking a detailed CRNRA with Morgan, Mona and Morecambe OWFs (**Section 10**).
09-Mar-22	Defence Infrastructure Organisation (DIO)	Meeting	Initial meeting to provide an overview of the Project and identify key impacts. DIO suggested the Project completes a pre-application to determine the impact of the Project to Ministry of Defence (MoD) activities to determine potential impacts of the development to line of sight and highlight major MoD activity in the area.	The Project undertook a pre-application request from DIO (**Section 8.8**).
10-Mar-22	Peel Ports Associated British Ports (ABP) Isle of Man Harbours and Coastguard (IoMHC)	Meeting	Initial meeting to provide an overview of the Project and identify key impacts. The cumulative impact of Morecambe with Morgan and Mona projects was raised as a significant concern. Further comments were made on the potential impacts to radar, and freight, cargo and passenger services.	Issues raised associated with cumulative risk posed by multiple projects were addressed by undertaking a detailed CRNRA with Morgan, Mona and Morecambe OWFs (**Section 10**). The impact to shipping routes for the combined projects is detailed in **Section 7.2, 7.3** and **7.4** of the CRNRA.

Date	Consultees	Source	Purpose and Issues Raised	Response to Issues within this NRA
12-May-22	RYA	Meeting	Initial meeting to provide an overview of the Project and identify key impacts. RYA noted the timing of the early August summer vessel traffic survey. RYA considers mid-July to mid-August as optimum period as organised recreational events tend to decline after this. RYA suggested the Project benchmark survey data with pre-COVID AIS data to ascertain recreational craft seasonality. RYA highlighted the need to consider Morgan, Mona and Morecambe projects together, in particular impacts on recreational craft, ferry routes and increase in space conflict with between maritime users. RYA commented on the south-eastern area of the windfarm site, which is a moderately used area for recreational craft, suggesting a further understanding of recreational use in the area would be beneficial.	Benchmark of data was undertaken based on the 2019 AIS data. Following the PEIR, a 2022 AIS dataset has been obtained to provide greater recency for the analysis. Issues raised associated with cumulative risk posed by multiple projects were addressed by undertaking a detailed CRNRA with Morgan, Mona and Morecambe OWFs (**Section 10**). Summer survey analysis and 2019 AIS data was used to determine magnitude of recreational vessel traffic activity, particularly to the south-east of the site. The summer survey was conducted in late July to mid-August 2022 to align with feedback received during consultation with the RYA.
09-Aug-22	Seatruck Ferries Stena Line IoMSPC CoS MCA Trinity House (TH)	Meeting	Follow up meeting to provide an update of the shipping and navigation Project timeline, including survey, consultation and HAZID, present ferry operator passage plans alongside full-year AIS ferry track data and other vessel types and refine understanding of passage planning and adverse weather routing. Key issues raised:	Issues raised associated with cumulative risk posed by multiple projects were addressed by undertaking a detailed CRNRA with Morgan, Mona and Morecambe OWFs (**Section 10**).

Date	Consultees	Source	Purpose and Issues Raised	Response to Issues within this NRA
			- Difficulties of providing comment on individual projects without knowing the cumulative effect of other schemes both planned and unplanned in the area (Seatruck Ferries) - How future vessel traffic can be understood in the cumulative assessment (IoMSPC) - Impact of the Project to Liverpool to Belfast ferry route, with concerns over safety and sea miles (Stena Line) - Decommissioning schedules for fixed assets and platforms in the Irish Sea should be considered in the PEIR (CoS) - Increase in passenger traffic on IoMSPC routes, with an additional vessel confirmed transiting the Liverpool/Douglas route (IoMSPC) - Displacement of vessels leading to vessel-to-vessel interaction (CoS) - Increase in tug and service vessels with risk increasing due to the concentration of vessels in one place (Seatruck Ferries) - Future adverse weather routing is dependent on the outcome of other projects in the area (Seatruck Ferries)	Impacts to ferry routes and operations are described in **Section 8.2**). Oil and Gas decommissioning and expected change in vessel traffic associated with oil and gas activity is described in **Section 7.3**. Future vessel traffic is addressed in **Section 7**. Adverse weather routing for ferries is addressed in **Section 8.2.3**.
12-October-2022	Workshop Attendees	Workshop	A hazard workshop was undertaken to inform the PEIR NRA, during which stakeholders raised a number of key navigation issues (see Appendix C).	Issues raised associated with cumulative risk posed by multiple projects were addressed by undertaking a detailed CRNRA with Morgan, Mona and Morecambe OWFs (**Section 10**).

Date	Consultees	Source	Purpose and Issues Raised	Response to Issues within this NRA
23-25 May 2023	Stena Line	Workshop	Update to navigation bridge simulations considering Project site boundary and layout changes.	A summary of the navigation simulations is provided in **Section 3.5.5**.
22-23 June 2023	Seatruck	Workshop	Update to navigation bridge simulations considering Project site boundary and layout changes.	A summary of the navigation simulations is provided in **Section 3.5.5**.
13-15 September 2023	IoMSPC	Workshop	Update to navigation bridge simulations considering Project site boundary and layout changes.	A summary of the navigation simulations is provided in **Section 3.5.5**.
29 September 2023	Workshop Attendees	Workshop	This hazard workshop followed an identical structure and methodology to the first workshop (held in October 2022) to consider site boundary and layout changes made for the Project, and for Mona and Morgan projects. The workshop was attended by many of the same stakeholder groups.	Issues raised associated with cumulative risk posed by multiple projects were addressed by undertaking a detailed CRNRA with Morgan, Mona and Morecambe OWFs (**Section 10**). Details of the Project hazard workshop, attendees, the issues raised by stakeholder concerns and the workshop results are contained in **Section 9.3** and **Appendix C.** Cumulative impacts are assessed in **Section 10**.
07 December 2023	Seatruck	Meeting	Review of engagements and assessments to date. Identification of potential increases in risk to vessels and residual impacts on commercial operations. Cumulative impacts associated with Mooir Vannin Offshore Wind Farm.	A summary of engagement is provided in **Section 3.5.1**. Impacts to navigational safety are described in **Section 8**. Impacts to ferry routes are described in **Section 8.2**. Cumulative impacts are assessed in **Section 10**.

Date	Consultees	Source	Purpose and Issues Raised	Response to Issues within this NRA
11 December 2023	IoMSPC	Meeting	Review of engagements and assessments to date. Identification of potential increases in risk to vessels and residual impacts on commercial operations. Cumulative impacts associated with Mooir Vannin Offshore Wind Farm.	A summary of engagement is provided in **Section 3.5.1**. Impacts to navigational safety are described in **Section 8**. Impacts to ferry routes are described in **Section 8.2**. Project impacts are assessed in **9**. Cumulative impacts are assessed in **Section 10**.
13 December 2023	Stena Line	Meeting	Review of engagements and assessments to date. Identification of potential increases in risk to vessels and residual impacts on commercial operations. Cumulative impacts associated with Mooir Vannin Offshore Wind Farm.	A summary of engagement is provided in **Section 3.5.1**. Impacts to navigational safety are described in **Section 8**. Impacts to ferry routes are described in **Section 8.2**. Project impacts are assessed in **9**. Cumulative impacts are assessed in **Section 10**.
18 December 2023	Trinity House	Meeting	Review of engagements and assessments to date. Identification of potential increases in risk to vessels and residual impacts on commercial operations. Cumulative impacts associated with Mooir Vannin Offshore Wind Farm.	A summary of engagement is provided in **Section 3.5.1**. Impacts to navigational safety are described in **Section 8**. Impacts to ferry routes are described in **Section 8.2**. Project impacts are assessed in **9**. Cumulative impacts are assessed in **Section 10**.
19 December 2023	MCA	Meeting	Review of engagements and assessments to date, and review of findings of the shipping and navigation assessments. Cumulative impacts associated with Mooir Vannin Offshore Wind Farm.	A summary of engagement is provided in **Section 3.5.1**. Impacts to navigational safety are described in **Section 8**.

Date	Consultees	Source	Purpose and Issues Raised	Response to Issues within this NRA
				Project impacts are assessed in **9**. Cumulative impacts are assessed in **Section 10**.

3.5.2 Vessel traffic datasets

3.5.2.1.1 Vessel traffic data from several sources was utilised to determine baseline conditions:

- High fidelity AIS data for 2019 and 2022 for study area (Source: MarineTraffic);
- Vessel traffic surveys of the study area (see **Appendix E** for survey reports):
- Survey 1: 14 day winter vessel traffic survey (09-Feb-22 to 26-Feb-22[1]) collecting AIS, radar and visual observations
- Survey 2: 14 day summer vessel traffic survey (30-July-22 to 13-Aug-22[1]) collecting AIS, radar and visual observations
- Survey 3: 14 day winter vessel traffic survey (27-Nov-23[1] to 13-Dec-23) collecting AIS, radar and visual observations[2]
- MMO 2019 anonymised AIS data
- RYA Coastal Atlas
- UK Vessel Monitoring Systems (VMS) 2020 Data
- Department for Transport (DfT) Shipping Statistics (2000 to 2022)

3.5.3 Incident datasets

3.5.3.1.1 Three accident datasets were utilised to support this assessment:

- Marine Accident Investigation Branch (MAIB) accidents database (1992-2022)
- Royal National Lifeboat Institute (RNLI) incident data (2008-2022)
- DfT SAR Helicopter taskings (2015-2022)

3.5.4 Other datasets

3.5.4.1.1 Other datasets utilised to support this assessment include:

- Marine Aggregate Dredging Licenses (Crown Estate 2023)
- Offshore Renewables Lease Areas (Crown Estate 2023)
- Oil and Gas Activity, Location and Status (Oil and Gas Authority, 2023)
- Admiralty Charts (2023)
- Admiralty Sailing Directions (NP40 Irish Coast Pilot, 2019 and NP37 West Coasts of England and Wales Pilot, 2022)

[1] Survey duration includes periods of weather downtime.
[2] Additional survey data collected to validate Survey 1 baseline data

- Tidal Data (Admiralty Total Tide)
- MetOcean Data (Sailing Directions) (NP40 Irish Coast Pilot 2019)

3.5.5 Full bridge simulations

3.5.5.1.1 Full bridge simulations of ferry passages through the Irish Sea were commissioned for the Morecambe, Mona and Morgan projects to assess the PEIR windfarm site (array) boundaries in 2022 and the revised ES windfarm site boundaries in 2023. The aim of the simulations was to understand, in more detail, potential navigation impacts of the projects on existing commercial ferries and to test the viability and safety of commercial ferry transits between and around the projects in normal and adverse weather conditions.

3.5.5.1.2 The simulations were administered by HR Wallingford at their UK Ship Simulation Centre, following initial engagement in which the scope of the simulations, simulation scenarios and assessment criteria were agreed together with verification of the ship models being tested. Each simulation session was attended by ferry masters and officers and is summarised in **Table 8**.

3.5.5.1.3 The assessment criteria and simulation scenarios used within the simulations were developed and agreed with the ferry companies prior to each simulator run. Realistic traffic scenarios, emergency situations and normal/adverse weather conditions were determined based off the analysis contained within this NRA, and consultation with ferry operators. A detailed report of the findings of the simulations has been produced (Appendix E of Appendix 14.2 Cumulative Regional Navigational Risk Assessment (Document Reference 5.2.14.2)).

Table 8: Simulation sessions

Operator	Model Verification Session	PEIR Session (Mona / Morgan Only)	ES Session (Mona, Morgan, Morecambe)
IoMSPC	21-22 July-2022	16-19 Aug-2022	12-14 Jun-2023 (project teams only) 13-15 Sep-2023
Stena Line	11-12 Aug-2022	23-25 Aug-2022	23-25 May 2023
Seatruck Ferries	Previously agreed with HR Wallingford	08-09 Sep-2022	22-23 Jun-2023
P&O (Project team only)	N/A	26-Aug-2022	N/A

3.5.5.1.4 The 2022 PEIR simulations resulted in numerous failed runs, particularly during adverse weather and with complex traffic situations. The Morecambe windfarm site was not included in these simulations as it did not affect the adverse weather routeing being tested.

3.5.5.1.5 As part of the updated CRNRA, considering the amended Morgan, Mona and Morecambe project boundaries, the Navigation Simulations were repeated between May and September 2023 with a total of 35 additional runs carried out. The key findings of the updated navigation simulations were as follows:

- The ES boundaries significantly improved navigation over the 2022 PEIR boundaries
- Collision risk whilst navigating between and around the Mona, Morgan and Morecambe arrays was manageable with existing operational procedures in complex, worst credible traffic situations. These were in full compliance with COLREGs and the practice of good seamanship
- Routes remain susceptible to adverse weather, which necessitate longer deviations with Mona, Morgan and Morecambe in place
- Vessels operating near or within the offshore windfarms were apparent by radar and visual means and any collision risk situation could be determined by the passing ferries
- During emergency situations, there remained some optionality for Masters to best position their vessel to respond
- None of the simulated scenarios were appreciably more challenging at night than during the day

3.5.5.1.6 The full findings of the Session 2 simulations conducted in 2023 are reported in Appendix E of Appendix 14.2 Cumulative Regional Navigational Risk Assessment (Document Reference 5.2.14.2).

4. PROJECT DESCRIPTION

4.1 INTRODUCTION

4.1.1.1.1 This section provides an overview of the Project by setting out its main components, as outlined within the ES project description. It also gives an overview of the main activities that will be undertaken during construction, operation and maintenance, and decommissioning.

4.2 GENERATION ASSETS

4.2.1 Layout

4.2.1.1.1 The WTG and OSP positions within the windfarm site will be refined following further data gathering and analysis, and finalised post-consent in consideration of design rules.

4.2.1.1.2 The WTG layout can be described in general terms at this stage. It would have some form of regularity in plan (two lines of orientation), i.e. WTGs would be set out in a regular pattern such that they were aligned in two straight, intersecting rows. In-row spacing is the distance separating WTGs in the main rows, which are generally orientated perpendicular to the prevailing wind, or as close to this as is practicable. Inter-row spacing is the distance between the main rows.

4.2.1.1.3 It should also be noted there may be locations within the regular grid of WTGs left unoccupied. This could be due to less favourable ground conditions or exclusion distances from existing infrastructure.

4.2.1.1.4 A layout plan will be submitted to the MCA and TH for review prior to installation. The required lighting and navigational markings will also be agreed post consent.

4.2.2 Wind turbine generators

4.2.2.1.1 Parameters for WTGs have been considered for a range of sizes, with a number of foundation options under consideration. Given the range in WTG sizes, two WTG scenarios have been used to encompass the Project Design Envelope (PDE):

- More (35) smaller WTGs
- Fewer (30) larger WTGs

4.2.2.1.2 The current wind turbine design envelope for the windfarm site is outlined in **Table 9**.

Table 9: Wind turbine generator design envelope (also see Figure 3).

Wind Turbine Generator Parameter	Range to be considered	
	Smaller WTGs	Larger WTGs
Maximum number of WTGs	35	30
Rotor diameter (m)	260	280
Maximum blade tip height (m) above highest astronomical tide (HAT)	290	310
Maximum hub height (m above HAT)	160	170
Minimum rotor clearance above sea level (m above HAT)	25	
Indicative rotor speed range (rotations per minute (RPM))	8.42	7.09
Maximum rotor swept area for total windfarm site (km^2)	1.858	
Minimum separation between WTGs (m) in-row	1,060	1,260
Minimum separation between WTGs (m) inter-row	1,410	1,680

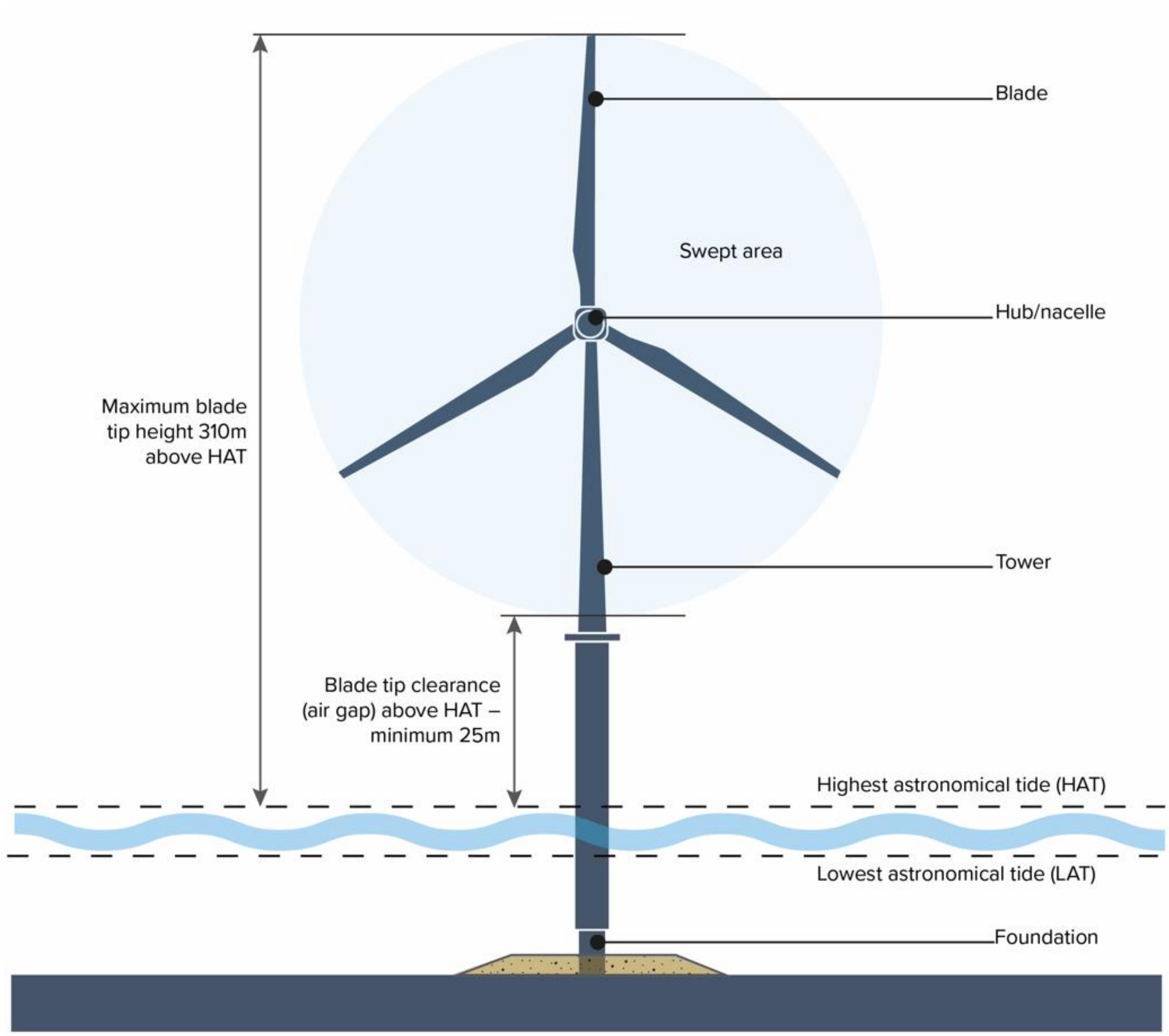


Figure 3: Wind turbine design envelope

4.2.3 Offshore substation platform(s)

4.2.3.1.1 The cables from WTGs will be brought to an offshore substation platform (OSP). Up to two OSPs may be required, depending on the electrical system voltage and final layout. At the OSP(s), the generated power will be transformed to a higher AC voltage suitable for transporting power to the onshore electrical transmission network. This higher voltage will be determined by detailed studies. The OSP(s) will be situated within the windfarm site.

4.2.3.1.2 The design of the OSP(s) will include a platform 'topside', supported above sea level on a foundation structure. The typical plan footprint of the OSP(s) will be a maximum of 50m by 50m, with the topsides comprised of several layers/decks stacked on top of another, as required. The highest point of topsides above HAT, including/excluding helideck and lightning protection, will be 50m/70m respectively. It is anticipated that OSP(s) will be installed prior to the WTGs.

4.2.4 WTG and OSP foundations

4.2.4.1.1 WTGs and OSP(s) will be fixed to the seabed with foundation structures. Potential WTG/OSP foundation types being considered are (options are illustrated in **Figure 4**):

- Gravity Base Structures (GBS)
- Multi-legged pin-piled jacket (four-legged[3])
- Monopile
- Multi-legged suction bucket jacket (three-legged jackets)

[3] There is a three-legged option, however the foundation design envelope is encompassed by the four-legged option.

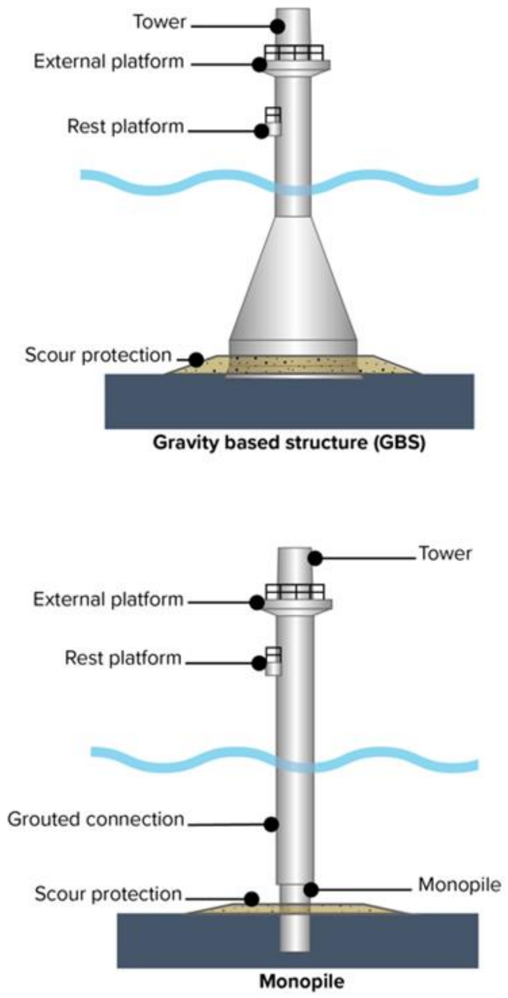


Figure 4: WTG/OSP foundation options

4.2.4.1.2 The foundation parameters are listed in **Table 10**. Seabed levelling may be required for the installation of all foundations.

Table 10: WTG/OSP foundation design envelope

Offshore Foundation Types	Parameter	Maximum
Gravity Base Structures	Maximum base slab diameter (m)	65
	Maximum cone bottom diameter (m)	55
	Maximum cone top/shaft diameter (m)	15
	Maximum cone height (m)	40
	Maximum footprint on the seabed per WTG/OSP (m^2)	3,318

Offshore Foundation Types	Parameter	Maximum
	Maximum footprint on the seabed for all WTGs/OSPs (m²)	122,766
Multi-legged pin-piled jacket (four-legged)	Maximum legs per jacket foundation	4
	Maximum pile diameter (m)	3
	Maximum leg spacing at seabed (m)	35
	Maximum footprint on the seabed, pile-edge to pile-edge, per WTG/OSP (m²)	28.5
	Maximum footprint on the seabed for all WTGs/OSPs (m²)	1,055
	Maximum pile penetration depth (m)	56
Monopile	Maximum pile diameter (m)	12
	Maximum footprint on the seabed per WTG/OSP (m²)	114
	Maximum footprint on the seabed for total WTGs/OSPs (m²)	3,648
	Maximum pile penetration depth (m)	56
Multi-legged suction bucket jacket (three-legged jacket)	Maximum legs per suction bucket (jacket) foundation	3
	Maximum bucket diameter (m)	20
	Maximum leg spacing at seabed (m)	35
	Maximum footprint on the seabed per WTG/OSP (m²)	945
	Maximum footprint on the seabed for all WTGs/OSPs (m²)	34,965
	Maximum bucket penetration depth (m)	25

4.2.5 Inter-array and platform link cables

4.2.5.1.1 Array cables connect the WTGs to each other and to the OSP(s). The array cables are expected to be 66kV to 132kV alternating current (AC). The length of each array cable will depend on the final layout.

4.2.5.1.2 Should the windfarm site require two OSPs, platform link cables will be required to connect each of the OSPs to enable transfer of generated power from one side of the windfarm site to the other, and to ensure that electricity transmission can continue in the event of one cable failing.

4.2.5.1.3 Where possible, inter-array and platform link cables will be buried, with depth of burial expected to be between 0.5 and 3m, and a target burial of 1.5m, and can be buried via several techniques depending on the seabed conditions along the route. It is anticipated that approximately 10% of the inter-array and platform link cable length will require additional cable protection due to ground conditions, noting that the burial depth and technique will be determined by a Burial Assessment Study (BAS) and a Cable Burial Risk Assessment (CBRA). The installation techniques include ploughing and trenching (including jetting and mechanical cutting). Where cable burial is not possible, alternative cable protection measures could be used. This includes rock placement and concrete mattresses.

4.2.5.1.4 Cable crossings will also be required where inter-array and platform link cables pass over other cables and/or pipelines.

4.3 OFFSHORE EXPORT CABLE

4.3.1.1.1 As described in **Section 1.1**, the Project and the Morgan Offshore Wind Project were scoped into the Pathways to 2030 workstream under the Offshore Transmission Network Review (OTNR). The output of this process concluded that both projects should work collaboratively in connecting the offshore windfarms to the National Grid at Penwortham, in Lancashire. Therefore, a separate joint consent application is being made for the shared offshore export cable corridors to landfall and shared onshore export cable corridors to onshore substations and grid connection point. The offshore export cable route associated with the Project is therefore not within the scope of this NRA and will be subject to a separate NRA for the joint Transmission Assets. Transmission Assets have been considered in the CRNRA (**Section 10**).

4.4 CONSTRUCTION

4.4.1 Construction Vessels

4.4.1.1.1 The number and specification of vessels employed during the construction of the Project will be determined by the marine contractor and the construction strategy, following successful consent to construct the Project. It is anticipated that several types of construction vessel could work in parallel during the construction period. During construction, it is estimated there will be up to 2,583 annual return vessel trips to deliver and install the main components to the windfarm site, to undertake cable installation and for support and crew vessels. Overall, a maximum number of 37 vessels are expected on site at any one time.

4.4.1.1.2 The final selection of the port facilities required to construct and operate the Project has not yet been determined, however it is assumed the construction port will be in the United Kingdom (UK) and the operational port will be within 50km of the windfarm site.

4.4.2 Unexploded ordnance clearance

4.4.2.1.1 Micro-siting of Project infrastructure will be adopted to avoid unexploded ordnance (UXO) where possible. Where avoidance is not possible for any reason, clearance activities may be required to safely remove or detonate any UXO that present a hazard to the construction activities, or the ongoing operation of the windfarm. Such clearance techniques could involve detonation, relocation or retrieval, with the implementation of appropriate safety zones. Low impact clearance techniques will be used where possible, e.g. low order deflagration.

4.4.2.1.2 Consent for UXO removal will be sought in a future Marine Licence application, when geophysical survey data of suitable spatial resolution is available to identify and quantify UXO risk.

4.4.3 Seabed preparation

4.4.3.1.1 Some form of seabed preparation may be required prior to installation of Project infrastructure. Seabed preparation includes seabed levelling, ground reinforcement, cutting and removal of any out of service cables, and removing surface and subsurface debris, such as boulders, fishing nets, lost anchors etc. If debris are present below the seabed, then excavation may be required for access and removal. Management of UXO is described in **Section 4.4.2**.

4.4.4 Marine construction and installation activities

4.4.4.1.1 The type of WTG/OSP foundation to be installed is yet to be determined and will depend on survey data, metocean data and the selected generator type. The foundations will be fabricated onshore, shipped from the designated loadout port to be marshalled, assembled with other components, and transported to the offshore site.

4.4.4.1.2 GBS will be lifted from barge and lowered to a prepared area of seabed, or adjusted buoyancy of floating foundation and sink to a prepared area of seabed.

4.4.4.1.3 Jacket foundations are anchored to the seabed by using single pin piles at each leg. Depending on seabed soil properties, pre-drilling at pile locations may be required to allow piles to achieve their target penetrations.

4.4.4.1.4 Monopiles can be installed with monohull floating, or jack-up, construction vessels. The monopile will be up-ended by crane to a vertical position and lowered to seabed through a pile guide. A piling rig will be added to the tip of the pile to drive it to the design target depth. Pre-drilling at pile locations may be required to allow piles to achieve their target penetrations.

4.4.4.1.5 It is expected that the WTG components will be lifted onto the installed foundation substructure by a jack-up vessel, typically with four or six legs. Similarly, the OSP substation topsides will be installed onto the OSP foundations using a crane vessel.

4.4.4.1.6 It is assumed that the cable lay vessel will use dynamic positioning for the installation of the inter-array and platform link cables.

4.4.4.1.7 Offshore cables will be buried for protection purposes at depths of between 0.5m and 3m, with a target depth of 1.5m. The length and depth of burial will be determined by a BAS and a CBRA.

4.5 OPERATIONS AND MAINTENANCE ACTIVITIES

4.5.1.1.1 Across the operational life of the windfarm site, operation and maintenance (O&M) activities can be split into three main categories as follows:

- Scheduled maintenance
- Unscheduled maintenance
- Emergency/special maintenance (in the event of major equipment breakdown and repairs)

4.5.1.1.2 The windfarm site will be maintained from shore using a number of varying O&M vessels (e.g. crew transfer vessels, supply vessels). An offshore base, for example a mother ship (a large offshore service vessel) may also be used. Helicopters are anticipated to be used only in exceptional circumstances.

4.5.1.1.3 A number of vessel visits to each WTG/OSP would be required each year to allow for scheduled and unscheduled maintenance. Up to three support vessels are expected on site at any one time during a standard year, with up to ten support vessels expected on site during a 'heavy maintenance' year. A further one jack-up barge may also be required approximately biennially (once every other year). Overall, a maximum of 384 return vessel trips during a standard year and 832 return vessel trips during a heavy maintenance year (expected to be every fifth year) are expected annually, including operational support vessels and those supporting maintenance activities.

4.5.1.1.4 The strategy for O&M will be finalised based on the location of a suitable port, which is yet to be defined. In choosing a suitable port, there will be requirements to ensure sufficient access to a fleet of vessels with the capabilities to complete any required O&M activities. The overall O&M strategy will also reflect the technical specification, once known, including WTG type, electrical transmission design and the final Project layout. At this stage, the high-level offshore activities will include, but not be limited to, the following:

- Inspections of cables, foundations, transition pieces, blades, safety equipment offshore substation equipment (including geophysical surveys to inspect subsea assets)
- Inspection and survey of cable and scour protection (including geophysical surveys to inspect subsea assets)
- System performance assessments and fault-finding
- Replacement of lubricants, oils and filters

- Grout and corrosion inspection and works (including cathodic protection and anode inspection, grouting core samples and re-grouting)
- Replacement of WTG parts, including bearings, gearboxes, generators, nacelles, transformers and blades
- Minor repairs and replacements
- Inspection of marine growth and removal of marine growth and guano
- Structural surveys
- Replenishment of cable and scour protection
- Recovery of dropped objects
- Transport and transfer of staff
- Inspection, maintenance and certification of lifting and lifesaving equipment
- Inspection and maintenance of equipment e.g. metocean equipment, communications systems, coating systems, electrical equipment, navigations aids, design generators, accommodation areas

4.5.1.1.5 Although it is not anticipated that large components would require replacement during the operational phase, it is a possibility. Should this be required, large jack-up vessels may need to operate continuously for significant periods to carry out these major maintenance activities. Replacement of a foundation would require a separate marine licence.

4.5.1.1.6 During O&M activities, the Project would seek to agree appropriate safety zones with the MCA around WTGs and work areas to be applied.

4.6 DECOMMISSIONING

4.6.1.1.1 At the end of the operational lifetime of the windfarm site, provisionally anticipated to be a minimum of 35 years, the decommissioning process will be undertaken in reverse of the construction sequence, involving similar types and numbers of vessels and equipment.

4.6.1.1.2 It is expected that the WTGs will be removed and the remaining foundations below the seabed may be left in a safe and fully buried condition. Any scour protection may also be left in-situ. The removal of OSPs is expected to be undertaken in two distinct stages; first, the topside will be removed from the foundation and transported to shore for onshore decommissioning, and second, the foundations will be removed in a similar manner to that of the WTG foundations. Inter-array and platform link cables may either be left in-situ, the entire cable network removed, or specific sections of the subsea cables could be removed.

4.6.1.1.3 At this stage, the full detail of the required decommissioning activities is not currently known. A decommissioning programme will be prepared and will be refined during the Project's lifetime and as decommissioning approaches. To reflect future best practice and new technologies, the approach and methodologies of the decommissioning activities will be compliant with the relevant legislation, guidance and policy requirements at the time of decommissioning.

4.7 MAXIMUM DESIGN SCENARIO

4.7.1.1.1 Based on a review of the Project description, the Maximum Design Scenario (MDS) used in this NRA is summarised in **Table 11.**

Table 11: MDS for the NRA

Parameter	Value
Project Boundaries	ES Boundary (87km^2) (**Figure 1**)
Operational Life	35 years
Maximum Number of WTGs/OSPs	Between 30 'larger' or 35 'smaller' WTGs, and up to two OSPs
Minimum Spacing Between Turbines (defined by the smaller WTGs)	1,060m in row 1,410m inter-row
Lines of Orientation	Two
Construction/ Decommissioning Base and Activities	Construction: 2.5 years duration Up to 2,583 return vessel movements/year Maximum of 37 vessels on site at any one time Port facilities yet to be determined
O&M Base and Activities	Assume NW England for O&M Base Maximum of 384 return vessel trips during a standard year with up to 3 vessels on site at any one time Maximum of 832 return vessel trips during a heavy maintenance year (expected to be every 5th year) with up to 10 vessels on site at any one time
WTG Size and Parameters	Maximum rotor diameter: 280m Maximum blade tip height: 310m above HAT Minimum blade tip clearance: 25m above HAT

4.8 NAVIGATIONAL MARKERS, LIGHTING AND CHARTING

4.8.1.1.1 Marking and lighting requirements for man-made offshore devices are described in IALA Recommendation G1162 (IALA, 2021) (previously O-139 2013). An Aids to Navigation (AtoN) Plan will be developed in agreement with the General Lighthouse Authority and MCA.

4.8.1.1.2 G1162 outlines the following specific recommendations made for offshore wind turbines (see **Figure 5**):

- Isolated WTGs, met masts and other structures are recommended to be:
- Marked with a white light flashing Mo (U) ≤15s, and with a nominal range of 10nm
- Have AtoN mounted below the lowest point of the arc of any rotor blades. They shall ideally be located at a height of at least six metres above HAT
- Have AtoN that comply with IALA recommendations and have an availability of not less than 99.0% (IALA Category 2)
- **Lettering:** It is recommended that each structure, displays identification panels with black letters or numbers one metre high on a yellow background visible in all directions
- **Painting:** Fixed structures should be painted yellow all around from the level of HAT up to at least 15m
- **Hazard Warning Signals:** Consideration may also be given to the provision of hazard warning signals, where appropriate, taking into account the prevailing visibility and vessel traffic conditions. The range of such a hazard warning signals should not be less than two nm
- **AIS/Racons:** Where there is a requirement to remotely identify a particular structure a radar beacon (racon) and/or an AIS AtoN may be fitted
- **A Significant Peripheral Structure (SPS)** will include the structures on the corners/periphery of an OWF as determined by the competent authority. It is recommended that:
- These lights display a Special Mark characteristic, flashing yellow, with a minimal nominal range of five nm
- The competent authority (AtoN) may consider the synchronization of all SPS of the same light characteristic
- In the case of a large or extended OWF, the distance between SPS should not normally exceed three nm

- On large windfarms, consideration should be given to using different light characteristics for marking SPS on corners of windfarms to those marking structures along the periphery of the windfarm
- SPS - lights visible from all directions in the horizontal plane. It is recommended to synchronize these lights in order to display a Special Mark characteristic, flashing yellow, with a range of not less than five nm
- **Intermediate Peripheral Structures (IPS)** may be considered selected on the periphery of an OWF:
- Are marked with flashing yellow lights
- The flash character of these lights shall be distinctly different from those displayed on the SPS, with a nominal range of two nm
- Have a lateral distance between IPS or the nearest SPS which will not normally exceed two nm
- Intermediate structures on the periphery of an OWF other than the SPS - marked with flashing yellow lights which are visible to the mariner from all directions in the horizontal plane with a flash character distinctly different from those displayed on the SPS and with a range of not less than two nm
- **Promulgation:** Notices to Mariners and the relevant Hydrographic Office must be informed of the marking, location and extent of any man-made structure, to permit the appropriate marking

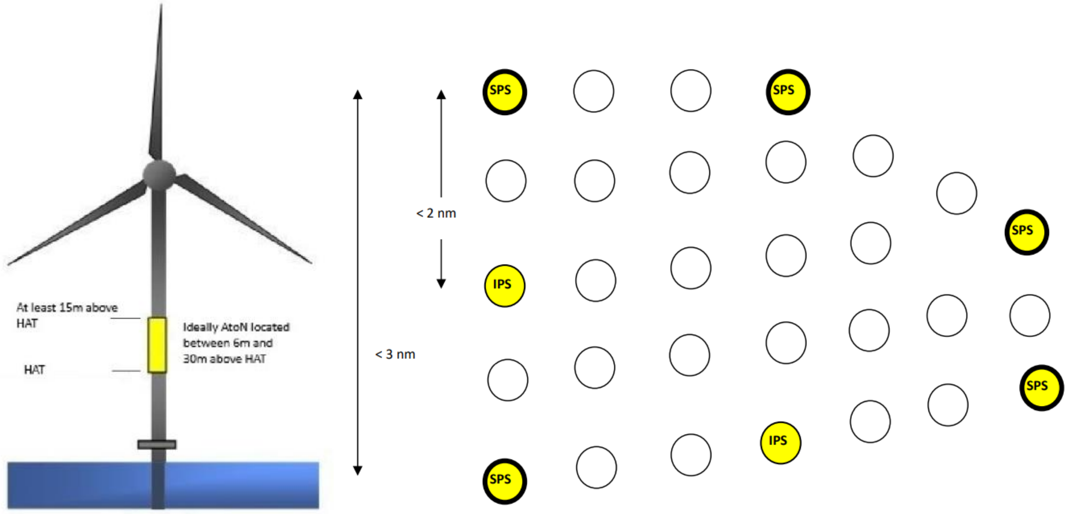


Figure 5: IALA G1162 OWF marking recommendations

4.9 EMBEDDED RISK CONTROLS

4.9.1.1.1 **Table 12** describes industry standard risk controls that the Project considers "embedded" in the project plans and design.

Table 12: Embedded risk controls

ID	Title	Description	Risks mitigated	Requirement
Promulgation and Awareness (PROM)				
PROM1	Notice to Mariners	To ensure that the appropriate authorities are informed of works being carried out in waters adjacent to the Projects. To include: • United Kingdom Hydrographic Office (UKHO) • MCA • Kingfisher • Trinity House • RYA • Local Ports and Harbours • Oil and Gas operators • MMO	All direct impacts of Project.	Typical licence condition
PROM2	Site Marking and Charting	Site is marked on nautical charts including an appropriate chart note.	All direct impacts of Project.	Typical licence condition
PROM3	Safety Zone	Application and use of safety zones of up to 500m measured from the outer edge of the surface infrastructure during construction/major maintenance and decommissioning phases. Safety zones shall be of appropriate configuration, extent and application to specified vessels of identified primary risk of sub-sea equipment to fishing and snagging hazard.	Risk of allision with structures.	Application under Electricity Regulations 2007

ID	Title	Description	Risks mitigated	Requirement
PROM4	Fisheries Liaison and Co-existence Plan	Provision of detailed Project information to fishermen, such as site location for upload into chart plotters	Fishing hazards, including snagging of cables.	Typical licence condition
PROM5	Continued Engagement	• Maintain the MNEF to facilitate information sharing and management/identification of additional risk controls: • Identify near misses and investigate incidents, disseminating learnings. • Coordinate construction activities.	Risk of allision or collision	Project commitment
PROM6	Recreational/Fishing Liaison	Ensure nominated persons are able to coordinate and communicate Project activities to recreational and fishing user groups. This includes during specific events (regattas).	Risk of allision, collision or cable snagging	Project commitment
Emergency Response (EMER)				
EMER1	Emergency Response Co-Operation Plan (ERCOP)	ERCOP with agreement of MCA.	Reduction of consequences of incidents.	Typical licence condition
EMER2	Marine Pollution Contingency Plan	Measures will be adopted to ensure that the potential for release of pollutants from construction, operation and maintenance activities is minimised, which will include planning for accidental spills and responding to all potential contaminant releases.	Reduction of consequences of incidents.	Typical licence condition
EMER3	Periodic Exercises	Periodic emergency management and response exercises will be run by developer, in conjunction with Coastguard Operations Centre (CGOC)/SAR.	Reduction of consequences of incidents.	Industry best practice

ID	Title	Description	Risks mitigated	Requirement
EMER4	Incident Investigation and Reporting	There are statutory incident reporting requirements and expectations: • MAIB (Merchant Shipping Act) • Health, Safety and Environment (HSE) (RIDDOR) • Harbour Authority under Port Marine Safety Code Risk assessments to be reviewed following incidents, and additional risk controls identified if appropriate.	Reduction of likelihood of incident reoccurrence.	Industry best practice
Site Design (DES)				
DES1	Aids to Navigation	Suitable (AtoN) lighting and marking the OWF site shall be undertaken complying with IALA Recommendations G1162 (IALA, 2021), to be finalised and approved in consultation with MCA and TH through an Aids to Navigation Management Plan. Review use of fog horns to alert vessels to the position of structures when visibility is poor. WTG informal naming/associated markings shall not interfere with formal AtoN's. AIS transponders to be placed on periphery corner WTGs.	Risk of allision with structures.	Typical licence condition
DES2	Buoyed Construction Area	Buoys deployed around construction work in windfarm site in line with TH requirements and may include a combination of cardinal and/or safe water marks. To be finalised and approved in consultation with MCA and TH through an Aids to Navigation Management Plan.	Risk of allision with structures or collision with construction vessels.	Typical licence condition

ID	Title	Description	Risks mitigated	Requirement
DES3	Hydrographic Surveys	MGN 654 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. Further information can be found in MGN 654 Annex 4 supporting document titled 'Hydrographic Guidelines for Offshore Developers', available on website.	Risk of grounding or snagging of cables.	Typical licence condition
DES4	Cable Burial Risk Assessment and periodic validation surveys	CBRA to be undertaken pre-construction, including consideration of under keel clearance. All subsea cables will be either fully buried (where ground conditions permit and burial tool performance allows), partially buried (buried but not to target depth) with rock protection, or surface laid with rock protection. Selected methods will be based on the risk assessment and the protection will be periodically monitored and maintained as practicable. No more than 5% reduction in water depth (referenced to Chart Datum) will occur at any point on the cable route without prior written approval from the MCA.	Risk of grounding or snagging of cables.	Typical licence condition
DES5	Air Draught Clearance	Wind turbine blades will have at least 22m clearance above water level and allow for anticipated range of motion (pitch, roll, yaw, heave, surge and sway), as appropriate.	Risk of allision/contact with structures.	Typical licence condition/MGN 654 recommendation
DES6	Layout Plan and Lines of Orientation	WTG layout plan to be agreed with MCA and TH prior to construction and maintain two lines of orientation.	Risk of allision/contact with structures and ensuring access for SAR.	Typical licence condition

ID	Title	Description	Risks mitigated	Requirement
DES7	Electromagnetic interference minimisation	A Cable Specification, Installation and Monitoring Plan will be prepared. This will include the technical specification of offshore electrical circuits, and a desk-based assessment of attenuation of electro-magnetic field strengths, shielding and cable burial depth in accordance with industry good practice.	Impact on navigation and communications equipment.	Industry best practice
DES8	Layout Design	To increase manoeuvring space and reduce impact on operators, project boundaries have been revised comprising realignment of western boundary to minimise impact to passage plan routes of ferries and commercial vessels, minimise course changes for vessels navigating north south.	Impact of windfarm site on ferry and commercial vessel routeing. Risk of allision or collision Impact on visual navigation.	Project commitment
Operational Management (OPS)				
OPS1	Construction Method Statement and Programme and Decommissioning Method Statement	Construction programme and plan to be submitted to MCA and TH for consultation. Where possible, construction to follow linear progression avoiding disparate construction sites across the windfarm site.	Risk of allision with structures or collision with vessels.	Typical licence condition
OPS2	Marine Operating Guidelines	Project vessels to follow Marine Operating Guidelines during construction and operation and maintenance activities to ensure Project vessels do not present unacceptable risks to each other or third parties. 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 windfarm site and activities during the offshore cable corridor construction.	Risk of allision with structures or collision with vessels.	Typical licence condition

ID	Title	Description	Risks mitigated	Requirement
OPS3	Vessel Standards	All work vessels operating on behalf of Project will have: • MCA vessel coding. • Appropriate insurance. • Crewed by suitably trained/qualified personnel. • AIS (Class A/B). • Very High Frequency (VHF) (Ch16). • Appropriate Mooring arrangements.	Risk of allision with structures or collision with vessels.	Industry best practice
OPS4	Personal Protective Equipment (PPE)	All personnel will wear the correct PPE suitable for the location and role at all times, as defined by the relevant Quality, Health, Safety and Environment (QHSE) documentation. This will include the use of Personal Locator Beacons (PLB's).	Minimising risk of loss of life.	Industry best practice
OPS5	Guard Vessels	Provision of guard vessel in vicinity of windfarm site during construction or major maintenance to monitor third party vessel traffic and intervene with warnings as necessary.	Risk of allision with structures or collision with construction vessels.	MGN 654 recommendation
OPS6	Inspection and Maintenance Programme	Regular maintenance regime by developer to check the Project infrastructure, its fittings and any signs of wear and tear. This should identify any areas which might result in a failure.	Minimising risk of Project asset failure.	Industry best practice
OPS7	Training	Developers are responsible for ensuring that all staff engaged on operations are competent to carry out the allocated work.	Minimising risk of loss of life.	Industry best practice

ID	Title	Description	Risks mitigated	Requirement
OPS8	Compliance with International, UK and Flag State Regulations inc. IMO conventions	Compliance from all vessels associated with the proposed Project with international maritime regulations as adopted by the relevant flag state (e.g. International Convention for the Prevention of Collision at Sea (COLREGS) (IMO, 1972) and SOLAS (IMO, 1974)	Risk of allision with structures or collision with vessels.	Industry best practice
OPS9	Vessel health and safety requirements	As industry standard mitigation, the Applicant will ensure that all Project related vessels meet both IMO conventions for safe operation as well as HSE requirements, where applicable. This shall include the following good practice: • Windfarm 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 by the Project 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.	Minimising risk of loss of life.	Industry best practice
Site Monitoring (MON)				
MON1	Continuous Watch	Continuous watch by multi-channel VHF, including Digital Selective Calling (DSC).	Responding to incidents swiftly.	MGN 654 recommendation

ID	Title	Description	Risks mitigated	Requirement
MON2	Vessel Traffic Monitoring	Continuous monitoring during construction and immediate period post construction to MCA approval	Identification of unanticipated Project impacts.	Typical licence condition
MON3	Vessel Traffic Management Plan (VTMP)	Development of a VTMP covering aspects of vessel management during the construction phase to set out the measures required to mitigate traffic and transport-related effects resulting from the construction.	Risk of allision with structures or collision with construction vessels.	Typical licence condition
MON4	CTV (Crew Transfer Vessel) Passage Planning	Develop coordinated passage plans for CTVs that minimises impact on other traffic, could include: • Specified passage plans; • Agreed passing protocols/CPA for interactions with commercial shipping (e.g. no crossing within 5nm ahead of commercial vessel underway); • Reporting protocols to be established prior to crossing corridors; • Dissemination of passage plans and operations to regular runners and ferry services; and • Restricted visibility protocols.	Risk of collision between Project vessels and any other vessels	Project commitment

5. OVERVIEW OF THE BASELINE ENVIRONMENT

5.1 ADMIRALTY CHARTS

5.1.1.1.1 The study area is well charted and covered by Admiralty Chart 1826-0.

5.2 METOCEAN CONDITIONS

5.2.1 Wind and wave climate

5.2.1.1.1 MetOcean conditions are described for the study area for the wind and wave climate, tide and currents, and visibility.

5.2.1.1.2 MetOcean information for the area has been provided by Admiralty Sailing Directions West Coasts of England and Wales Pilot, NP37, 21st Edition, 2022. The closest station to the windfarm site is located at Blackpool (53° 46’ N 003° 02’ W), 10m above Mean Sea Level (MSL) with information presented in **Figure 6**.

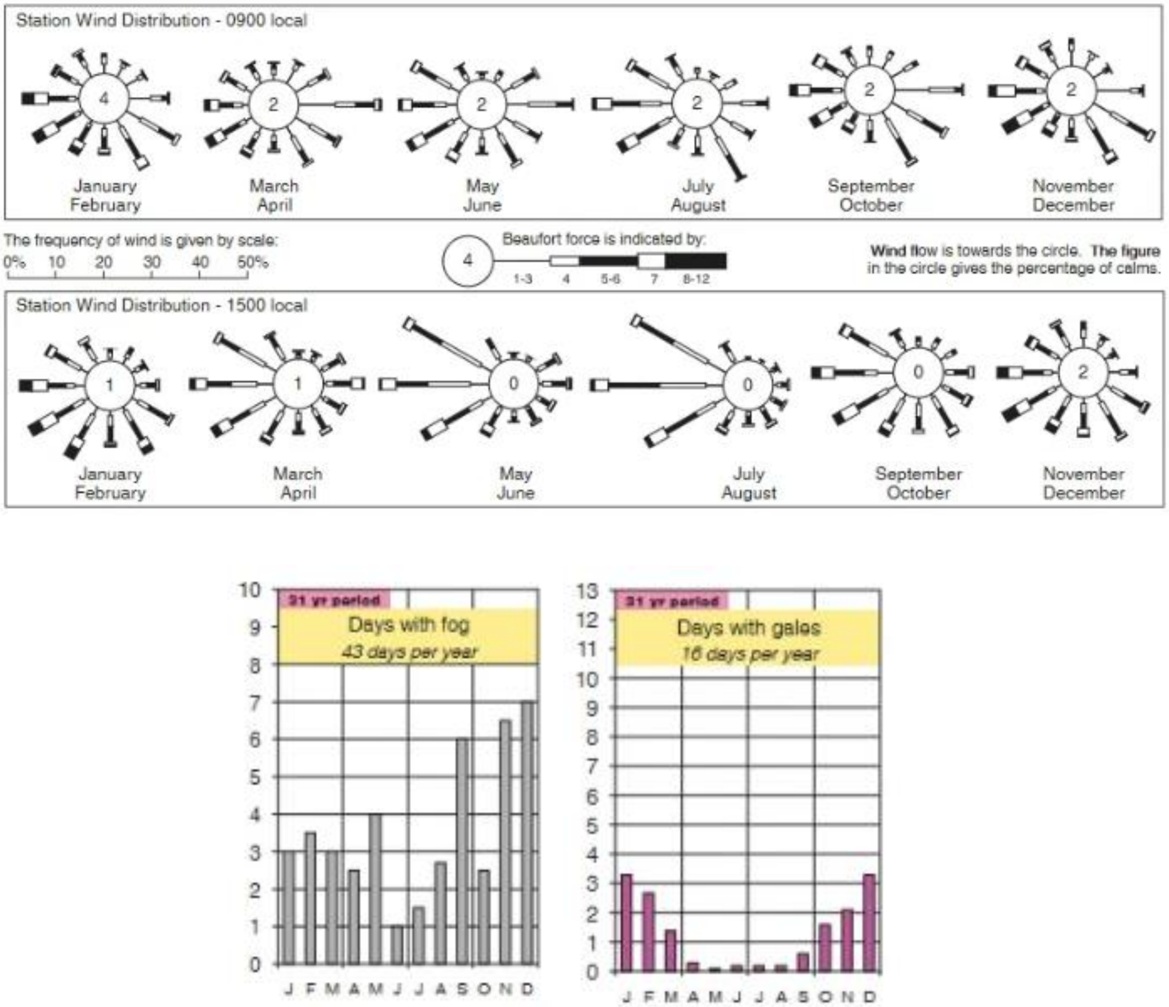


Figure 6: MetOcean conditions – Blackpool

5.2.1.1.3 The most frequent waves across the windfarm site approach from the west southwest (see **Figure 7**). Fetch lengths from this direction are relatively short, due to the presence of Ireland, Isle of Man and Anglesey land masses. Nearshore wave conditions are modified by the presence of sandbanks, such as Cockerham Sands, Sunderland Bank, Shell Flat and the Shoulder of Lune. The Lune Deep protects the northern Fleetwood coast by refracting severe waves northwards[4].

[4] Morecambe Offshore Windfarm Scoping Report – Generation Assets. Document code: FLO-MOR-REP-0007, version 3.0, June 2022.

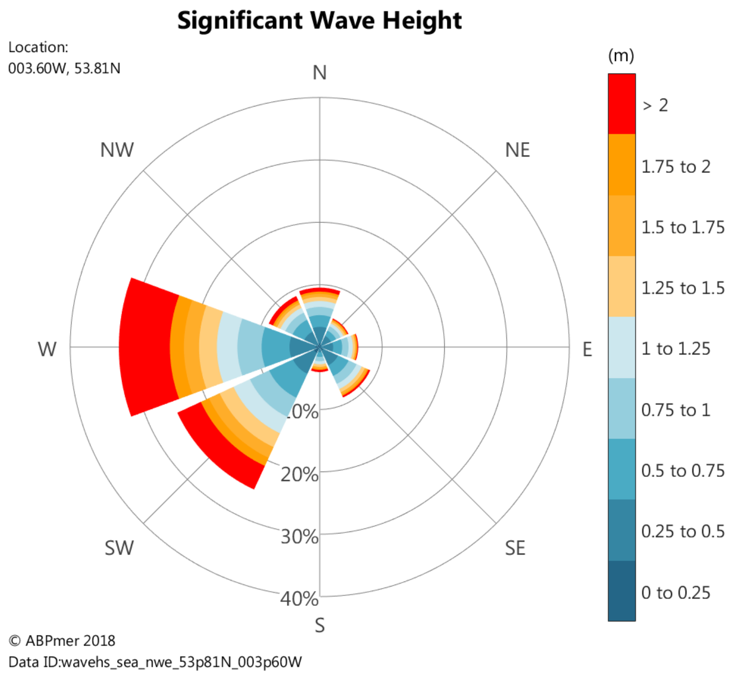


Figure 7: Dominant wave direction rose diagram at the windfarm site (ABPmer, 2018)

5.2.2 Tides and currents

5.2.2.1.1 Tidal current flows across the windfarm site are from the east/north-east on a flood tide, and to the west or south-west on an ebb tide. Mean spring tidal current speeds of 0.45-0.75m/s (0.87-1.46kts) occur at the windfarm site on a flood tide and 0.45-0.60m/s (0.87-1.17kts) on an ebb tide. The Lune Deep is subject to strong tidal currents. Tidal current speeds in the deep-water channel are approximately 0.90-1.05m/s (1.75-2.04kts) (flood tide) and 1.05-1.35m/s (2.04-2.62kts) (ebb tide). Tidal current speeds decrease closer to the coastline[5].

5.2.2.1.2 Tidal diamond M (53° 54.0 N, 003° 44.6 W) from Admiralty Chart 1826-0, located 3nm of the windfarm site, is presented in **Table 13**, providing context of tidal current rates and directions in spring and neap tidal cycle conditions. There are no tidal limitations at the windfarm site.

[5] Morecambe Offshore Windfarm Scoping Report – Generation Assets. Document code: FLO-MOR-REP-0007, version 3.0, June 2022.

Table 13: Details for tidal diamond M on Admiralty Chart 1826-0.

Hours		Tidal Stream	Rate at spring tide (kn)	Rate at neap tide (kn)
Before High Water	6	024°	0.4	0.2
	5	067°	0.7	0.4
	4	078°	1.1	0.6
	3	082°	1.4	0.7
	2	086°	1.3	0.7
	1	101°	0.9	0.4
High Water (HW)		174°	0.5	0.2
After High Water	1	231°	0.9	0.5
	2	251°	1.4	0.8
	3	263°	1.5	0.8
	4	277°	1.2	0.6
	5	297°	0.8	0.4
	6	347°	0.4	0.2

5.2.3 Visibility

5.2.3.1.1 The Admiralty Sailing Directions reports fog between 43 days/year (Blackpool) and 12 days/year (Crosby).

5.3 PRINCIPAL NAVIGATIONAL FEATURES

5.3.1 Key Features

5.3.1.1.1 Key relevant features relating to management of vessels and safety of navigation are described in this section and shown in **Figure 8** and **Figure 9.**

5.3.2 Responsible authorities – MCA

5.3.2.1.1 The study area is in a region of general navigation in UK waters with the MCA as the responsible authority for safe navigation.

5.3.3 IMO routeing/reporting measures and recommended channels

5.3.3.1.1 There are no IMO routeing/reporting measures or recommended channels in the study area.

5.3.3.1.2 The Liverpool Bay TSS is the closest routeing measure, located approximately 12.4nm south of the windfarm site (see **Figure 8**). This TSS deconflicts vessel traffic on passage to/from the Mersey ports and maintains a safe distance between vessels, the oil and gas infrastructure to the north and the Gwynt-Y-Mor windfarm to the south. The area surrounding the Douglas Oil Field infrastructure is charted 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'.

5.3.4 Aids to navigation

5.3.4.1.1 AtoNs located in the study area are shown in **Figure 8**. There are AtoNs marking oil and gas infrastructure located within the study area, with one platform charted adjacent to the western boundary of the windfarm site (Calder 110/7a marked with a white light displaying morse 'U'). There are nine other locations in the study area where oil and gas infrastructure is marked with either AtoN on the structure, buoyage or both. It is noted that the DP3 110/8 structure, located in the windfarm site, is charted as having four cardinal marks. The DP3 110/8 structure has been fully decommissioned and removed and as well as all associated cardinals have been removed.

5.3.4.1.2 AtoNs marking the West of Duddon Sands (WODS) windfarm and the Walney windfarm are present to the north of the study area. These AtoN comprise of cardinal marks indicating the safe water to the south and east of the WODS windfarm and marking of SPS for both windfarms.

5.3.4.1.3 The Morecambe westerly cardinal mark is located 5nm northeast of the windfarm site, marking the western extent of Shell Flat on the southern approaches to Lune Deep.

5.3.4.1.4 A Single Buoy Mooring (SBM) for mooring vessels transferring oil from Douglas oil field is located 4nm south of the windfarm site.

5.3.5 Pilotage

5.3.5.1.1 Pilot boarding stations for ports in the area with Competent Harbour Authority (CHA) status are shown on **Figure 8.** Pilot stations and their proximity to the windfarm site are provided in **Table 14.** There are no pilot boarding stations within the study area.

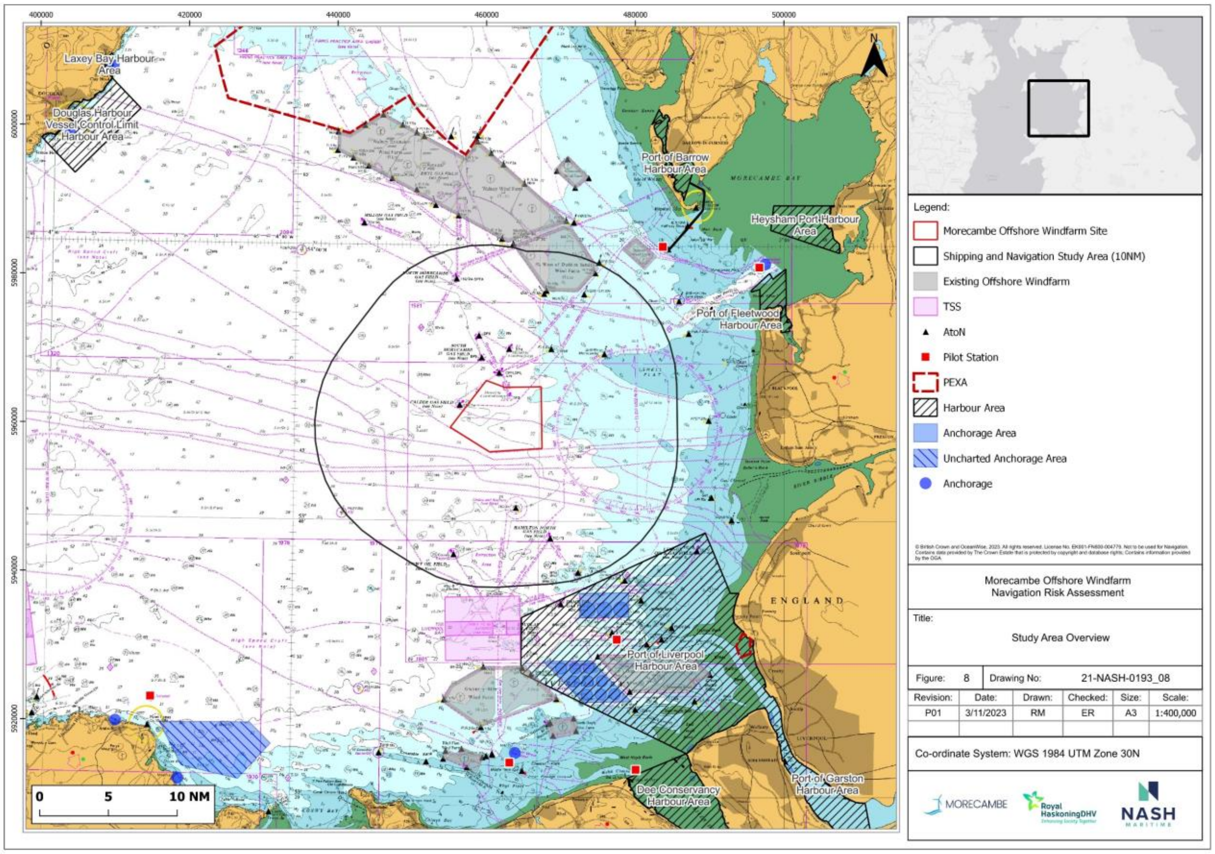


Figure 8: Navigational features in the study area

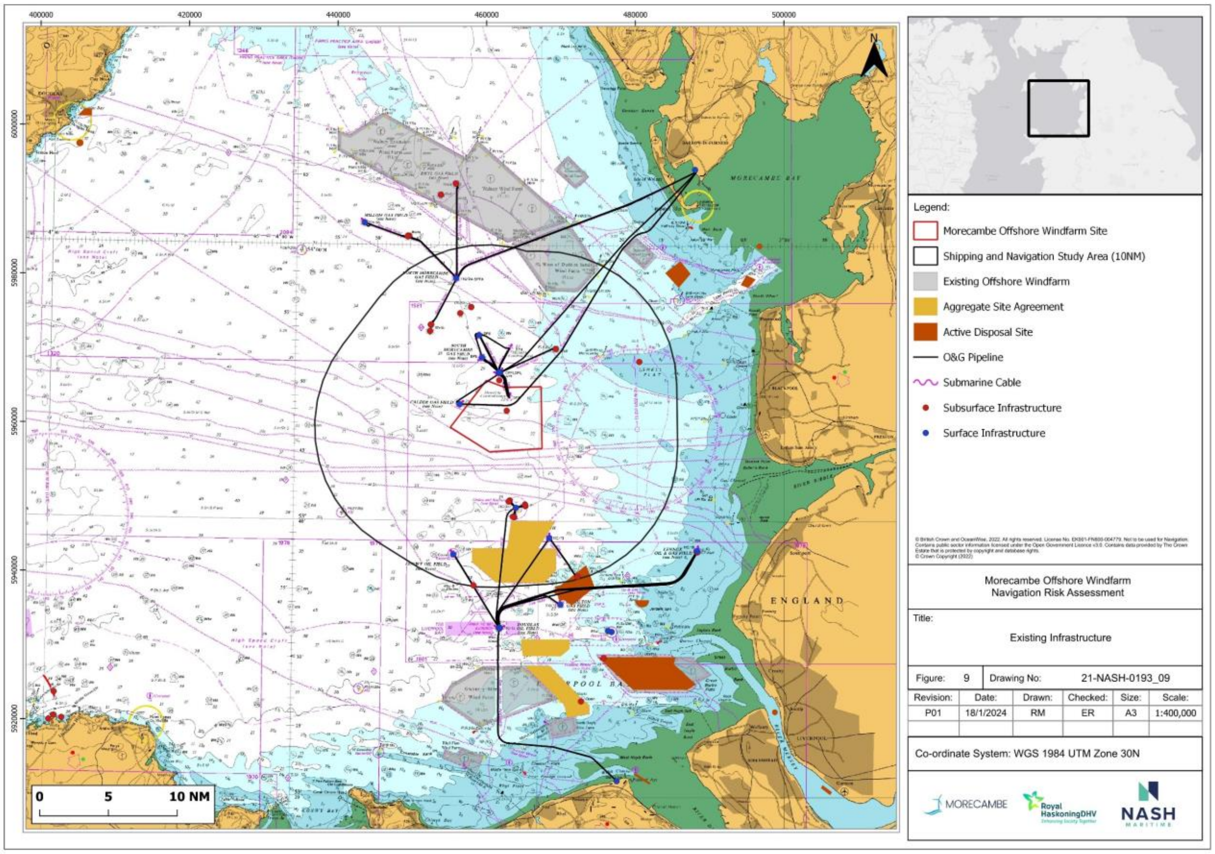


Figure 9: Existing offshore activities and infrastructure

Table 14: Pilot boarding stations

Boarding Station	Distance from windfarm site
Barrow	13nm northeast
Liverpool	15nm southeast
Fleetwood and Heysham	18nm northeast
Mostyn Outer	23nm south
Mostyn	24nm southeast
Point Lynas (Liverpool heavy weather)	29nm southwest
Douglas Port (pilot boarding stations for Liverpool)	35nm northwest

5.4 VESSEL TRAFFIC SERVICE

5.4.1.1.1 The windfarm site and study area are outside of any Vessel Traffic Service (VTS) or Local Port Service (LPS) areas. The closest VTS is Liverpool to the southeast of the study area. The VTS covers the Liverpool Statutory Harbour Authority (SHA) area monitoring vessel traffic through AIS and radar.

5.5 LOCAL PORTS AND HARBOURS

5.5.1.1.1 Nearby ports and harbours are shown in **Figure 8** and **Table 15**.

Table 15: Ports and harbours

Port	Type	Distance from windfarm site
English Ports		
Port of Barrow (England)	Commercial port	19nm northeast
Port of Fleetwood (England)	Fishing and recreational port	18nm northeast
Heysham Port (England)	Commercial port	24nm northeast
Port of Liverpool (England)	Major west coast commercial port	25nm southeast
Isle of Man Ports		
Douglas Port	Main port for the Isle of Man. Commercial port	35nm northwest
Laxey Port	Fishing and recreational port	36nm northwest
Castletown Harbour (Isle of Man)	Fishing and recreational port	38nm northwest
Port Erin (Isle of Man)	Fishing and recreational port	43nm northwest
Port St Mary (Isle of Man)	Fishing and recreational port	41nm northwest
Peel (Isle of Man)	Fishing and recreational port	44nm northwest
Welsh Ports		
Port of Mostyn (Wales)	Commercial port	27nm southeast
Conwy Harbour (Wales)	Fishing and recreational port	29nm south
Holyhead (Wales)	Commercial port	42nm southwest

5.6 SEARCH AND RESCUE

5.6.1.1.1 His Majesty's Coastguard's (HMCG) Aviation Branch provides aviation-based search and rescue via the UK Search and Rescue Helicopter (UKSARH) programme. The nearest HMCG helicopter base is located at Caernarfon Airport, Gwynedd and is 47nm southwest of the windfarm site. The Caernarfon Facility provides a 24-hour search and rescue service, with two Sikorsky S-92 helicopters.

5.6.1.1.2 There are 12 RNLI lifeboat stations within the region, as detailed in **Table 16** and shown in **Figure 10**.

Table 16: RNLI stations in the east Irish Sea

ID	Facility	Resources	Distance from windfarm site
1	**Blackpool**	Lifeboat station with three inshore lifeboats, including an Atlantic 85 and two D class lifeboats.	16nm east
2	**Lytham St Annes**	Shannon class all-weather lifeboat and a D class inshore boat. Lifeboats are housed in Lytham and St Annes.	16nm east
3	**Fleetwood**	Shannon and D class lifeboats.	18nm northeast
4	**Barrow**	Tamar class and D class lifeboats.	19nm northeast
5	**Hoylake**	Shannon class lifeboat.	24nm southeast
6	**West Kirby**	D class lifeboat.	26nm southeast
7	**Rhyl**	Shannon class all-weather lifeboat and a D class inshore boat.	26nm south
8	**Llandudno**	Shannon class all-weather lifeboat and a D class inshore boat.	27nm south
9	**Morecambe**	D class and Hover class lifeboats.	27nm northeast
10	**Douglas (Isle of Man)**	Mersey class lifeboat. There are also RNLI stations located in Port Erin, Port St. Mary and Peel in the Isle of Man.	36nm northwest
11	**Moelfre**	Tamar class and D class lifeboats.	32nm southwest
12	**New Brighton**	Operates a B class Atlantic 85 lifeboat.	25nm southeast

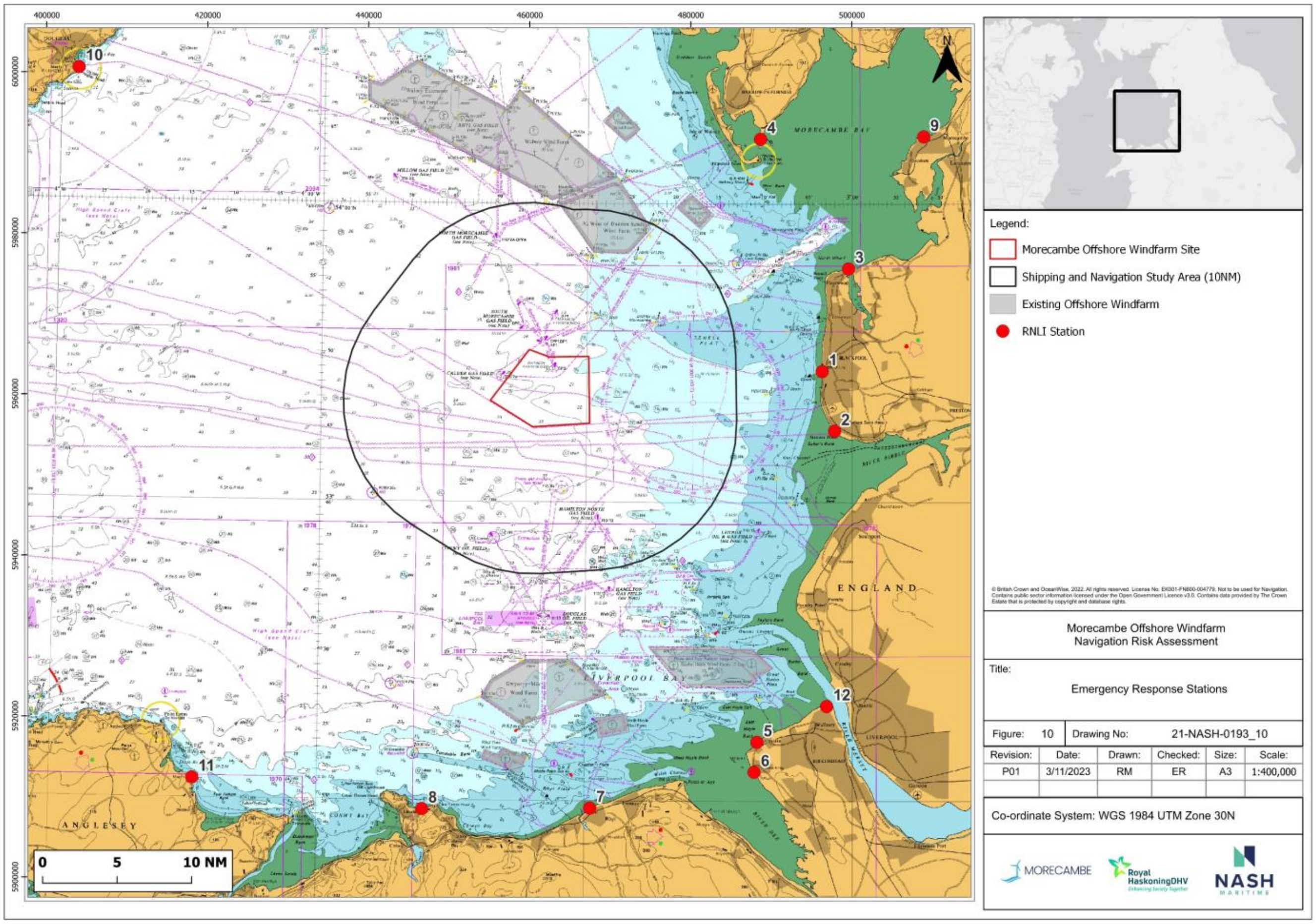


Figure 10: Emergency response stations

5.7 OTHER OFFSHORE ACTIVITIES

5.7.1 Oil and gas

5.7.1.1.1 The study area overlaps with the South Morecambe gas field, North Morecambe gas field and the Calder gas field. South Morecambe gas field is owned and operated by Spirit Energy. Calder 110/7a is owned by Harbour Energy and operated by Spirit Energy, with the pipeline between the Calder CA1 platform and the onshore facility at Barrow running through the windfarm site. These fields are supported by offshore infrastructure (platforms, pipelines, cables and wells) and onshore facilities for extracting, transporting and processing reserves. Some wells and pipelines associated with these fields overlap with the windfarm site.

5.7.1.1.2 The closest gas platforms to the Project windfarm site are the Calder CA1 platform located 0.9km (0.5nm) to the west of the site, and the South Morecambe Central Processing Complex (CPC) located 1.6km (0.9nm) to the north of the site. CPC is comprised of three bridge linked platforms including an accommodation platform (AP1), central production platform (CPP1) and drilling platform (DP1). AP1 and CPP1 combined are referred to as CPC-1. Oil and gas infrastructure within proximity of the windfarm site is listed in

5.7.1.1.3 **Table** 17 and shown in **Figure 9**.

Table 17: Oil and gas fields in the east Irish Sea

Name	Type	Distance from windfarm site	Status
Calder gas field	Normally unmanned	0.2nm west	Producing. Decommissioning expected, but timeline not fully established.
South Morecambe gas field	Manned	0.6nm north	Producing. Decommissioning of two drilling platforms (DP3 and DP4) commenced in 2021, with the decommissioning of these platforms and jackets completed in 2023. Decommissioning of DP6, DP8 and CPP1 is planned but timeline not fully established.
North Morecambe gas field	Manned	7.4nm north	Producing
Hamilton North gas field	Normally unmanned	6.3nm south	Producing
Conwy Oil field	Manned	7.4nm south	Producing
Hamilton gas field	Normally unmanned	11.2nm south	Producing
Millom gas field	Normally unmanned	14.2nm northwest	Producing
Douglas Oil field	Manned	12.4nm south	Producing
Lennox Oil and gas field	Normally unmanned	13.3nm southeast	Producing

5.7.2 Subsea cables

5.7.2.1.1 The Irish Sea has a significant number of cables, primarily telecommunication connections between the UK and the Isle of Man and Ireland, along with numerous export cables from existing offshore windfarms.

5.7.2.1.2 In the windfarm site there are power cables suppling the oil and gas infrastructure at the Calder Gas Field and South Morecambe gas field, along with the GTT/Hibernia Atlantic cable traversing the windfarm site in a west-east direction (see **Figure 9**). The telecommunications cable Lanis 1, owned by Vodafone, runs along the southern boundary of the windfarm site.

5.7.2.1.3 In the wider study area, to the south of the windfarm site, there are five telecommunications cables running from either Blackpool or Southport to either the Republic of Ireland or the Isle of Man. North of the windfarm site, there is one power interconnector between Douglas and Blackpool, along with the inter-array cabling and export cables for the other windfarms in the study area. There is also one power cable passing through the south-west of the study area, between Birkenhead and Ardneil Bay, West Kilbride, Scotland.

5.7.3 Aggregates

5.7.3.1.1 There are no aggregate extraction areas in the windfarm site. The closest active aggregate extraction area to the windfarm site is Area 457, in Liverpool Bay, to the south of the study area. All aggregate and extraction areas in the vicinity are detailed in **Table 18**.

Table 18: Aggregate and extraction areas

Name	Type	Distance from windfarm site
Area 457: Liverpool Bay	Extraction Area	5nm south
Area 1808: Liverpool Bay	The Crown Estate 2018/19 Marine Aggregates Tender	13.8nm south
Area 392/393: Hilbre Swash	Extraction Area	15.5nm south

5.7.4 Disposal sites

5.7.4.1.1 Disposal sites are shown in **Figure 9**. One licensed active disposal area is present within the study area. The distances of local active disposal areas to the windfarm site are presented in **Table 19**.

Table 19: Active disposal areas in vicinity of the study area

Disposal area	Distance from windfarm area
Site Y	9nm southeast
Barrow D	12.2nm northeast
Site Z	12.9nm southeast
Morecambe Bay: Lune Deep	16.3nm northeast
Burbo Bank Extension OWF	15.7nm southeast
Mersey	25.3nm southeast
Mostyn Deep	24.3nm southeast
Douglas Harbour	35nm northwest

Douglas	34nm northwest

5.7.5 Other offshore wind projects

5.7.5.1.1 The proximity of existing offshore wind infrastructure to the Project windfarm site is listed in **Table 20** and shown in **Figure 8**.

Table 20: Proximity of offshore windfarms to the Project windfarm site

Name	Type	Distance to windfarm site	Status
WODS Windfarm	Operational windfarm (389MW capacity)	7nm north	Operational since 2014
Walney Windfarm (including extensions)	Group of operational windfarms (total capacity of 1026MW)	10.1nm north	Operational since 2011, with extensions operational in 2012 and 2018
Barrow Windfarm	Operational windfarm (90MW capacity)	11.4nm northeast	Operational since 2006
Ormonde Windfarm	Operational windfarm (150MW capacity)	14.5nm north	Operational since 2012
Gwynt-y-Môr Windfarm	Operational windfarm (576MW capacity)	15.5nm south	Operational since 2015
Burbo Bank Windfarm (including extensions)	Operational windfarm (90MW plus 258MW extension)	15.6nm southeast	Operational since 2007, extension operational since 2017
North Hoyle Windfarm	Operational windfarm (60MW capacity)	19.5nm south	Operational since 2004
Rhyl Flats Windfarm	Operational windfarm (90MW capacity)	21.5nm south	Operational since 2009

5.7.6 Anchorages and offshore waiting areas

5.7.6.1.1 There are no charted anchorages within the study area. A SBM south of the windfarm site is used as an anchorage by tankers loading oil from the Douglas oil field.

5.7.6.1.2 **Figure 8** shows two charted anchorages located within the Port of Liverpool SHA area. One lies south of the approaches to Liverpool, between the Burbo Bank Extension and Gwynt y Mór windfarms. The other is located north of the approaches to the River Mersey.

5.7.6.1.3 Douglas Bay is used as an anchorage for vessels waiting to enter the Port of Douglas and for cruise vessels when undertaking tendering operations.

5.7.6.1.4 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.

5.7.6.1.5 Heysham Port has a designated anchorage located in Lune Deep, adjacent to the Pilot Boarding Station.

5.7.7 Practice and exercise areas

5.7.7.1.1 There are no Practice and Exercise Areas (PEXA) located in the study area. Firing practice area D406 is the closest PEXA, located c. 15nm to the north of the windfarm site, as shown in **Figure 8**. No restrictions are placed on the right to transit the firing practice areas at any time. The firing practice area is operated using a clear range procedure, meaning that firing only takes place when the area is confirmed clear of all shipping.

6. DESCRIPTION OF EXISTING MARINE ACTIVITIES

6.1 INTRODUCTION

6.1.1.1.1 A description of existing marine activities in the study area is presented, based on the data collected, as listed in **Section 3.5**. The following section includes:

- Description of COVID effects
- Details of the vessel traffic surveys
- Analysis of full-year 2019 and 2022 vessel traffic by:
- Traffic types
- Determination of vessel routes
- During adverse weather
- Non-transit activity
- Analysis of historical maritime incidents

6.2 EFFECTS OF COVID-19

6.2.1.1.1 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. As such, and where appropriate, datasets have been used that precede the pandemic, including AIS data for 2019 for the whole Irish Sea. In addition, following the PEIR, a 2022 AIS dataset has been obtained to provide greater recency for the analysis.

6.3 VESSEL TRAFFIC SURVEYS

6.3.1.1.1 Vessel traffic surveys were conducted in compliance with requirements under MGN 654. Therefore, full coverage of all transits through the study area could be obtained using the following datasets:

- Commercial vessel traffic that are required to carry AIS under SOLAS are captured through the vessel traffic surveys
- Non SOLAS commercial, recreational and fishing vessels captured through AIS for those vessels with AIS transceivers and through radar for those that do not
- Visual observations to identify non-AIS vessel types

6.3.1.1.2 Details of the vessel traffic surveys are provided in **Table 21** and tracks of the survey vessels whilst deployed on the surveys are shown in **Figure 11** (see **Appendix E** for the survey reports).

6.3.1.1.3 Vessel traffic tracks collected as part of the surveys are presented in **Figure 12**.

Table 21: Vessel traffic survey details

Attributes	Winter 2022	Summer 2022	Winter 2023
Vessel	KARELLE (28m Fishing Vessel) 	MORNING STAR (23m Fishing Vessel) 	
Dates (Coordinated Universal Time (UTC))	09-Feb-22 to 26-Feb-22	30-Jul-22 to 13-Aug-22	27-Nov-23 to 13-Dec-23
Downtime (UTC)	18-Feb-22 00:10 to 19-Feb-22 06:29 20-Feb-22 06:53 to 21-Feb-22 15:00	08-Aug-22 10:00 to 09-Aug-22 03:40	06-Dec-23 10:30 to 08-Dec-14:59. 08-Dec-23 19:26 to 09-Dec-01:05
Survey Area	Windfarm site + 10nm study area	Windfarm site + 10nm study area	Windfarm site + 10nm study area
Total Vessels Recorded (study area)	355 (25.5/day)	460 (32.9/day)	348 (24.9/day)
Total Vessels Recorded (windfarm site)	31 (2.2/day)	35 (2.4/day)	41 (2.9/day)
Cargo	**Study area:** 13 (0.9/day) **Windfarm site:** 5 (0.4/day)	**Study area:** 7 (0.5/day) **Windfarm site:** 2 (0/day)	**Study area:** 13 (0.9/day) **Windfarm site:** 4 (0.3/day)
Fishing	**Study area:** 73 (5.2/day) **Windfarm site:** 1 (0.1/day)	**Study area:** 25 (1.8/day) **Windfarm site:** 1 (0.1/day)	**Study area:** 29 (2.1/day) **Windfarm site:** 4 (0.3/day)
Passenger	**Study area:** 168 (12/day) **Windfarm site:** 5 (0.4/day)	**Study area:** 240 (17.1/day) **Windfarm site:** 10 (0.7/day)	**Study area:** 181 (12.9/day) **Windfarm site:** 15(1.1/day)
Recreational	None	**Study area:** 12 (0.9/day) **Windfarm site:** 6 (0.4/day)	None
Tanker	**Study area:** 12 (0.9/day) **Windfarm site:** 6 (0.4/day)	**Study area:** 3 (0.2/day) **Windfarm site:** 2 (0.1/day)	**Study area:** 8 (0.6/day) **Windfarm site:** 0 (0/day)
Tug and Service	**Study area:** 89 (6.4/day) **Windfarm site:** 14 (1/day)	**Study area:** 173 (12.4/day) **Windfarm site:** 13 (0.9/day)	**Study area:** 117 (8.4/day) **Windfarm site:** 18 (1.3/day)

6.3.1.1.4 MGN 654 specifies that vessel traffic surveys should be undertaken within two years of Application. As the February 2022 winter survey will be outside the two-year window, an additional 14-day winter survey as per MGN 654 4.6b was undertaken in December 2023 to extend the data validity for a further 12 month period.

6.3.1.1.5 The findings of the winter 2023 survey are consistent with the previous vessel traffic surveys conducted in 2022, as well as the 2019 and 2022 AIS datasets. As such, no impact on the conclusions reached within the NRA have been identified. The datasets are concluded to be valid for a further 12 month period as per MGN654 4.6b (MCA, 2021a).

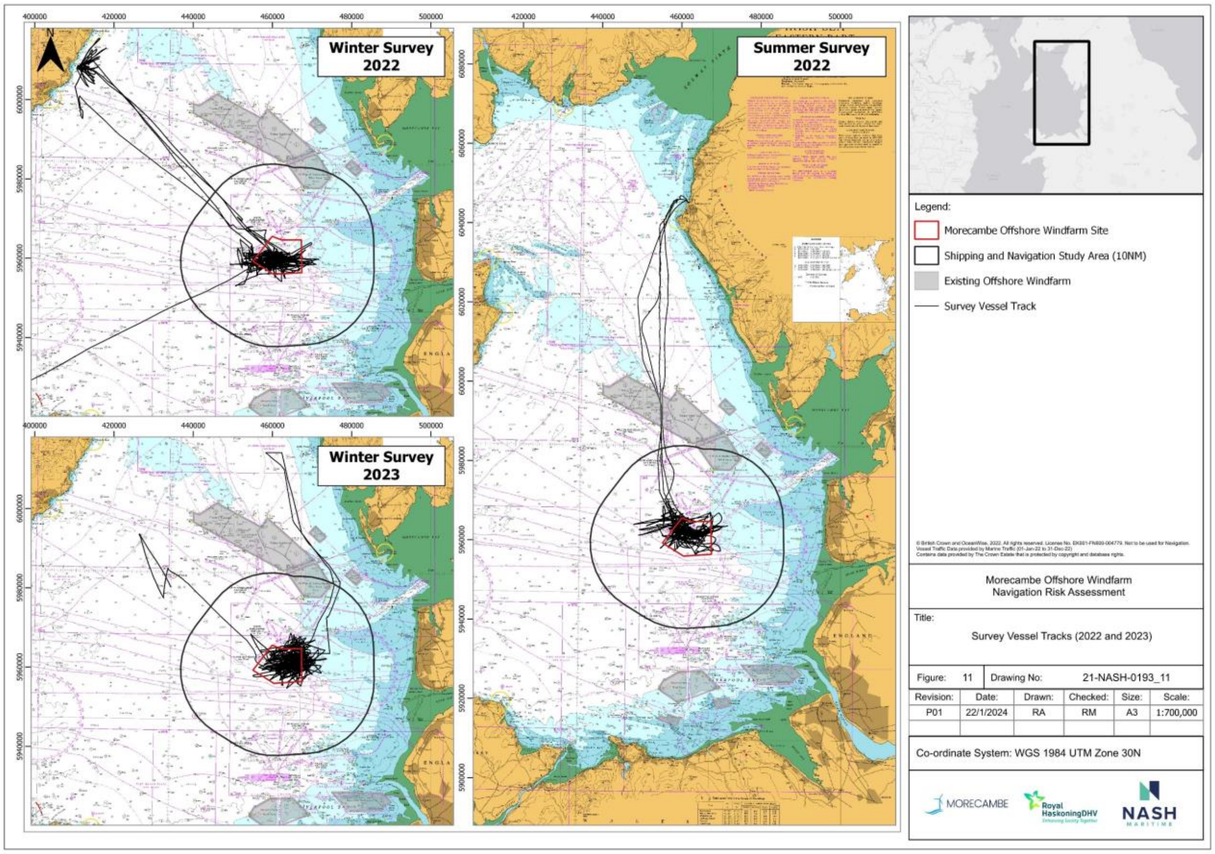


Figure 11: Track of survey vessel during winter and summer surveys

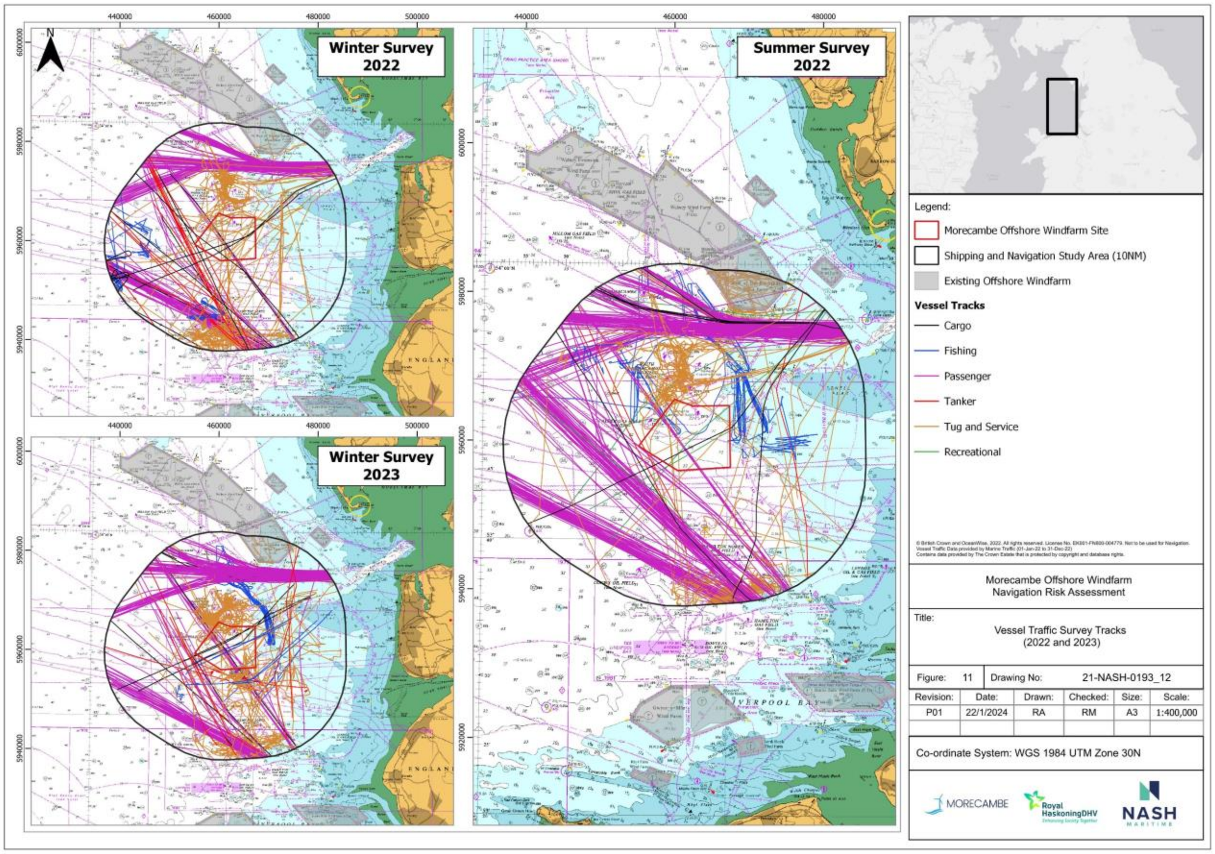


Figure 12: Winter and summer vessel tracks recorded during vessel traffic surveys

6.4 VESSEL TRAFFIC ANALYSIS

6.4.1 Overview

6.4.1.1.1 Annualised vessel traffic density for 2019 and 2022 (which shows the number of vessel transits through individual grid cells in the east Irish Seas) is presented in **Figure 13** and **Figure 14**, respectively, they show:

- Key vessel traffic routes run from Heysham and Liverpool, passing north and south-east of the windfarm site respectively
- Ferry routes intersecting the study area are between Liverpool-Belfast/Dublin and Liverpool-Douglas or between Heysham-Douglas and Heysham Dublin/Warrenpoint
- High vessel density to the north of the windfarm site is associated with oil and gas service vessel activity

- A difference plot for the change in vessel traffic density is presented in **Figure 15**. Although, much of the traffic follows similar routeing between the two years, there are notable changes. The plot shows a decrease in traffic transiting through the Liverpool TSS from 2019 to 2022. There are however more vessels transiting to/from the Liverpool TSS northwest to pass south of the Isle of Man. The change in activity around the Walney OWF is also present with a reduction in vessel activity in 2022.

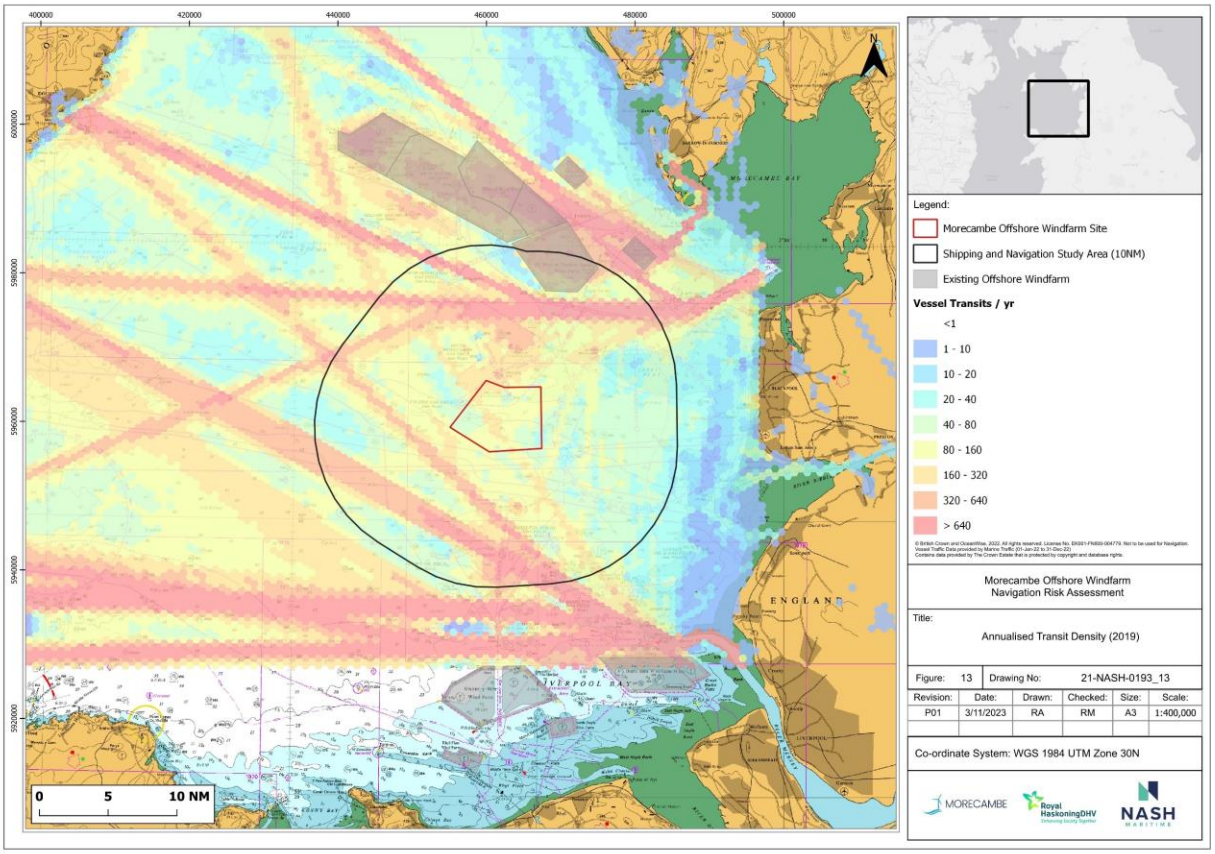


Figure 13: Annualised vessel transit density (2019)

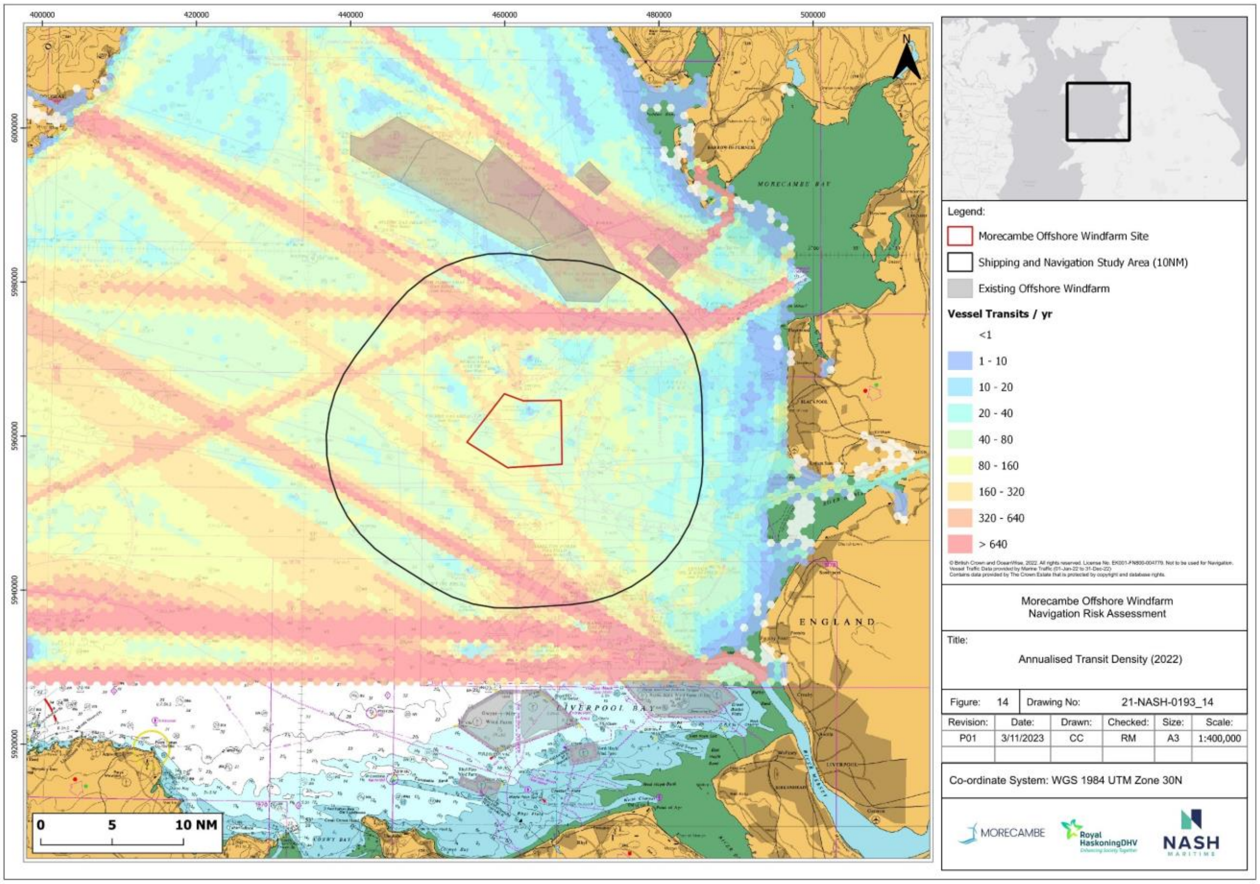


Figure 14: Annualised vessel transit density (2022)

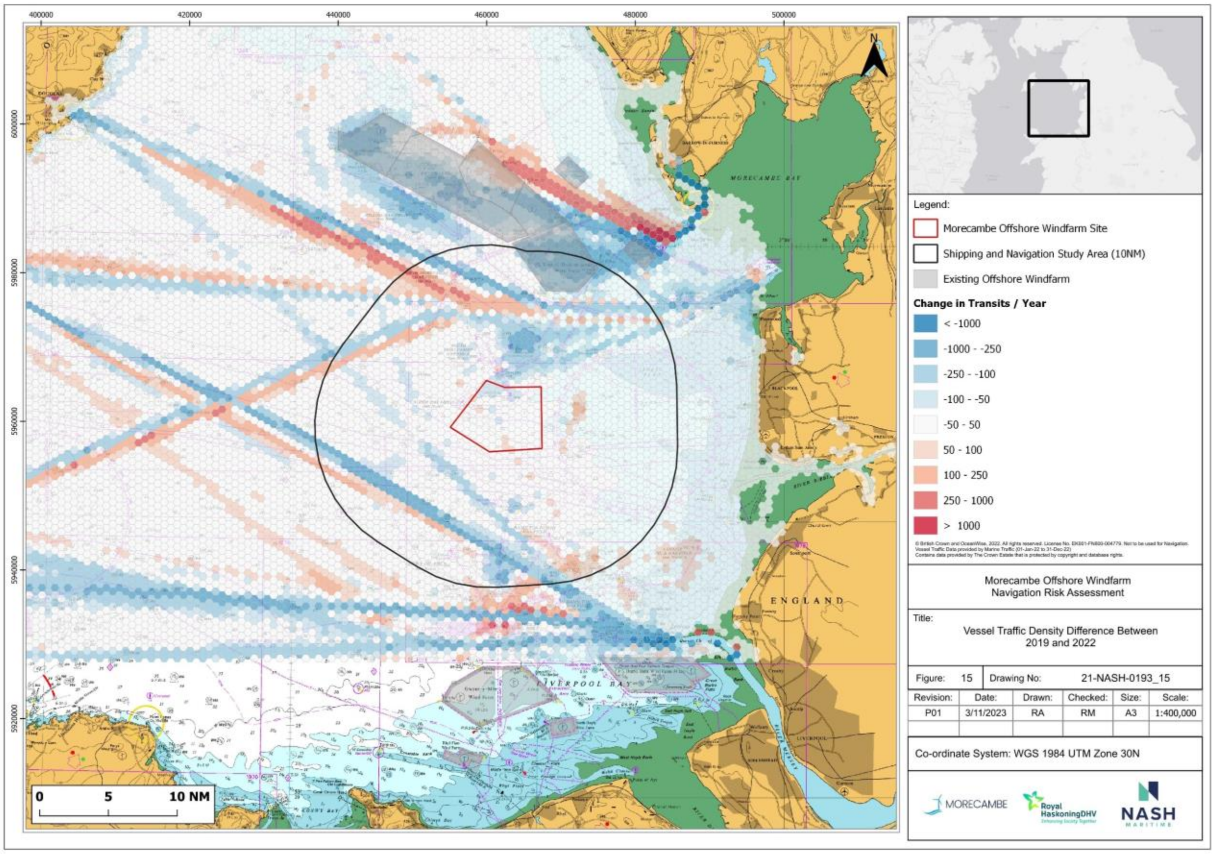


Figure 15: Difference between 2019 and 2022 annualised vessel transit density.

6.4.1.1.2 **Figure 16** shows vessel tracks by vessel length for 2019 and 2022. Vessels from all length groups navigate within the study area. Vessels over 250m use the Liverpool Bay TSS transiting south of the study area and either converge towards Liverpool or diverge on routes through the Irish Sea, dependent on their next port. There is also limited activity by vessels over 250m in the southern portion of the study area, which may be associated with the SBM for the Hamilton North Gas Field. Vessels >200m are also shown using the SBM to the south of the windfarm site.

6.4.1.1.3 Between 2019 and 2022 there is an increase in 200–250m vessels, and a decrease in those of 150–200m, transiting through the study area. This is largely explained by the ferry operator Stena replacing route services during this time. For example, in March 2020 the 215m Stena Edda replaced the 186.5m Stena Lagan, and in January 2021 the 186.5m Stena Mersey was replaced by the 215m Stena Embla. Tracks of vessels between 100-200m in length are predominantly ferries between Liverpool and Heysham to Dublin, Belfast and Douglas.

6.4.1.1.4 Commercial vessels between 100-150m transit east/west through the windfarm site between Barrow and Heysham, aligning with Off Skerries TSS. Vessels under 100m are shown throughout the windfarm site and north/south of the study area, primarily associated with support of oil and gas or windfarm operations.

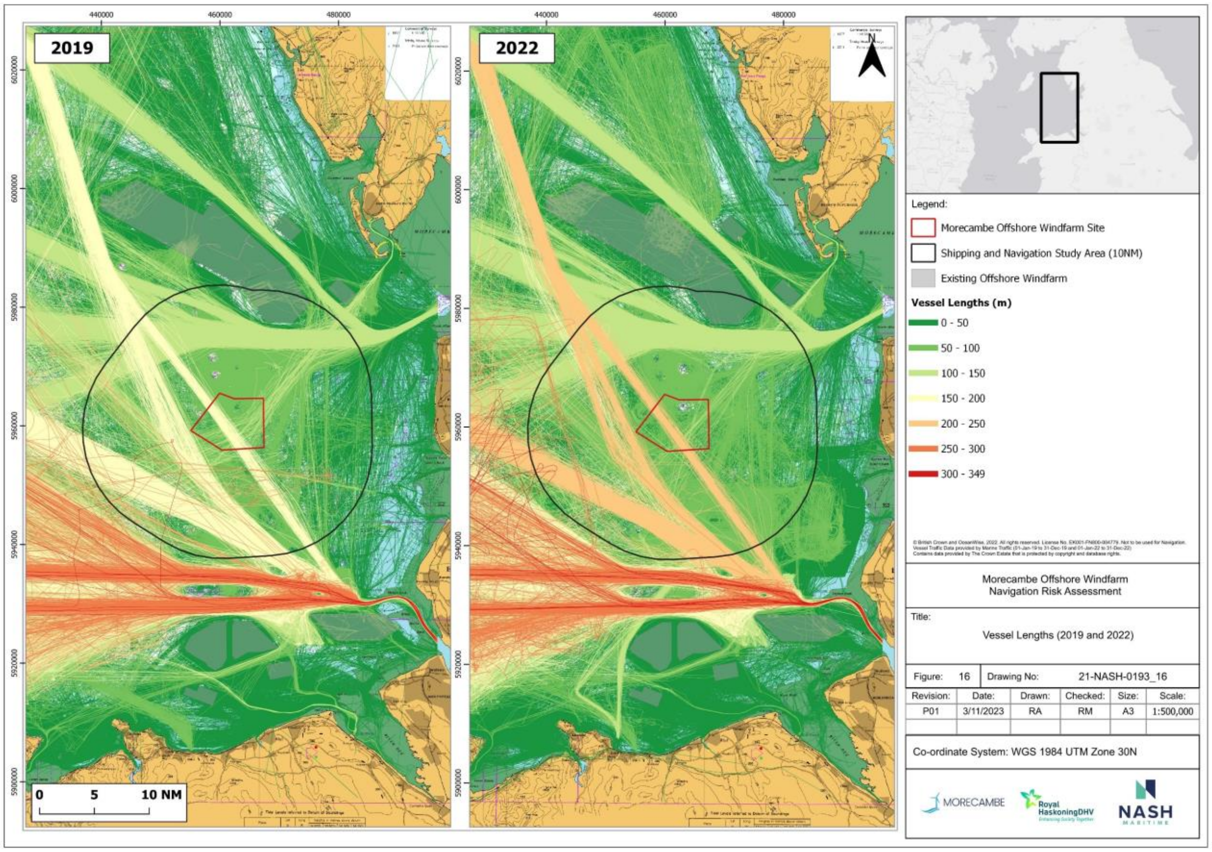


Figure 16: All vessel tracks by length (m)

6.4.1.1.5 **Figure 17** shows vessel tracks by vessel draught. Vessel traffic within the windfarm site largely comprises of vessels with a draught less than 7.5m. Deeper draught vessels over 10m typically navigate south of the study area, through Liverpool Bay TSS, with a small number transiting between Liverpool and Douglas, likely associated with the carrying over of Liverpool pilots during periods of adverse weather.

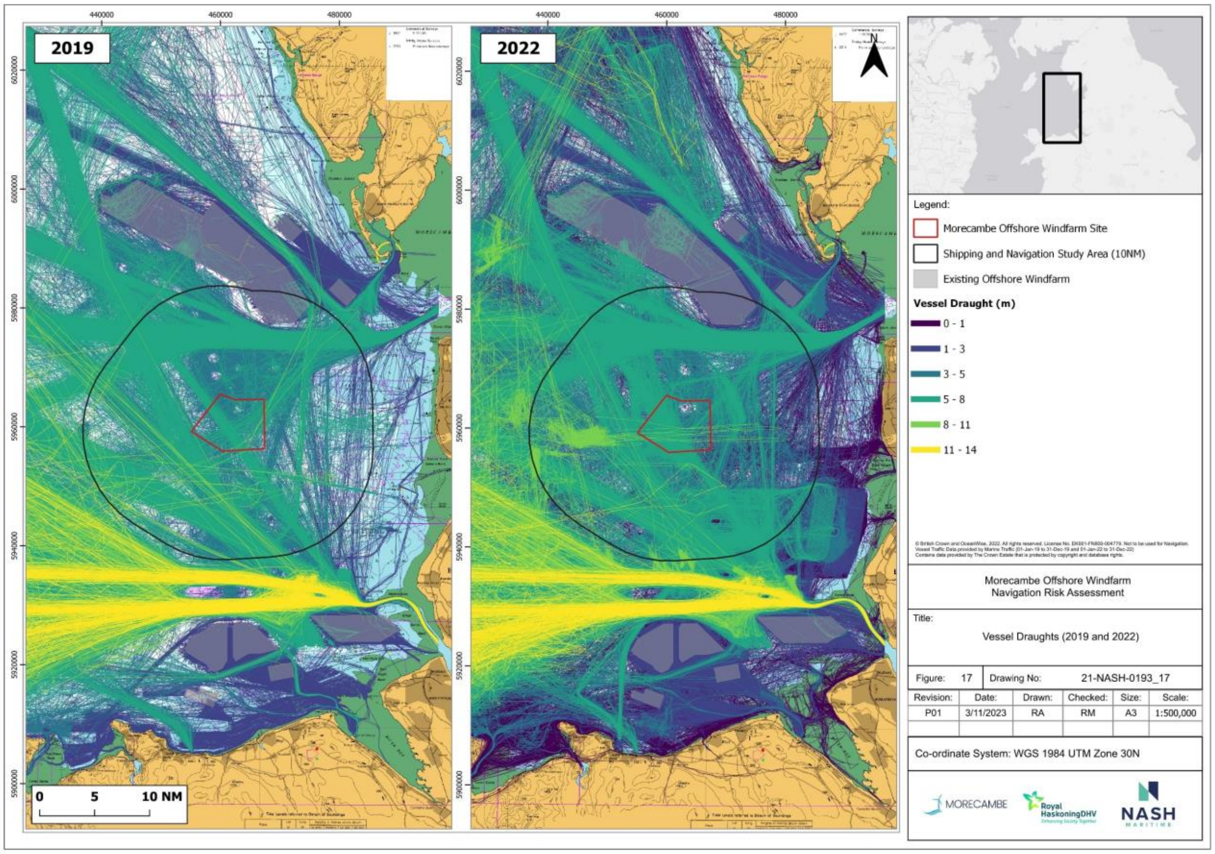


Figure 17: All vessel tracks by vessel draught (m)

6.4.2 Vessel traffic by type

6.4.2.1.1 The following sections consider the vessel traffic by type of vessel for AIS data obtained for the periods 01-Jan-2019 to 31-Dec-2019 and 01-Jan-2022 to 31-Dec-2022. The collection of radar and visual data during the 2 x 14-day traffic surveys in 2022 (validated with the winter 2023 survey data) was used to supplement the understanding of vessel traffic movements in the study area.

6.4.3 Commercial

6.4.3.1.1 The tracks of commercial vessels, namely dry cargo vessels and tankers, are shown in **Figure 18** and **Figure 19**, respectively.

6.4.3.1.2 There are three primary cargo vessel routes intersecting the windfarm site shown in **Figure 18**. Firstly, a route running southwest/northeast, through the centre of the windfarm site, to/from Heysham and Barrow, aligning with Off Skerries TSS. Secondly, a route running northwest/southeast, through the centre of the windfarm site, between Liverpool and Ireland/Scotland, passing 2nm east of the SBM south of the windfarm site. A third route runs west of the SBM through the centre of the windfarm, with vessels on passage between Liverpool and Ireland/Scotland. Each of these routes are considered to be low frequency, with <1 vessel/day.

6.4.3.1.3 Cargo vessel tracks passing through the wider study area primarily comprise vessels transiting between Dublin, Warrenpoint, Belfast or the Isle of Man and Heysham, Barrow or Liverpool. Routes of out Heysham and Barrow transit east-west between WODS and South Morecambe gas field. In total, there were 484 cargo vessel transits through the study area in 2019 and 269 in 2022, this is an average of 1.4/day and 0.7 per day, respectively. During the vessel traffic surveys, 20 cargo vessels were identified during the 28-day survey period (an average of 0.7 vessels/day). A total of 13 cargo vessels were observed during the 14-day winter 2023 survey period (an average of 1 vessel/day).

6.4.3.1.4 Tankers are shown in **Figure 19**. All tanker tracks that passed through the windfarm site in 2022 transited the southwestern corner. These tracks primarily comprise vessels transiting northwest/southeast, between Belfast or Larne and Liverpool. In total, seven tracks on this route intersected the windfarm site. Although the route was used frequently in 2019, there were no vessels that intersected the windfarm site. A less frequent tanker route is evident in an east/west direction, through the windfarm site between Barrow and Off Skerries TSS, and in 2019 vessels on this route transited the windfarm site nine times. This route does not a appear to have been used by tanker vessels in 2022.

6.4.3.1.5 For the wider study area, a north/south route between Larne/Belfast and Liverpool is located 5.2nm east of the windfarm site. A single vessel, Keewhit, transited this route in 2019, with 23 transits identified. This vessel is regularly used for bunkering of other vessels whilst they are in port. Keewhit was also the only tanker vessel using this route in 2022, however, the number of transits it completed increased to 64. On 19 of these occasions, Keewhit took a variation of this route, 1.5nm to the west of the primary route. This alternative route is 3.5nm east of the windfarm site. This less frequent route takes the tanker west of the Morecambe Q(9)15s cardinal mark and is likely done to avoid the Shell Flats at low tide.

6.4.3.1.6 There were 272 tanker vessel transits through the study area in 2019, and 166 in 2022, which equates to an average of 0.7 and 0.5 vessels/day respectively. The vessel traffic surveys identified 15 tanker transits during the 28-day survey period (an average of 0.5 vessels/day) and were observed to be utilising routes identified in the 2019 and 2022 data. A total of eight tankers were observed during the 14-day winter 2023 survey period (an average of 0.6 vessels/day).

6.4.3.1.7 Further detailed analysis of commercial shipping routes is contained in **Section 6.4.3**.

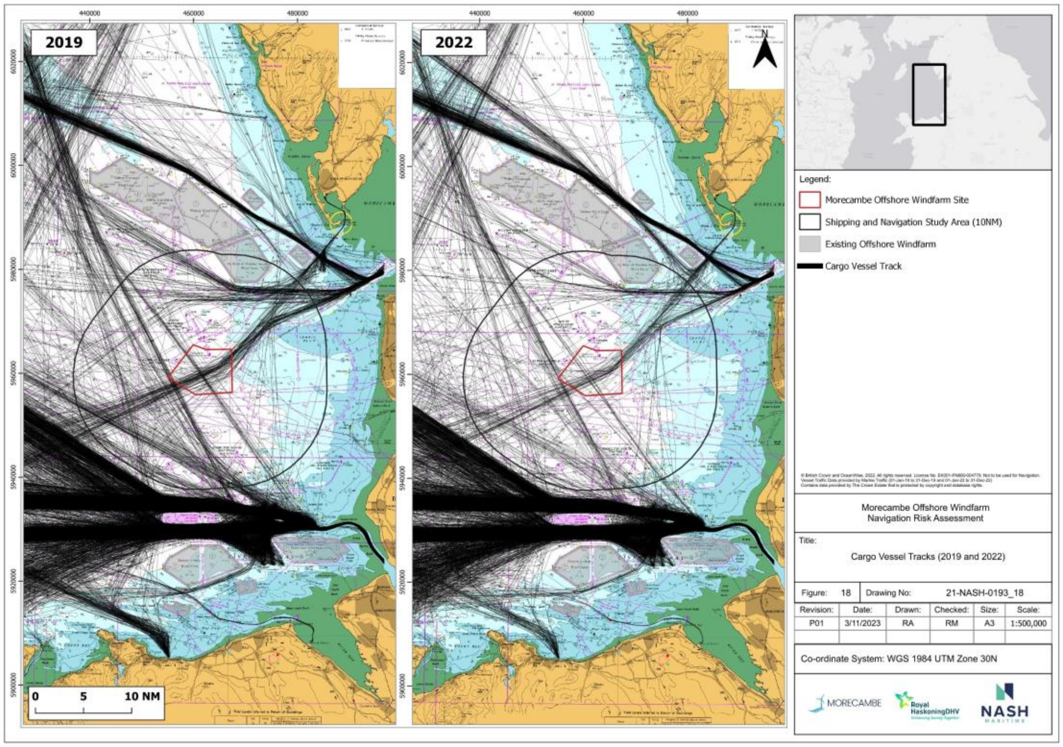


Figure 18: Cargo vessel tracks

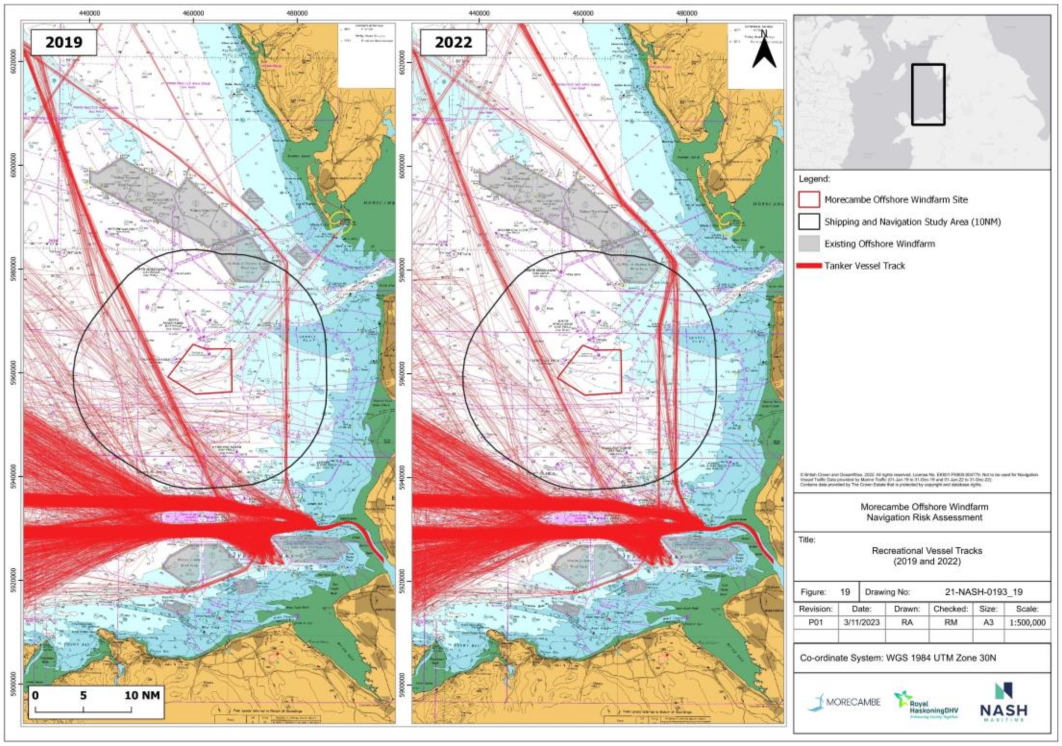


Figure 19: Tanker vessel tracks

6.4.4 Ferries

6.4.4.1.1 The tracks of ferries are shown in **Figure 20**, including passenger and freight services. Four principal operators are identified in the eastern Irish Sea. 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 operate between Liverpool and Dublin.

6.4.4.1.2 During adverse weather, vessels use alternative routes where courses are used to reduce the effects of the prevailing wind and wave conditions. A detailed analysis of these routes is contained within **Section 6.4.12** and **Section 6.4.14.**

6.4.5 Cruise ships

6.4.5.1.1 The tracks of cruise ships are shown in **Figure 20**. Cruise vessel activity in the area is centred around the Port of Liverpool and Douglas. Liverpool has a cruise terminal, which has a regular cruise itinerary and provides turnaround services. Approximately 18 cruise ships were recorded transiting the study area in 2019, this number decreased to six in 2022. These vessels were on a southeast/northwest route and transited the southern region of the study area on voyage between Liverpool and Ireland or Douglas. A second route transiting the north of the study area is evident in 2022 and not 2019. All of these vessel tracks are the 90m cruise ship Corinthian visiting Barrow-in-Furness, and the vessel transited the study area on 10 occasions in 2022. The shortest distance between the Corinthian and the windfarm site was 4.7nm, recorded Jul-26th 2022. The majority of cruise ships in the Irish Sea are bound for Liverpool and pass outside of the shipping study area, principally between April and September.

6.4.5.1.2 No cruise ships were identified passing through the windfarm site in either 2019 or 2022. The closest passing cruise ship was Amadea (193m in length), passing 1.5nm southwest of the windfarm site on passage between Liverpool and Douglas (Sep-27th 2022).

6.4.5.1.3 The Corinthian cruise vessel was identified during the summer vessel traffic survey on two occasions to the north of the windfarm site on passage to Barrow-in-Furness.

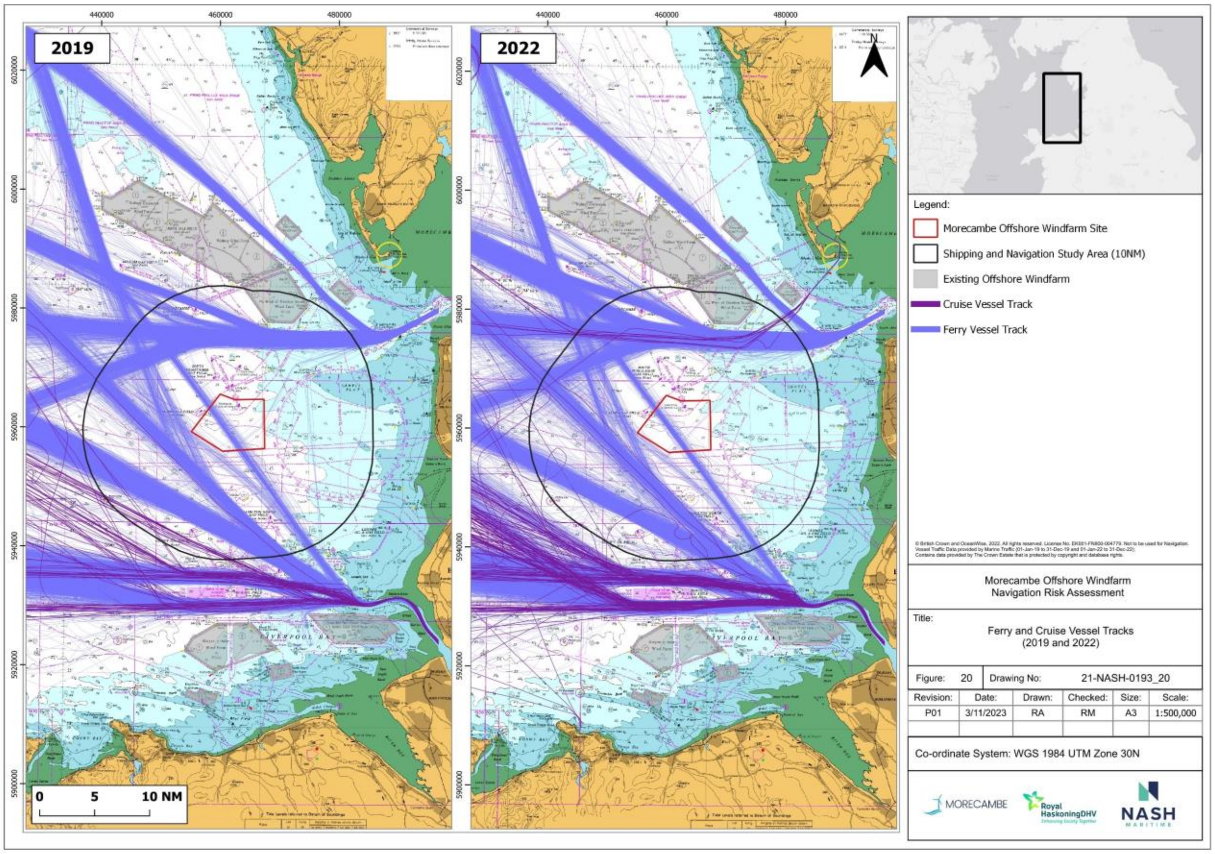


Figure 20: Ferry and cruise ship tracks

6.4.6 Recreational

6.4.6.1.1 The intensity of recreational activity within the study area is shown in **Figure 21**. Historical AIS data for 2019 and 2022, along with the RYA Coastal Atlas (2019), were combined to identify areas of increased recreational activity. The Morecambe windfarm site is characterised by reduced recreational activity. Most recreational vessels remain close to the coast, particularly along the entrance to Liverpool, and around Holyhead, Douglas, and Rhyl. Inshore cruising routes are clear of the Morecambe windfarm site. Low to moderate intensity is also evident within the study area, notably south of the windfarm site.

6.4.6.1.2 Offshore cruising routes are evident between Liverpool, Douglas, Menai Straights, and Morecambe Bay, running adjacent to the Morecambe windfarm site. Relatively few yachts were recorded during the 2021/2022 vessel traffic surveys, with 12 tracks recorded during the summer survey (six intersected the windfarm site) and none recorded during the winter survey. This suggests significant seasonality in recreational movements through the study area. Each identified track was attributed to a unique vessel, suggesting offshore cruising use rather than regular use of the area.

6.4.6.1.3 AIS data revealed that recreational vessels were occasionally transiting through the Morecambe windfarm site, with some vessels sailing offshore passages. **Figure 22** shows the recreational vessel tracks around the study area derived from 2022 AIS data. The study area is characterised by a reduced coverage of cruising vessel tracks, especially within the windfarm site. In total, 131 recreational tracks were detected crossing study area, with 26 tracks crossing the windfarm site. Five major cruising routes (shown in **Figure 22**) were also identified in the study area from the 2022 AIS data: (1) Conwy to Douglas, (2) Conwy to Morecambe, (3) Liverpool to Douglas, (4) Morecambe to Douglas, and (5) Whitechapel to Anglesey. The Morecambe windfarm site appears to be encased within a "triangle" of routes between Morecambe, Douglas, Liverpool, and Conwy, with few intersections between recreational vessel tracks and the Project site.

6.4.6.1.4 The cruising route Liverpool to Douglas runs adjacent to the southwest boundary of the windfarm site. This route is also used by vessels participating in the Isle of Man Midnight Race, organised by the Liverpool Yacht Club (LYC), which is the only relevant yacht race that crosses the study area, with approximately 10 vessels participating each year (40 vessels in 2019 due to 100th anniversary of race). Nevertheless, 88% of recreational vessels detected along this route did not sail through the windfarm site. Similarly, 80% of vessels on the route between Morecambe and Conwy avoided the windfarm site. All vessels detected sailing along the other identified routes (i.e., Conwy to Douglas, Morecambe to Douglas, and Whitechapel to Anglesey) did not cross the windfarm site.

6.4.6.1.5 Existing offshore windfarms can also serve as a reference for understanding how recreational craft respond when their routes intersect with offshore windfarms. For example, the route between Morecambe and Douglas is intersected by two offshore windfarms (Walney and WODS). About 79% of cruising vessels sailing along this route opted for a longer passage, to avoid crossing the existing windfarms. The majority of craft chose a southerly route around the windfarms, extending the shortest possible passage of 46nm by an additional 4nm, which can add up to one hour of passage time (depending on the vessel type and weather conditions). However, during consultation with the RYA, it was noted that recent evidence from AIS data suggests that yachts avoid transiting through an offshore windfarm less than previously thought, based on responses to surveys.

6.4.6.1.6 A challenge in analysing recreational vessel patterns using AIS data is that not all vessels, particularly the smaller crafts, transmit AIS signals. A 2014 RYA survey found that 37% of recreational vessels around the UK transmit AIS signals. This survey showed a potential bias, as vessel owners were more likely to participate in an AIS survey if already use AIS on their crafts. Previous RYA studies have concluded that between 10 to 30% of recreational crafts are transmitting AIS signals in the UK, though this varies greatly depending on the specific location. For comparison, 63% of vessels participating in the LYC Isle of Man Midnight Race in 2022 were transmitting AIS signals (81% in 2019).

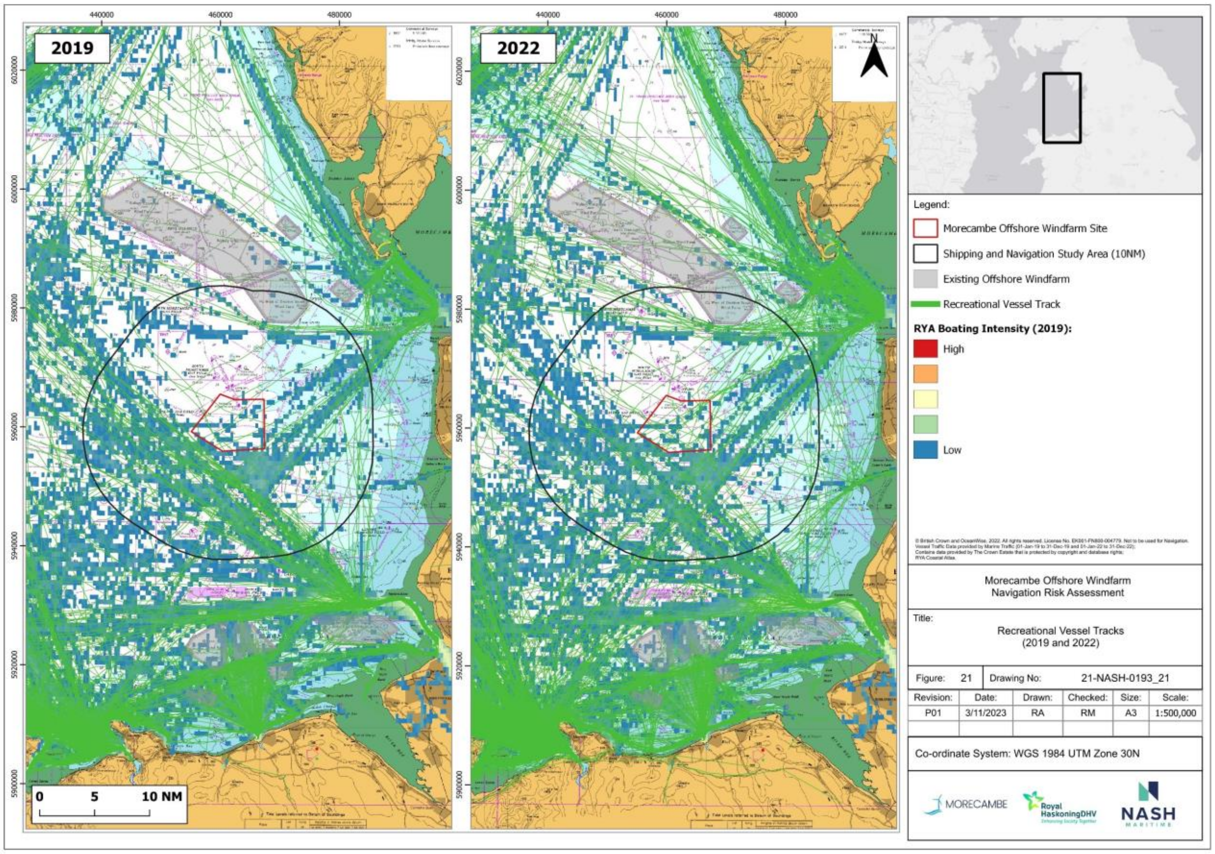


Figure 21: RYA Atlas recreational vessel density

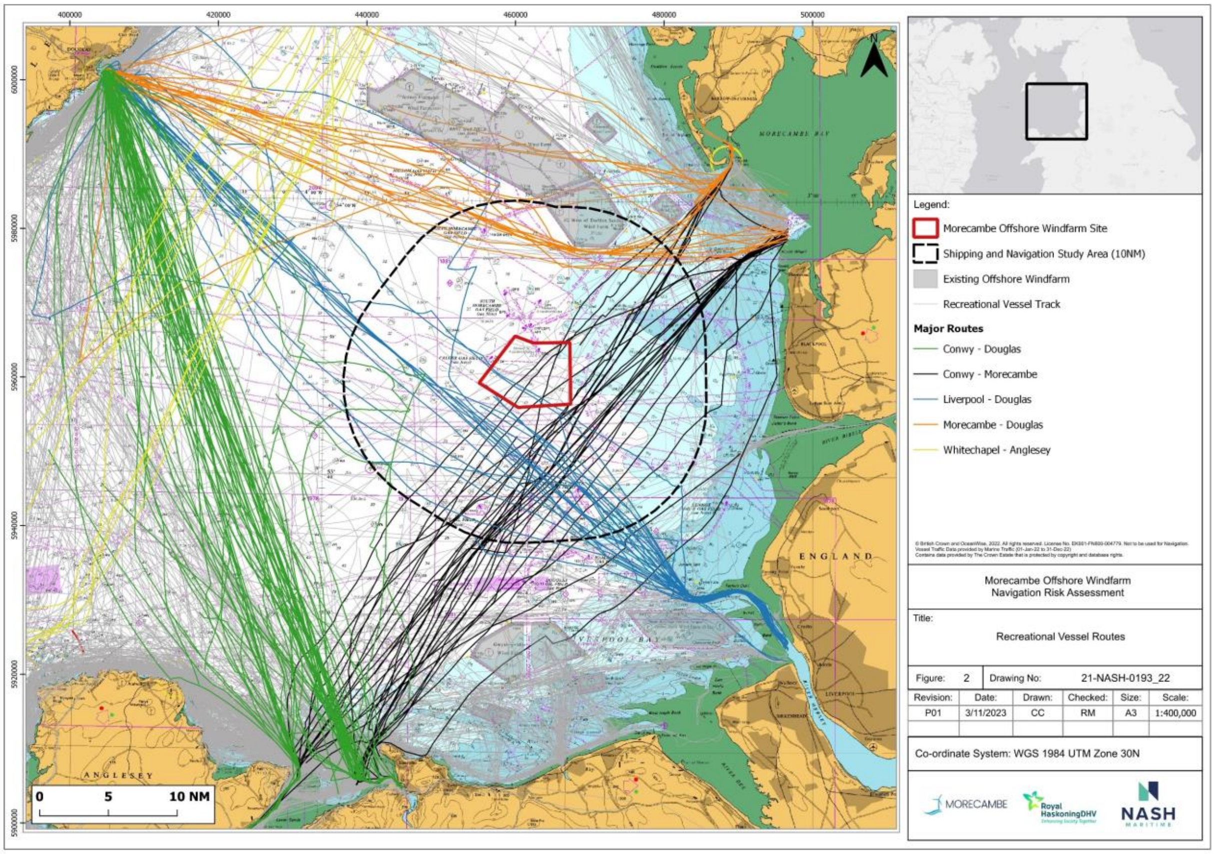


Figure 22: Recreational vessel tracks and routes

6.4.7 Fishing

6.4.7.1.1 Fishing vessel tracks during each season in 2019 and 2022 are shown in **Figure 23** and **Figure 24,** respectively. Fishing activity is undertaken across the study area throughout the year. There were 1,189 fishing vessels transits of the Study Area in 2019, and this number decreased to 549 in 2022. Autumn (Aug–Oct) was the busiest season in 2019, with 453 transiting fishing vessels, whilst in 2022, experiencing 214 transiting fishing vessels, Spring (Feb-Apr) was the busiest season. Winter was the quietest season of 2019, with 189 transits, while in 2022, only 87 transits passed through the study area in summer, making that the quietest season.

6.4.7.1.2 Spring was the most consistent season for both years, with 2022 only seeing 12.7% fewer transiting vessels than 2019. Whilst the vessels mostly occupied the same spaces in both years, Spring 2022 saw more vessels in the southeastern part of the study area, compared to 2019, when the vessels clustered further south-west. Another slight variation was in the central study area, where there were more vessels to the west of the windfarm site in Spring 2022 compared to 2019. There were also fewer vessels transiting in the northeast corner of the study area in Spring 2022. The winter season was also somewhat similar between the years in terms of the spatial distribution of transits, and saw just a 25% decrease in transits through the study area in 2022 compared to 2019. The main difference was a much greater clustering of vessels to the northeast, north and northwest of the windfarm site in 2019, compared to 2022.

6.4.7.1.3 The biggest difference between 2019 and 2022 was Autumn, when 2022 saw 76.6% fewer vessels compared to 2019. Most of the vessels within the study area during 2022 were clustered just northeast of the windfarm site, with some transiting in an east-west direction around 5.5nm north of the windfarm site and some transiting in a northeast-southwest direction, around 3.5nm southeast of the windfarm site. Whereas, in Autumn 2019, there were a lot more vessels transiting east-west, north of the windfarm site, and larger clusters of vessels to the west and to the south of the windfarm site. Summer also saw a significant (71.2%) drop in transiting vessels in 2022 compared to 2019, however, the spatial distribution was not too dissimilar, with a couple of the main clusters located approximately 3 nautical miles further west in 2022.

6.4.7.1.4 During the hazard workshop in 2023, it was discussed that the area is used primarily by vessels using static gear from ports in Wales and Fleetwood, with very little trawling activity. Belgium beam trawlers were noted as making periodic visits to the area. 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.

6.4.7.1.5 Fishing vessel activity during vessel traffic surveys was concentrated to the south and southwest of the study area during winter and within the northern half of the study area during summer.

6.4.7.1.6 **Figure 25** shows the intensity of fishing activity as recorded by the MMO using VMS, required on fishing vessels over 15m. The area southwest of the windfarm site has been recorded as having over 10,000 hours of fishing time in 2020. Fishing intensity within the windfarm site is observed from the VMS data to be greatest to the southeast, with between 1,000 and 10,000 hours recorded in 2020.

6.4.7.1.7 Additional data and analysis on fishing activity is contained within the Project's Chapter 13 Commercial Fisheries chapter.

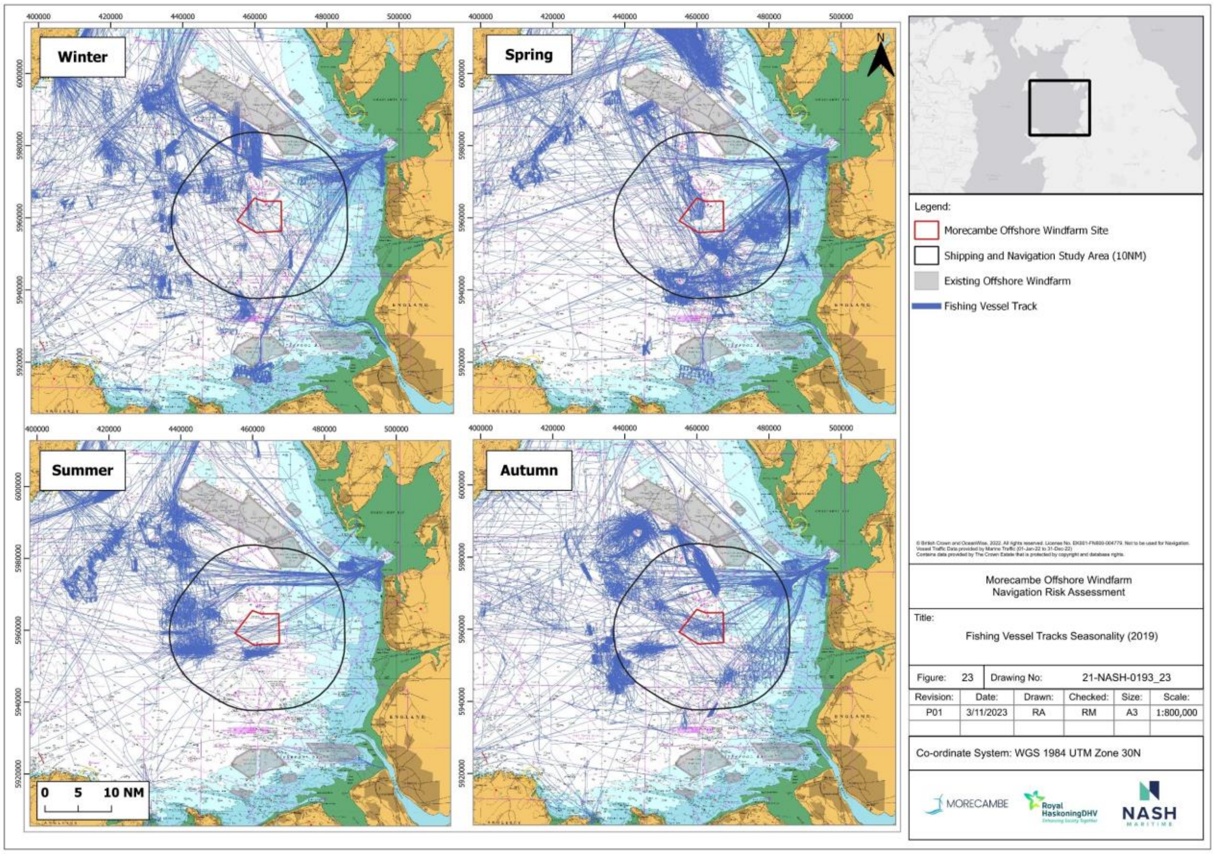


Figure 23: Fishing vessel seasonal activity (2019)

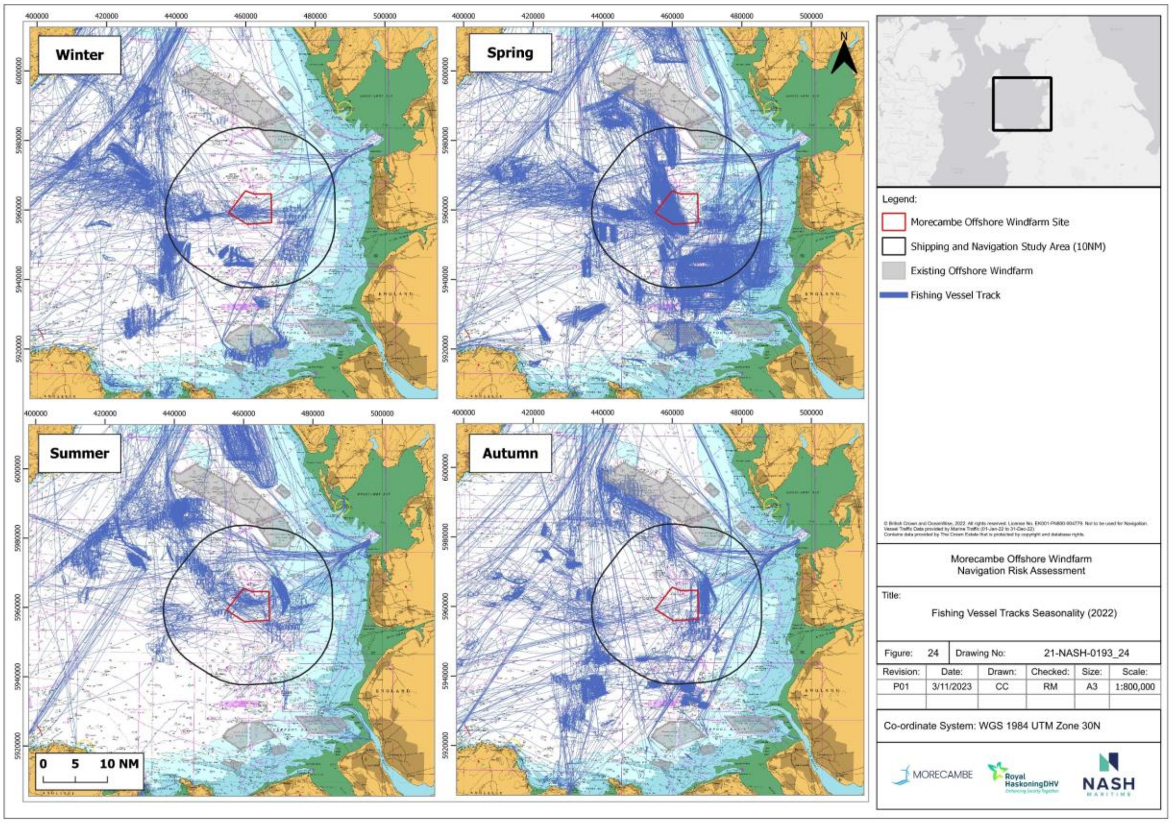


Figure 24: Fishing vessel seasonal activity (2022)

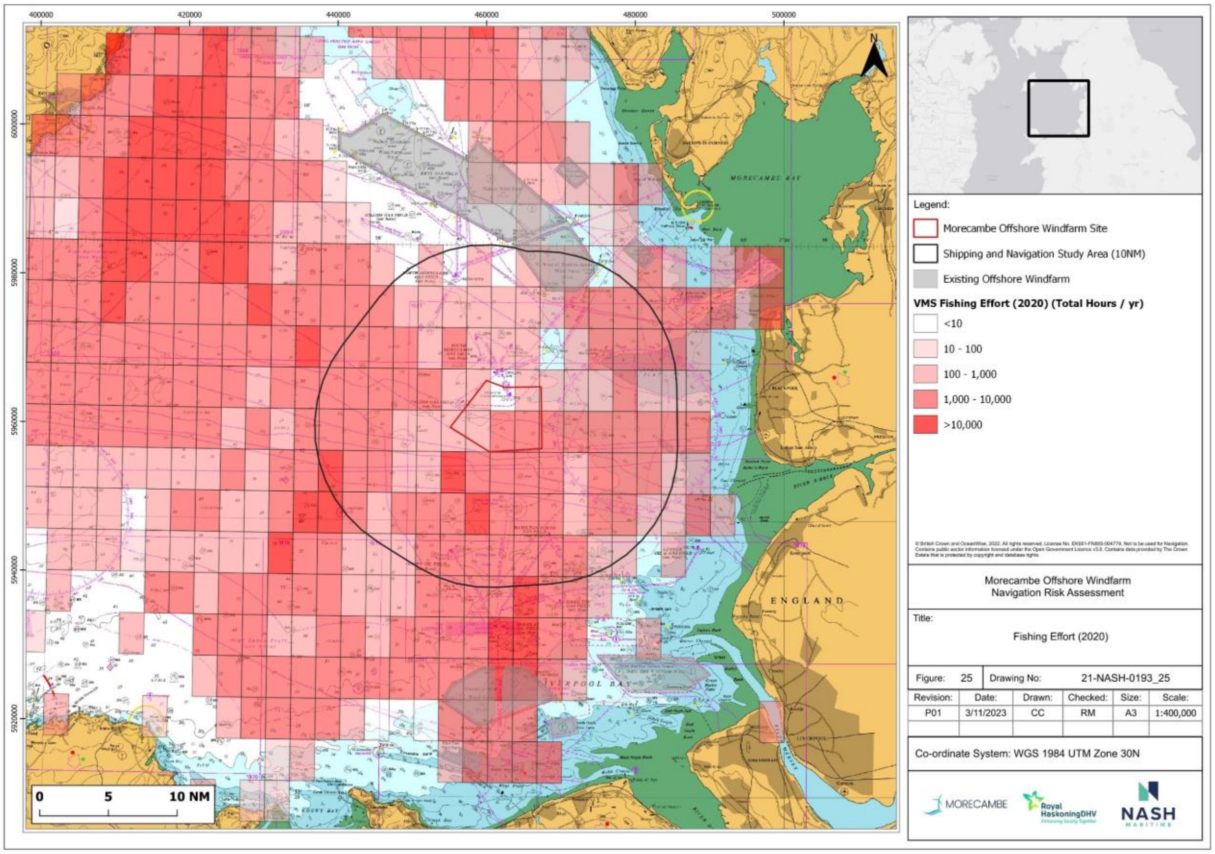


Figure 25: Fishing effort (VMS 2020)

6.4.8 Tug and Service

6.4.8.1.1 The tracks of tug and service vessels are shown in **Figure 26** and **Figure 27**. These have been subdivided into key categories.

6.4.8.1.2 CTVs operate between O&M bases and the existing OWFs to the north (Walney and WODS) and south (Burbo Bank and Gwynt y Mor) of the study area. 16 CTV tracks transited in a southeast-northwest direction through the windfarm site in 2019 travelling between Liverpool and the Walney Extension OWF. There were 22 CTV tracks that passed through the windfarm site, transiting southwest/northeast between Barrow and Off Skerries TSS. Transits through the eastern region of the study area passed north/south between Liverpool and the OWFs to the north, totalling 157 transits. 21 of these tracks passed within 1nm of the north-eastern corner of the windfarm site.

6.4.8.1.3 In 2022, 18 CTVs were recorded transiting the windfarm site in a southeast-northwest direction. Additionally, the number of CTVs transiting southwest-northeast decreased to two. The eastern region of the study area remained frequently transited by CTVs travelling north-south, though the 157 transits recorded in 2019 decreased to 71 in 2022.

6.4.8.1.4 Oil and gas associated supply ships and standby safety vessels have a high intensity within the windfarm site and study area where platforms are located. Oil and gas service vessels mostly operate out of Heysham or Liverpool. In 2019, approximately 1.5 vessels per day passed through the windfarm site and 11.5 vessels per day operated within the study area. In 2022, activity decreased with one vessel per day transiting the windfarm site, and 7.5 vessels per day entering the in the study area.

6.4.8.1.5 In both 2019 and 2022, the activities of dredgers and pilot vessels are concentrated to the east and south-east of the study area. A low-use route used by dredgers is present between Heysham and Off Skerries TSS. SAR vessels are dispersed throughout the study area.

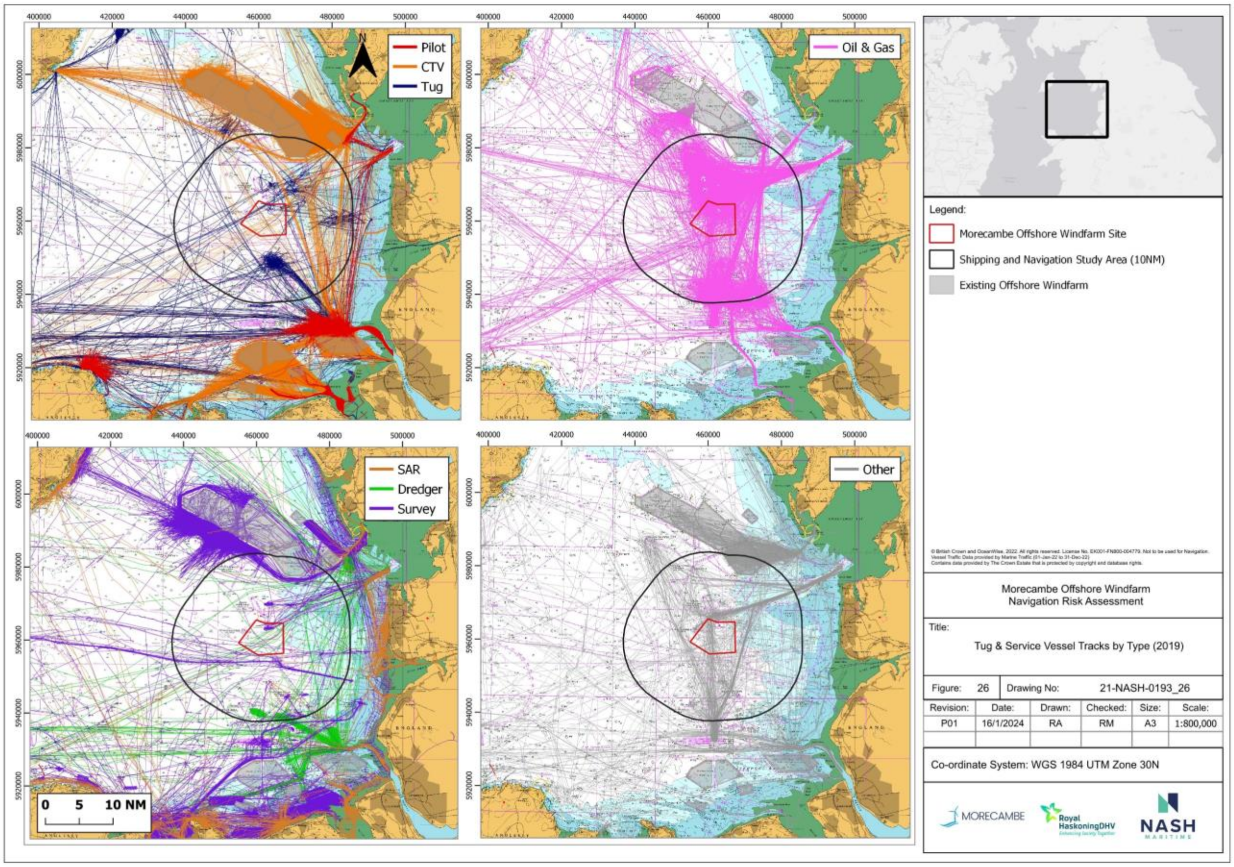


Figure 26: Tug and Service Vessel Tracks by Type (2019)

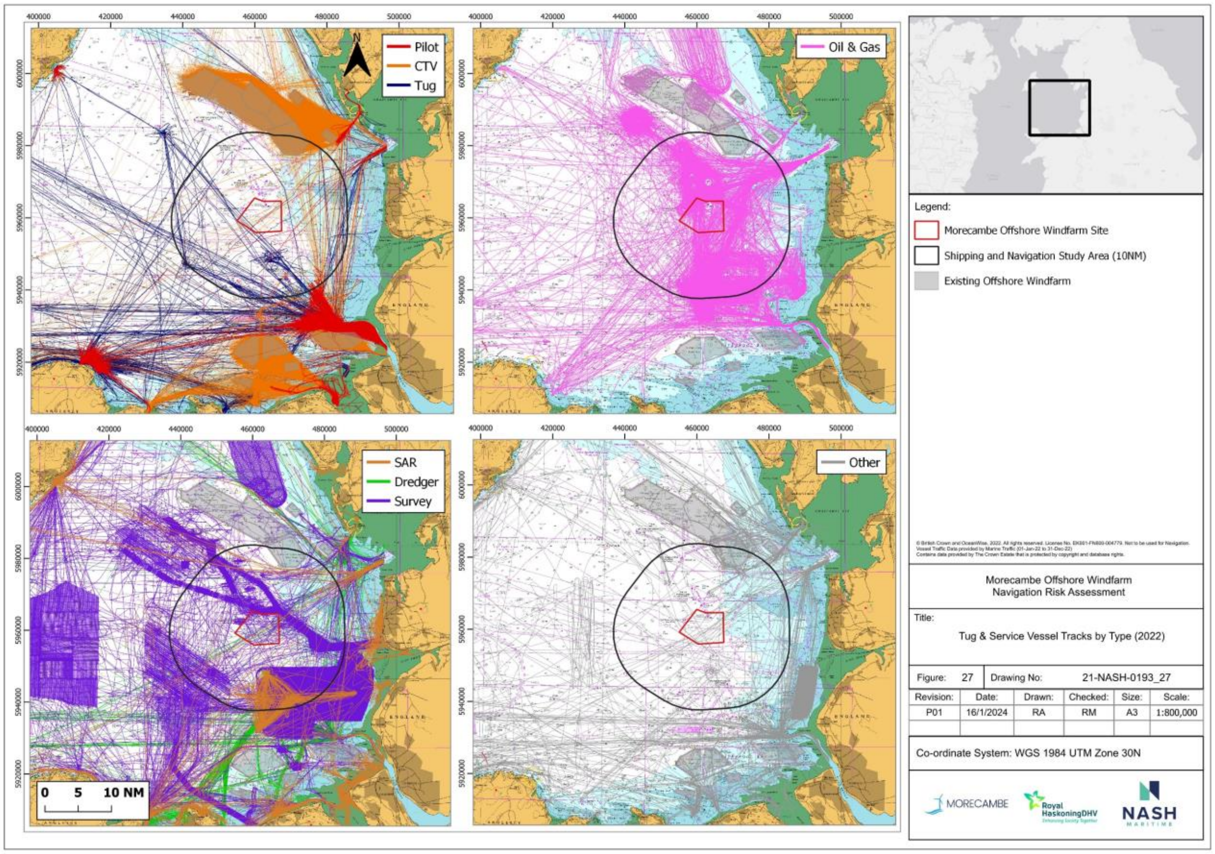


Figure 27: Tug and service vessel tracks by type (2022).

6.4.9 Transit counts and seasonality

6.4.9.1.1 **Figure 28** show the numbers of vessels transiting through the windfarm site and study area by type and by month respectively.

6.4.9.1.2 **Figure 28** illustrates that tug and service vessels are the predominant vessel type in both the windfarm site and study area with 26 vessels/day in the study area and three vessels/day in the windfarm site. This is most likely due to the offshore oil and gas infrastructure present in the area. The next most frequent vessel type was passenger vessels which is due to the ferry routes in the region.

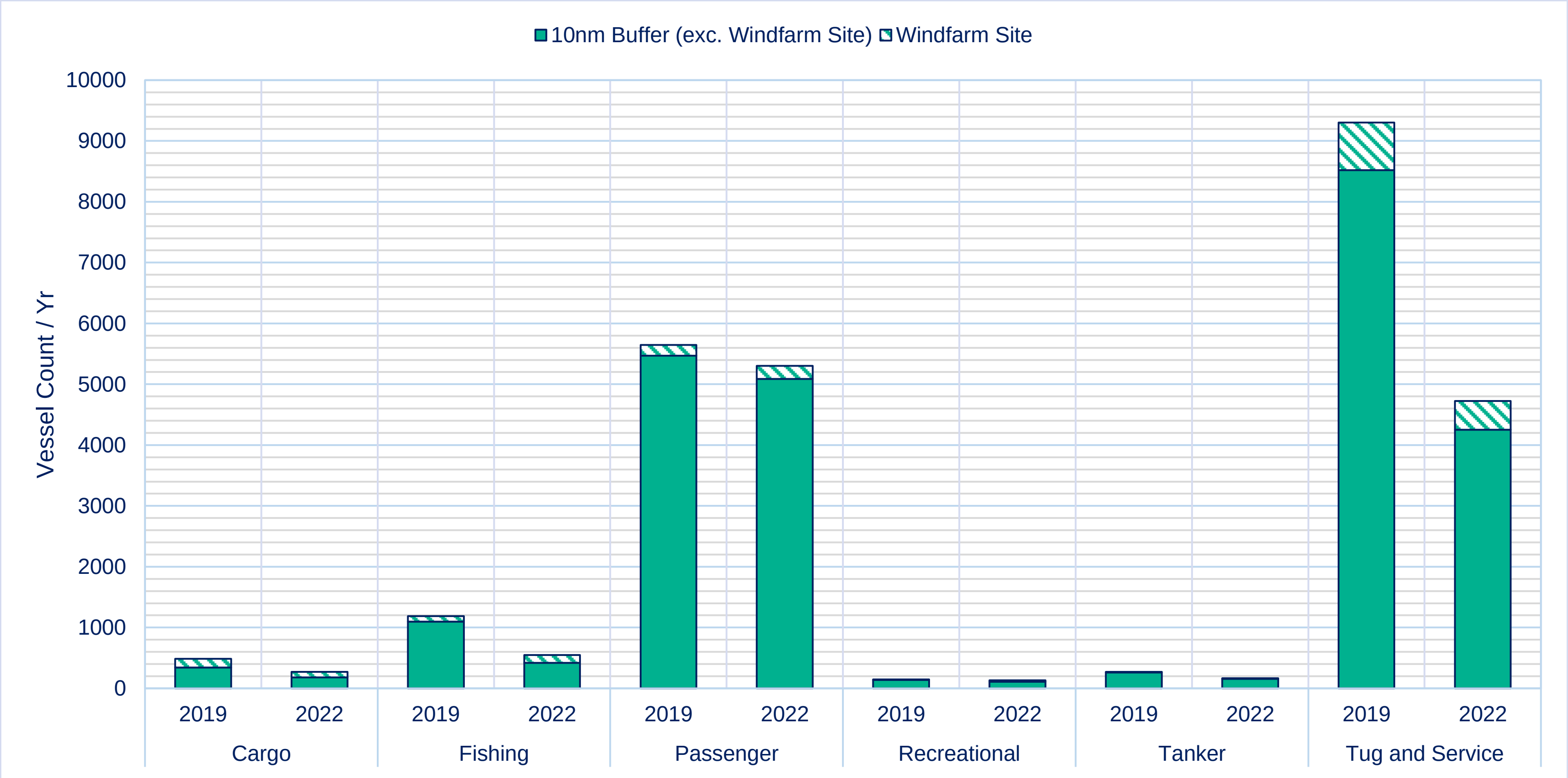


Figure 28: Vessel count per year by vessel type (2019 and 2022)

6.4.9.1.3 Analysis presented in **Figure 29** and **Figure 30** shows transit counts per month through the study area and windfarm site for 2019 and 2022, respectively. In 2019 there were between 63 (Jan) and 191 (Dec) transits/month that intersected the windfarm site, in 2022 these figures reduced to between 52 (Feb) and 129 (Jul). Additionally, in 2019 between there were between 959 (Jan) and 1,657 (Jul) transits per month through the study area, this reduced to between 508 (Feb) and 1,176 (Aug) transits/month in 2022. The vessels transiting through the study area are predominantly tug and service and passenger vessels associated with the oil and gas infrastructure and ferry routes.

6.4.9.1.4 Vessel traffic within the study area peaks during summer, due to an increase in ferry service operations, recreational and fishing activity. Vessel counts within the windfarm site fluctuate across the year, primarily driven by changes in tug and service activity. Evidence of this can be seen in December 2019, where 164 of the 191 vessels that intersected the windfarm site were tug and service. This is an increase from the 63 tug and service vessels recorded in the previous month and is primarily comprised of vessels associated with oil and gas operating around the South Morecambe Gas Field (145 out of the 164).

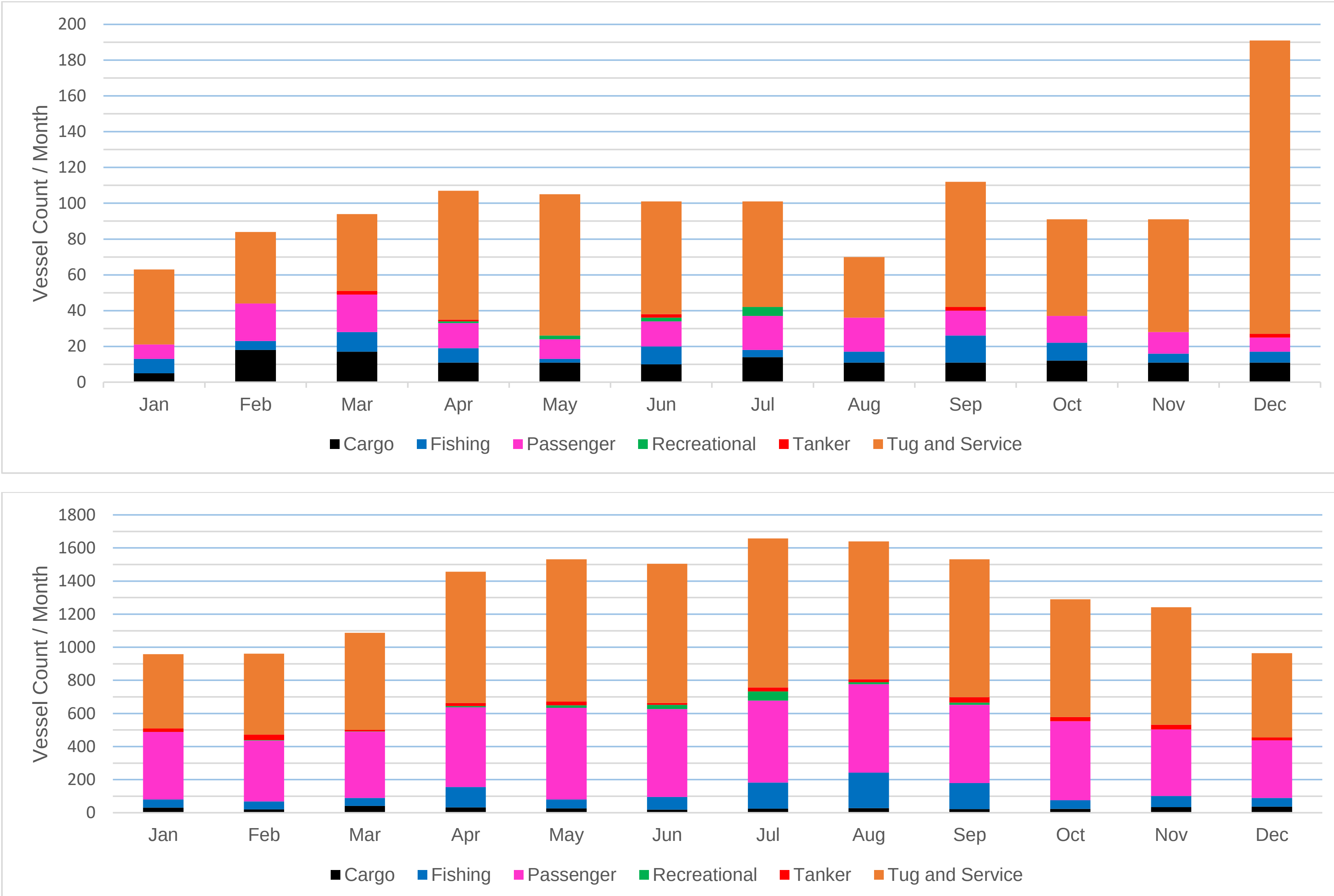
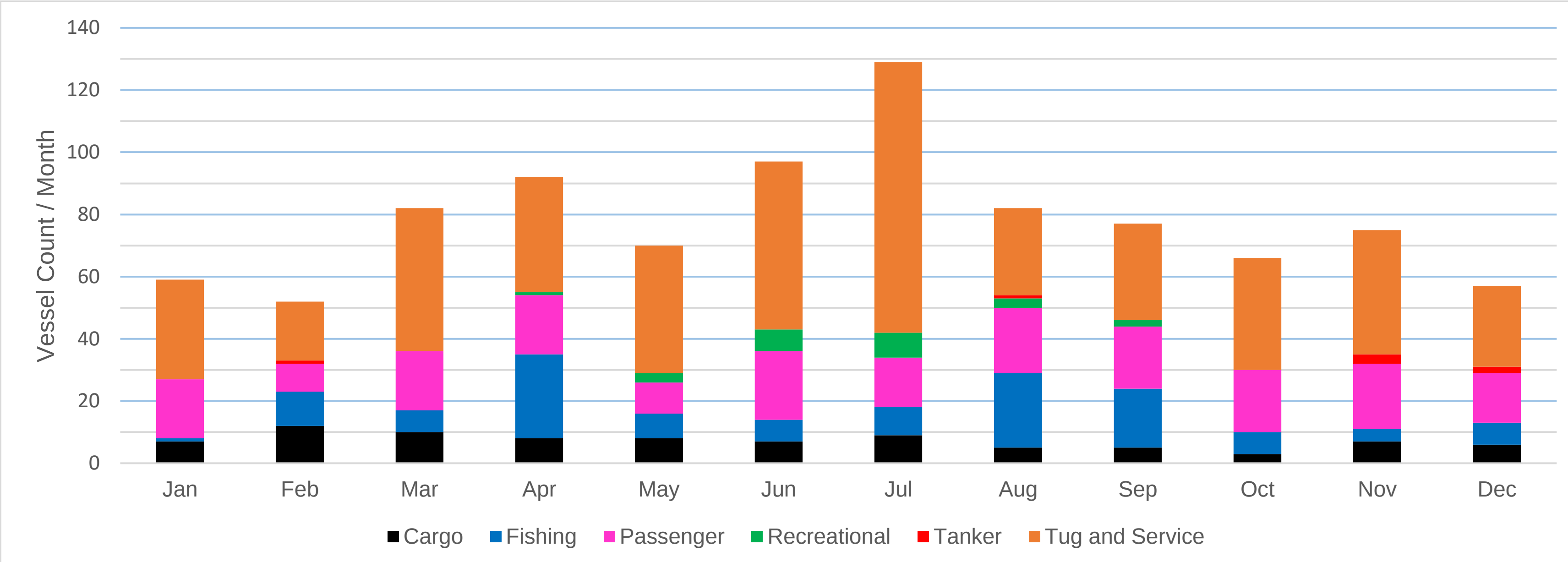


Figure 29: Vessel counts within the windfarm site (top) and study area (bottom) per month (2019).



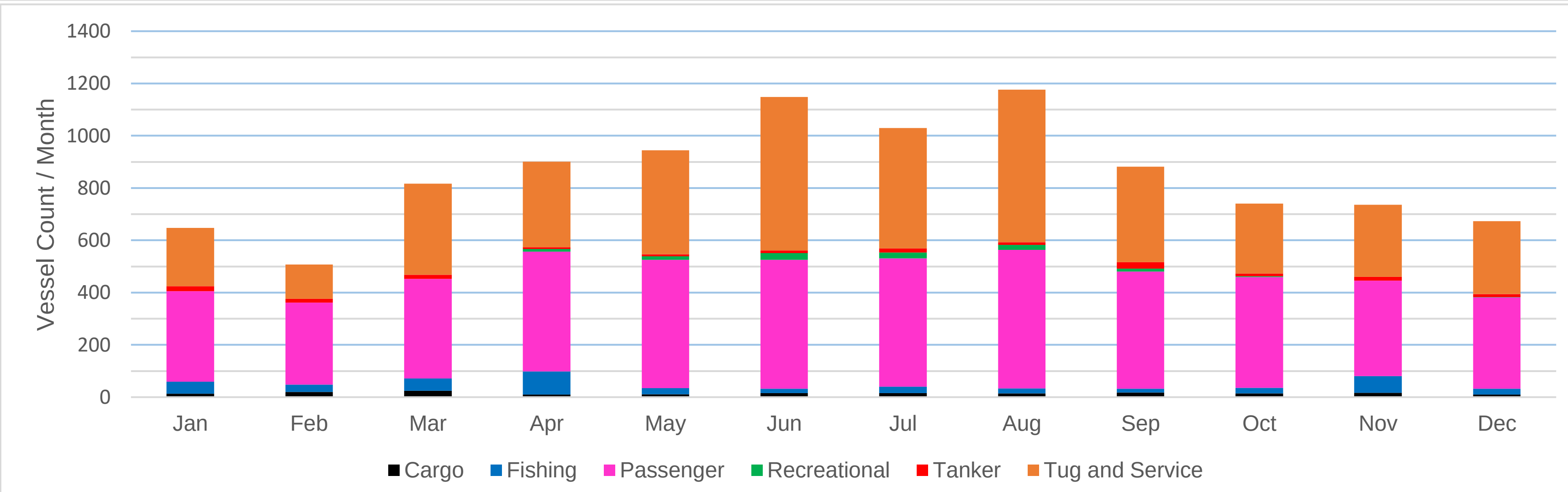
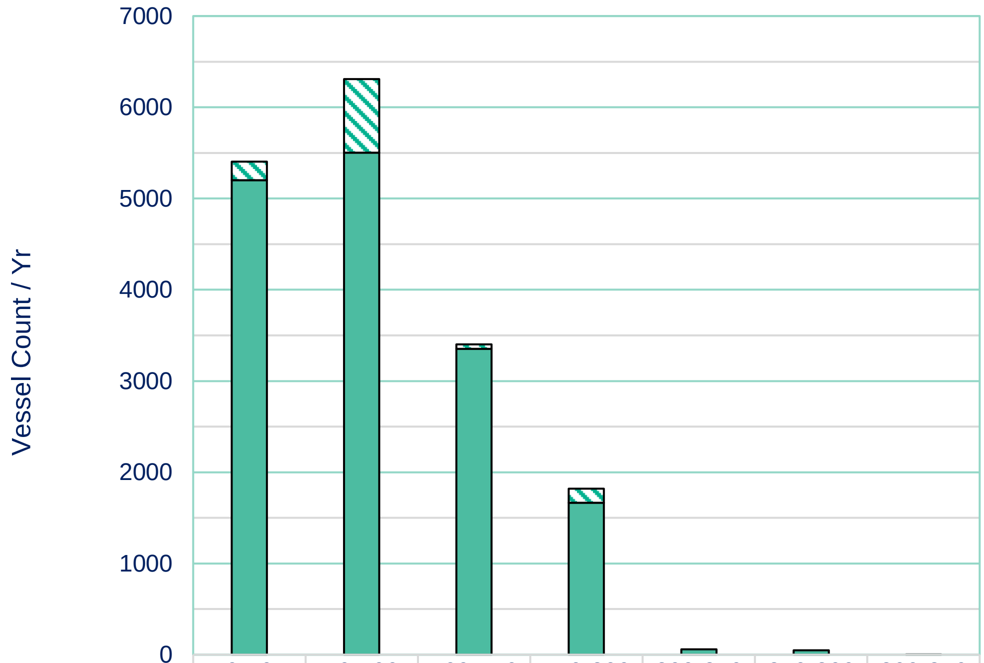


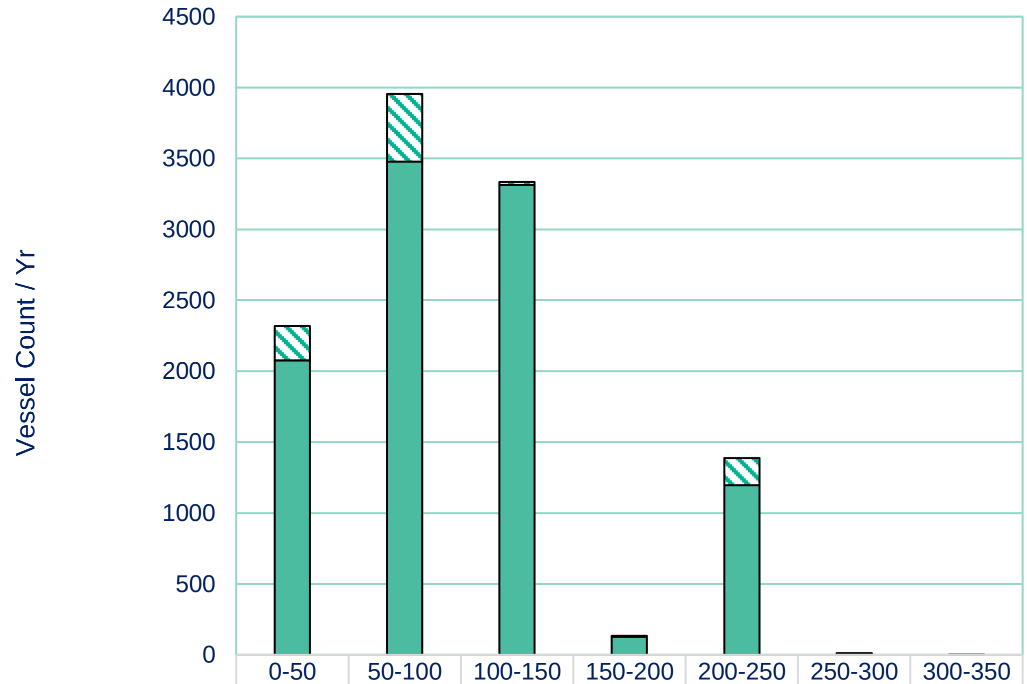
Figure 30: Vessel counts within the windfarm site (top) and study area (bottom) per month (2022).

6.4.9.1.5 **Figure 31** and **Figure 32** shows a breakdown of vessels by length. Around 23% less vessels overall passed through the windfarm site in 2022, compared to 2019, and there were 35% fewer vessels through the study area. Over three quarters (76%) of all the vessels that entered the windfarm site in 2022 were less than 100m in length. In 2022, 192 vessels over 200m in length passed through the windfarm site in comparison to none in 2019. All 190 vessel tracks are the three Stena 215m E-Flexer-class ferries that begun operating on the Irish Sea routes.



	0-50	50-100	100-150	150-200	200-250	250-300	300-350
Windfarm Site	203	807	48	154			
10nm Buffer (exc. Windfarm Site)	5201	5503	3354	1664	60	47	2

Figure 31: Vessel counts by length within the windfarm site and study area (2019)



	0-50	50-100	100-150	150-200	200-250	250-300	300-350
Windfarm Site	241	477	21	7	192		
10nm Buffer (exc. Windfarm Site)	2077	3478	3313	127	1196	13	2

Figure 32: Vessel counts by length within the windfarm site and study area (2022)

6.4.10 Identification of vessel routes

6.4.10.1.1 MGN 654 (MCA, 2021) provides guidance regarding the definition of shipping routes, in order to inform OWF assessments. To account for variation of tracks taken by vessels, the guidance note establishes the 90th percentile corridor principles, the central portion of traffic on a route containing the majority (90%) of vessel traffic. **Figure 33** shows a schematic of how the 90th percentile routes can be defined. To identify shipping routes, the MCA's 90th percentile concept has been utilised.

6.4.10.1.2 The 90th percentile concept considers that as vessels navigate between specific locations, they may take a variety of routes due to avoiding other traffic or as a result of leeway from wind or waves. However, they are generally concentrated in a particular corridor – approximately normally distributed. At any point along the route the cross track geometric distribution of vessel tracks can be determined and is typically stylised as a "normal" distribution.

6.4.10.1.3 To minimise any anomalous tracks, and therefore mark the width of a specified route, the MCA advise using the centre 90th percentile of the determined Total Route Width (see **Figure 33**) around the assumed median or centre line, for all vessels engaged on passage between the same two points.

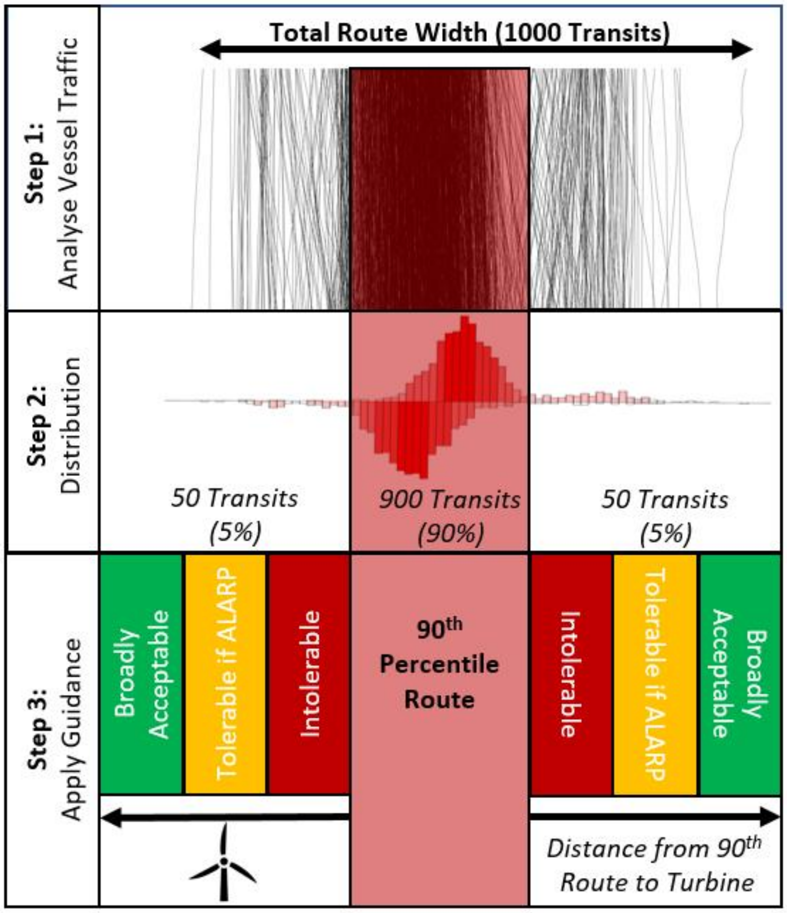


Figure 33: MGN654 90th percentile workflow

6.4.10.1.4 To identify the 90th percentile routes, the following data processing steps were undertaken:

- **Step 1:** Vessel tracks filtered to commercial only (cargo, tanker & passenger)
- **Step 2:** Tracks along a defined route selected
- **Step 3:** Gate transects constructed along the length of the route (ensuring transects at course changes are included)
- **Step 4:** Calculate number of tracks through cross track transect subsections
- **Step 5:** Calculate location of 9^{0t}h percentile through transect (**Figure 34**)
- **Step 6:** Draw polygon capturing all 9^{0t}h percentile locations on each transect

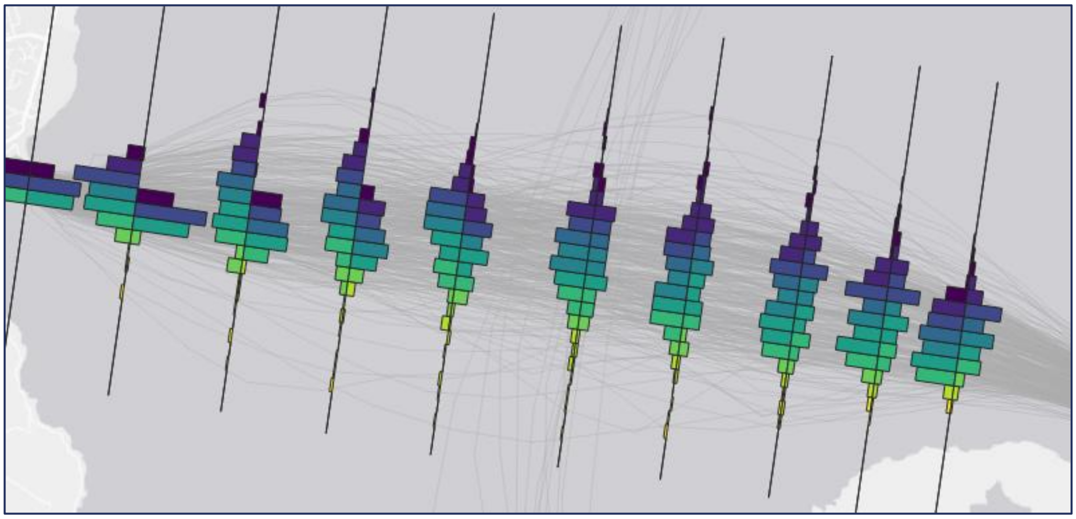


Figure 34: Determination of 90th percentile transects using cross track distributions

6.4.11 Commercial routes

6.4.11.1.1 The commercial vessel routes have been identified in **Figure 35,** which also shows the number of vessel movements per day. **Table 22** provides details of significant routes passing through the study area and windfarm site, including the number of approximate annual crossings and baseline distance.

6.4.11.1.2 All routes with more than one vessel movement/day transit between the Port of Liverpool and operate outside of the study area. The route between Liverpool Bay TSS and Off Skerries TSS south of the study area has the most vessel traffic with 4-6 vessel movements/day in either direction.

6.4.11.1.3 There are 13 commercial vessel 90th percentile routes with <1 vessel movement/day that intersect the study area, of which six intersect the windfarm site (**Table 22**).

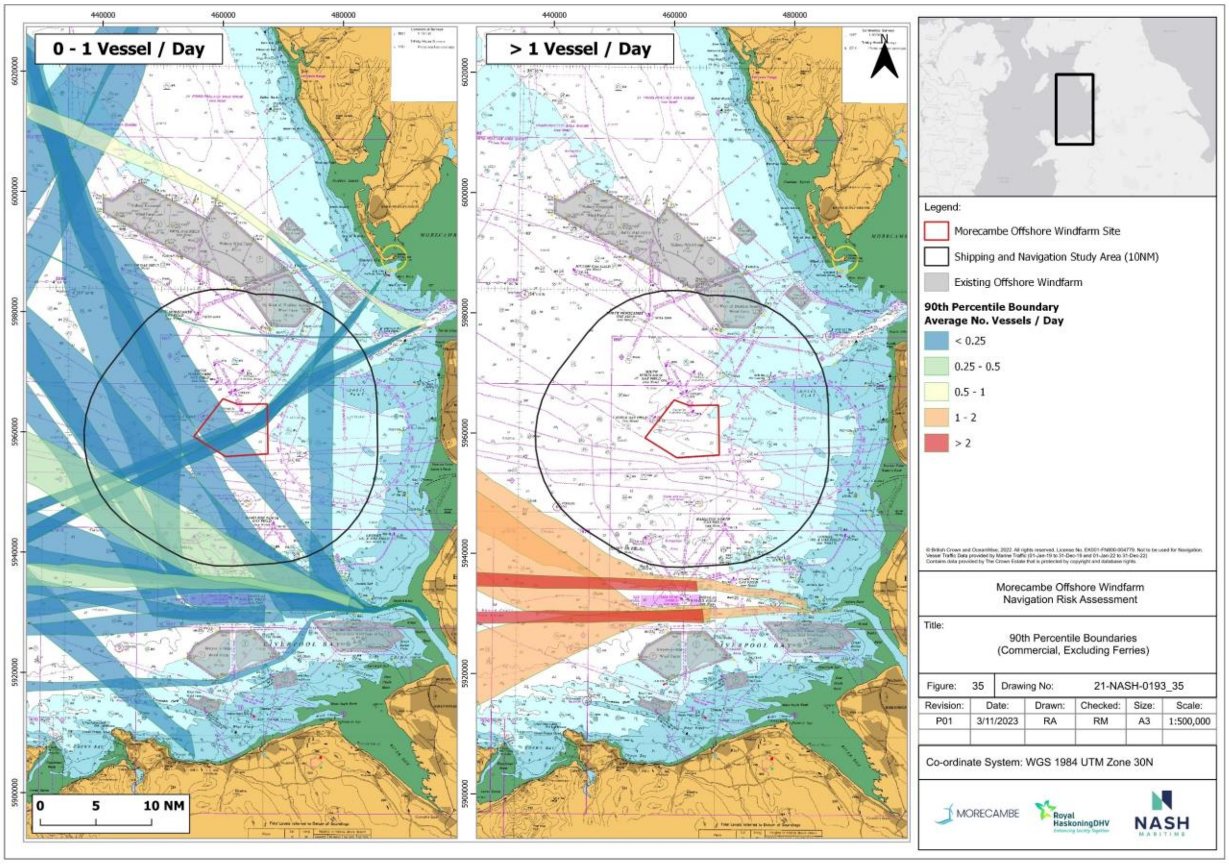


Figure 35: Commercial vessel routes

Table 22: Commercial vessel routes passing through the windfarm site

Passage Plan Route	Route Direction	Annual Vessel Count (2019)	Total Annual Vessel Count (2019)	Annual Vessel Count (2022)	Total Annual Vessel Count (2022)
LIV-East of IoM (W)	Southward / Northward	20	40	13	27
LIV-East of IoM I)	Southward / Northward	20		14	
HEY-Off Skerries TSS	Eastward	35	53	10	17
	Westward	18		7	
BAR-Off Skerries TSS	Eastward	22	39	13	17
	Westward	17		4	

6.4.12 Ferry routes

6.4.12.1.1 The ferry routes in the study area are presented in **Table 23**, along with a count of the crossings during 2019 and 2022. Eight ferry routes pass through the study area, with two 90th percentile routes passing through the windfarm site, as shown in **Figure 36**. All routes divided between the four operators are shown in **Figure 37**, which includes passage plan information provided by IoMSPC, Stena and Seatruck during consultation.

6.4.12.1.2 The IoMSPC ferries operate between Douglas on the Isle of Man, and either Heysham or Liverpool. The Heysham/Douglas route is the most frequently run route, with 1,372 and 1,451 transits/year (3-4/day) in 2019 and 2022, respectively, and passes east/west through the northern region of study area between South Morecambe gas field and WODS OWF. The Liverpool/Douglas route had 674 transits/year in 2019 and 593 in 2022, passing northwest/southeast through the study area. The route runs primarily west of the SBM, through the south of the study area (599 transits/year in 2019 and 551 transits/year in 2022). A small proportion of vessels on this route transit east of the SBM (53 transits/year during 2019, and 42 transits/year in 2022), of which 14 and 8 passed through the windfarm site in 2019 and 2022, respectively. During consultation it was confirmed vessels transit east of the SBM on northbound transits, to avoid congestion in the Liverpool Bay TSS (thereby exiting the TSS earlier) and are dependent on current and forecast weather conditions, to ensure safe and comfortable passage for passengers.

6.4.12.1.3 Stena Line operates routes between Belfast and either Liverpool or Heysham. Vessels between Heysham and Belfast transit between Barrow/Ormonde and WODS/Walney OWFs with 1,150 transits/year (3/day) in 2019 and 1,094 transits/year (3/day) in 2022. Vessels using the route between Belfast and Liverpool pass either east or west of the Isle of Man dependent on prevailing metocean conditions. Primarily, vessels use the westerly route, with a total of 1,442 transits/year (3-4/day) in 2019 and 1,490 transits/year (4/day) in 2022. However, whilst in 2019 vessels that transit to the west of the Isle of Man use one primary route, in 2022 west transiting vessels use one of three potential routes. Two of these routes are south of the study area, via the Liverpool TSS, either east (226 transits/year in 2022) or west (166 transits/year in 2022). The other route runs as in 2019, through the southwest of the study area (1,098 transits/year in 2022). Ferries passing east of the Isle of Man transit northwest/southeast on two planned routes. One route passes southwest of the windfarm site, to the west of the Calder platform, with 200 transits/year, (<1 vessel/day) in 2019, and 194 transits/year (<1/day) in 2022. Approximately, 80% of traffic that use this route is southbound traffic. On this sub-route 0.5% (one transit) and 1.5% (three transits) of vessels intersected the windfarm site in 2019 and 2022, respectively. The second route passes directly through the windfarm site, to the east of Calder, and is utilised by northbound traffic exiting Liverpool Bay TSS, with 153 transits/year (<1 vessel/day) in 2019 and 196 transits/year (<1/day) in 2022.

6.4.12.1.4 Seatruck operates two east-west routes through the northern section of the study area, passing between South Morecambe gas field and WODS OWF: Heysham to Warrenpoint and Heysham to Dublin, totalling 1,490 ferry transits/year (3-4/day) in

2019, and 1,705 (4-5/day) in 2022. Seatruck also operates a route between Liverpool to Dublin south of the study area.

6.4.12.1.5 P&O ferries operates a route between Liverpool and Dublin, which passes south of the windfarm site, outside the study area.

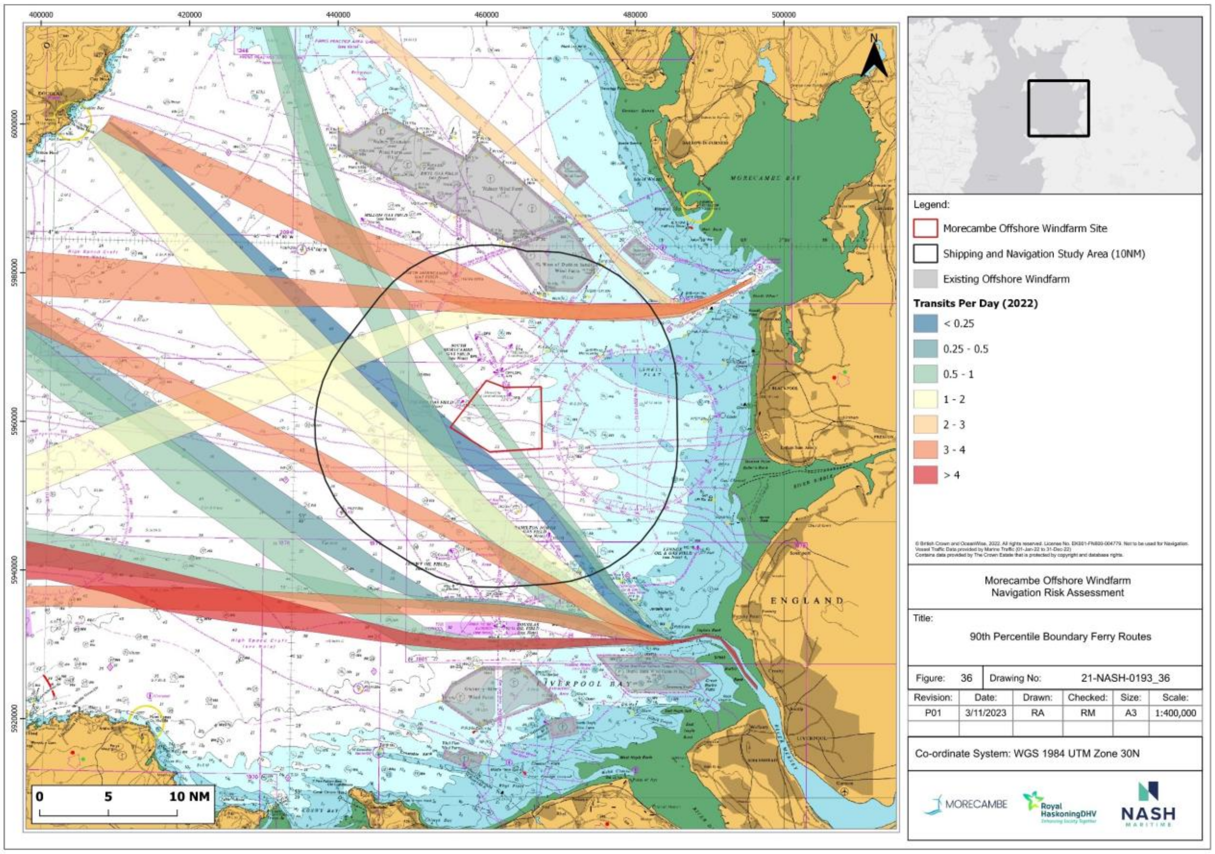


Figure 36: 90th percentile boundary ferry routes

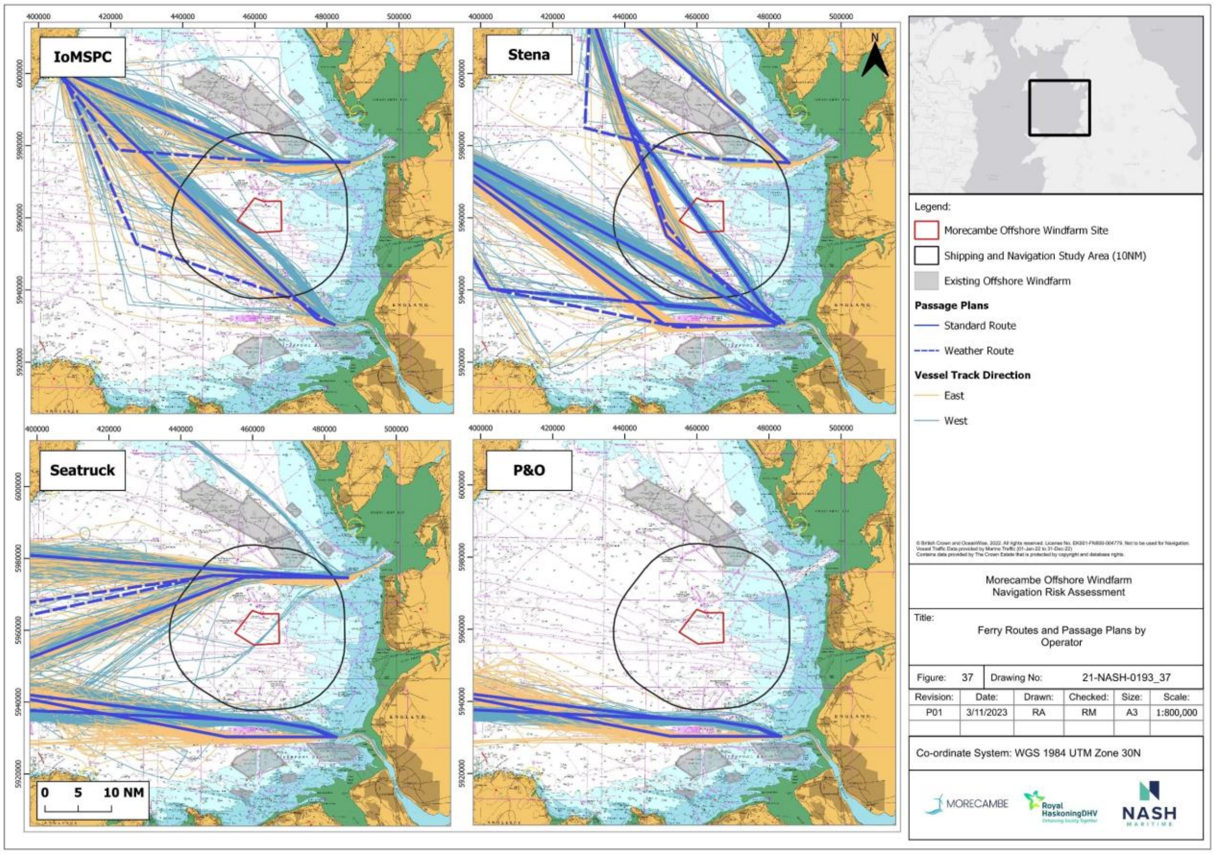


Figure 37: Ferry routes and passage plans by operator

Table 23: 90% percentile ferry routes and annual crossings by operator passing through the windfarm site (blue) and the study area (grey)

Operators	Routes	Example Vessels	Normal Conditions		Adverse Conditions	
			Approximate Annual Crossings (2019)	Approximate Annual Crossings (2022)	Approximate Annual Crossings (2019)	Approximate Annual Crossings (2022)
IoMSPC	HEY - DOUG	ARROW	86	107	0	10
		BEN MY CHREE	1286	1275	17	21
		MANANNAN	0	69	0	10
	LIV - DOUG[6]	MANANNAN	628	590	13	31
		BEN MY CHREE	46	3	0	0
Stena	LIV - BEL W of IOM & No TSS	STENA EDDA STENA EMBLA STENA ESTRID (2022 Only) STENA HORIZON (2019 Only) STENA LAGAN (2019 Only) STENA MERSEY (2019 Only) STENA FORECASTER STENA FORERUNNER (2019 Only) STENA FORETELLER (2022 Only)	1442	1098	20	15
	LIV - BEL E of IOM (E of Calder)		153	196	0	2
	LIV - BEL E of IOM (W of Calder)[7]		200	194	24	3
Seatruck	HEY - WAR	SEATRUCK PERFORMANCE SEATRUCK PRECISION	967	1099*	44	38

[6] The passage plan is outside (southwest) of the windfarm site, however 14 and 8 vessels on this route passed through the windfarm site in 2019 and 2022
[7] Route passes outside (southwest) of the windfarm site. On this sub-route one transit and three transits of vessels intersected the windfarm site in 2019 and 2022, respectively

Operators	Routes	Example Vessels	Normal Conditions		Adverse Conditions	
			Approximate Annual Crossings (2019)	Approximate Annual Crossings (2022)	Approximate Annual Crossings (2019)	Approximate Annual Crossings (2022)
	HEY - DUB	SEATRUCK PACE SEATRUCK PANORAMA (2019 Only)	523	606**	27	25

*14 transits of HEY- WAR in 2022 were undertaken by the vessels CLIPPER PENNANT (2), CLIPPER POINT (1), SEATRUCK PACE (10), and SEATRUCK PROGRESS (1).
** 48 transits of –EY - DUB in 2022 were undertaken by the vessels CLIPPER POINT (25), SEATRUCK PERFORMANCE (14), and SEATRUCK PRECISION (9).

6.4.13 Adverse commercial routeing

6.4.13.1.1 Analysis of vessel tracks during Met Office named storm events did not identify any repeatable adverse weather routeing behaviours taken by commercial shipping. This is likely due to the low number of commercial vessels operating in the area. Commercial vessels will typically route to minimise impact to cargo and crew, whilst retaining schedule requirements.

6.4.14 Adverse ferry routeing

6.4.14.1.1 **Figure 38** shows the ferry tracks alongside the calculated 90th percentile routes. Ferries deviating from these identified routes are considered as pursuing non-typical routeing. The primary reason for a ferry to take a non-typical route is to mitigate the effects of vessel movement during adverse weather conditions. Prevailing south westerly adverse weather typically results in ferries 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.

6.4.14.1.2 During adverse weather, there is evidence that IoMSPC takes routes to the south-west of their typical route. For the Liverpool to Douglas route, this takes them further southwest of the study area, as opposed to passing adjacent to the site. The Heysham to Douglas route is similarly deviated during adverse weather, but vessels pass clear to the northwest of site.

6.4.14.1.3 The Stena routes to the west of the Isle of Man between Liverpool and Belfast is similarly deviated further southwest, through the southern extent of the study area.

6.4.14.1.4 Adverse routeing of Seatruck vessels from Heysham to Dublin or Warrenpoint occurs west of the study area. There were three vessel tracks that intersected the windfarm site in the 2022 analysis.

6.4.14.1.5 Further discussion on adverse routeing of ferries is contained in **Section 8.2.3**.

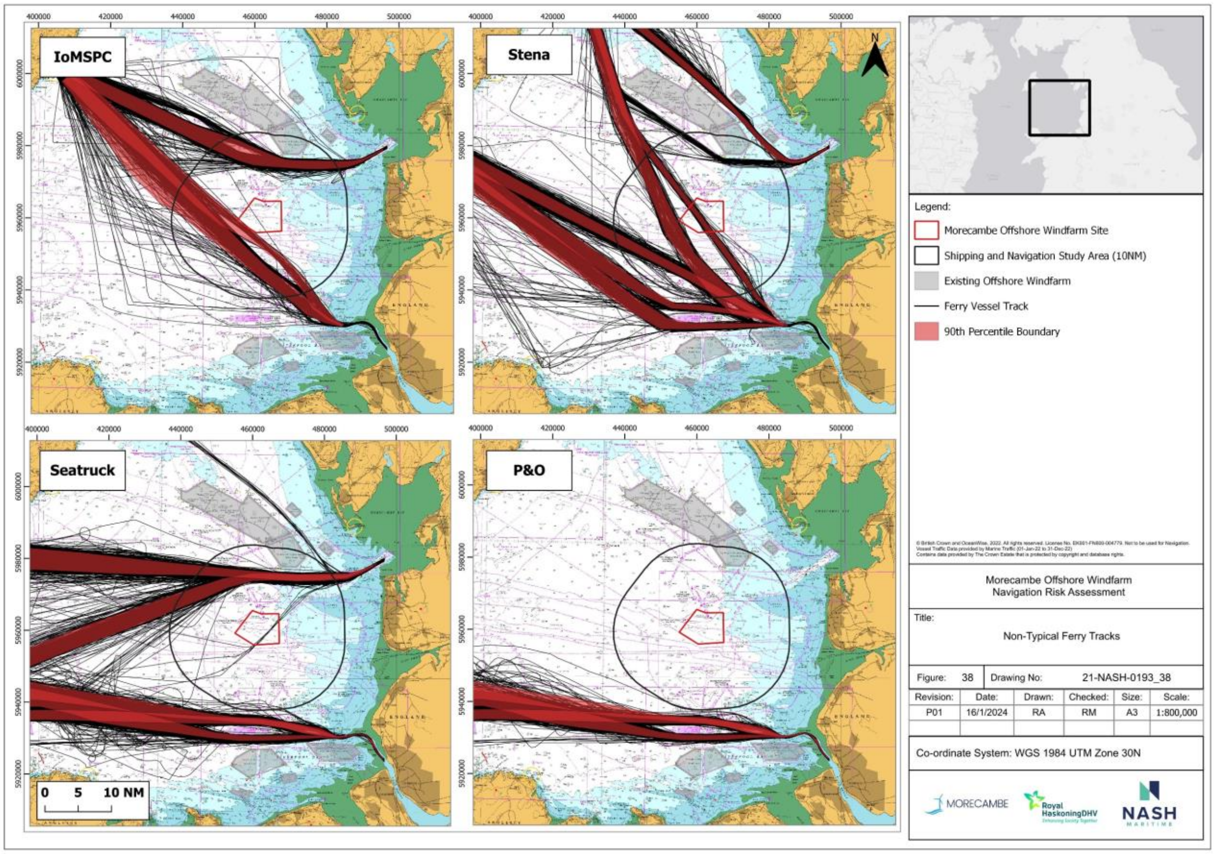


Figure 38: Non-typical ferry tracks

6.4.15 Anchoring, non-transiting and waiting vessels

6.4.15.1.1 Anchored or slow speed vessels are shown in **Figure 39**. The intensity of anchoring has been identified by extracting AIS positions with speeds of less than 0.5knots for vessels over 100m in length.

6.4.15.1.2 The most significant intensity of anchored vessel activity takes place outside of the study area, on the eastern coast of Anglesey near the Point Lynas Pilot Boarding Station. Anchoring or loitering within the study area also occurs at non-charted anchorage areas, notably around oil and gas infrastructure to the north of the windfarm site and the southern extent of the study area. No anchoring activity is evident within the windfarm site.

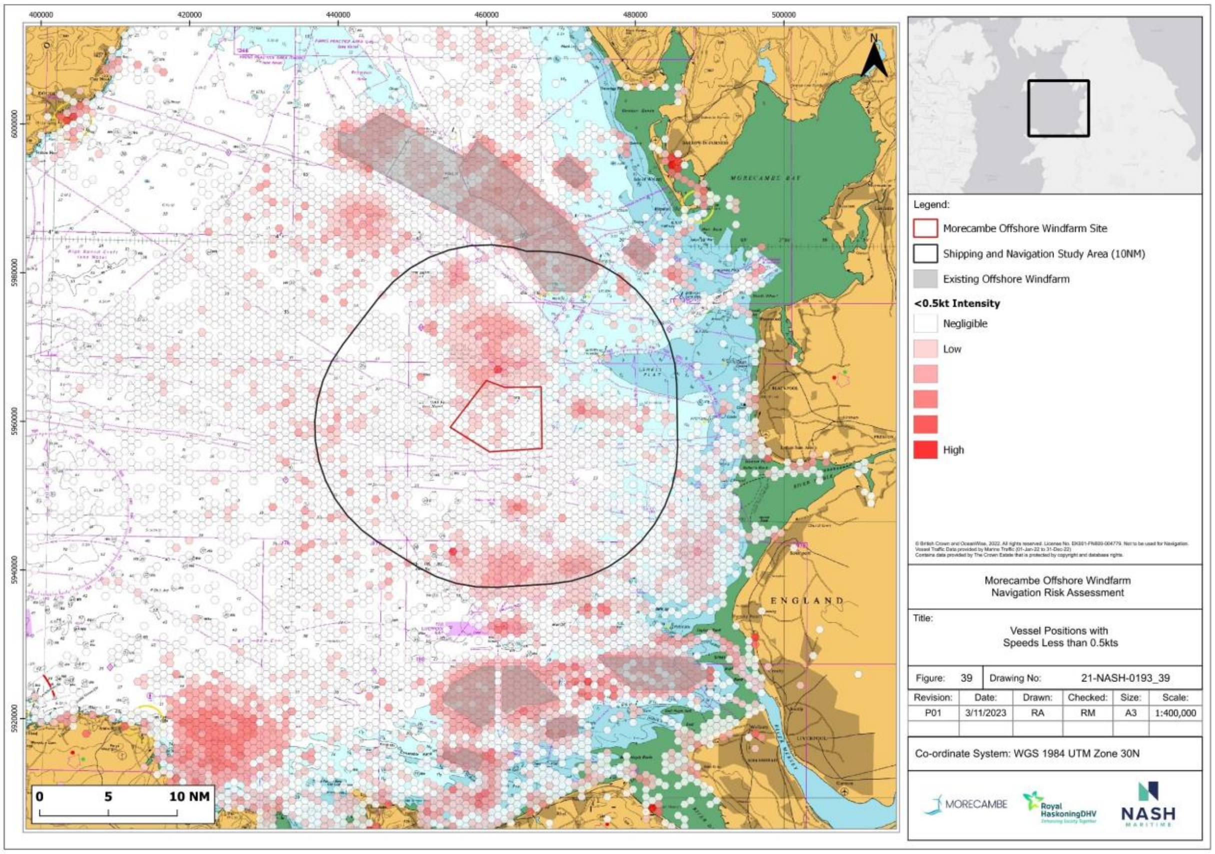


Figure 39: Non-transiting vessels and vessels at slow speed or anchored

6.5 MARITIME INCIDENTS

6.5.1 Incidents associated with other offshore windfarms

6.5.1.1.1 To better understand the types and frequency of navigational incidents that might occur with the proposed Project, analysis was conducted on historical accidents associated with UK operational OWFs. Analysis was conducted on the MAIB database (2010-2019), RNLI databases (2008-2019), MAIB incident reports and news reports.

6.5.1.1.2 In total, 69 incidents were identified between 2010 and 2019 (see **Table 24**). This includes six collisions between vessels, 29 allisions of a vessel with a fixed structure, 21 groundings and 13 near misses. 36% of incidents occurred within the array boundary, 43% occurred within ports or harbours and 20% occurred on-transit between the two. 82% of incidents involved project craft (such as Crew Transfer Vessels (CTV) 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 unreported.

6.5.1.1.3 From the historical incident record, and using an estimate of the number of years of operation for UK OWFs, incident rates per an "average" project are derived (see **Table**

24) (see 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. Therefore, over a typical 25-35 years 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 and offshore windfarms in the UK. Nor did any of the recorded navigational incidents across the UK sector result in loss of life.

Table 24: Average incident rate per project between 2010-2019 in UK

Incident Type	Total Number	Rate	Return Period
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
WFSV Allisions	27	0.099	10.1
Fishing Allisions	2	0.007	136.9
Total	69	0.254	3.9

6.5.2 Incidents within study area

6.5.2.1.1 **Figure 40** and **Table 25** show navigational incidents recorded in the study area between the MAIB (1992-2022) and RNLI (2008-2022) databases. In processing the incidents, non-navigationally significant incidents have been removed, such as shore-based activities (e.g. people cut off by the tide or swimmers in distress). Furthermore, duplicate values recorded in both databases have been removed.

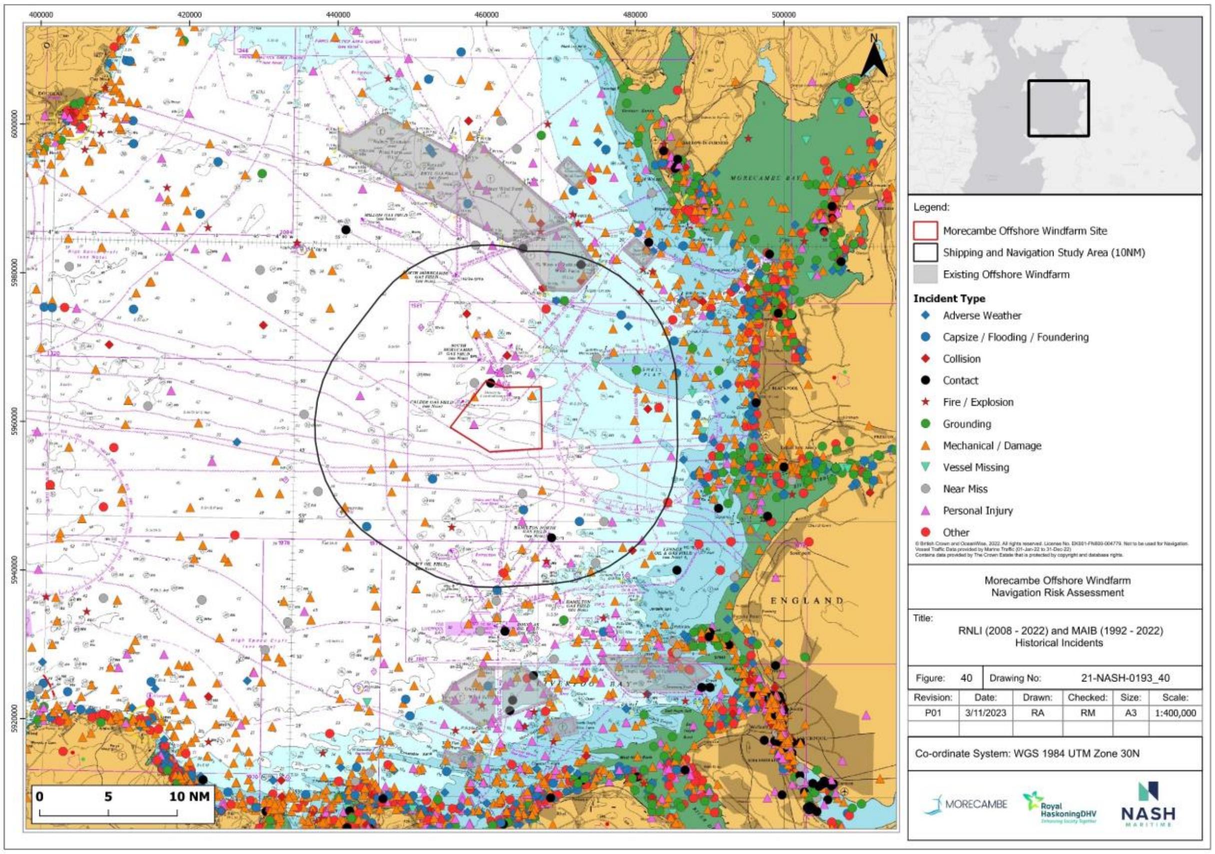


Figure 40: Historical incidents in study area

6.5.2.1.2 Four incidents were recorded within the windfarm site between 1992 and 2022. Two incidents were related to mechanical failures or damage; one involving a fishing vessel, the other involving a recreational craft. A minor personal injury incident in the windfarm site, related to the roll of a passenger ship in heavy weather, which resulted in injury to a passenger was also reported. A contact incident was recorded to the north of the windfarm site, related to the loss of control of a service ship and subsequent rig contact, at the South Morecambe gas field. The MAIB recorded this as a Less Serious incident, with minor damage reported.

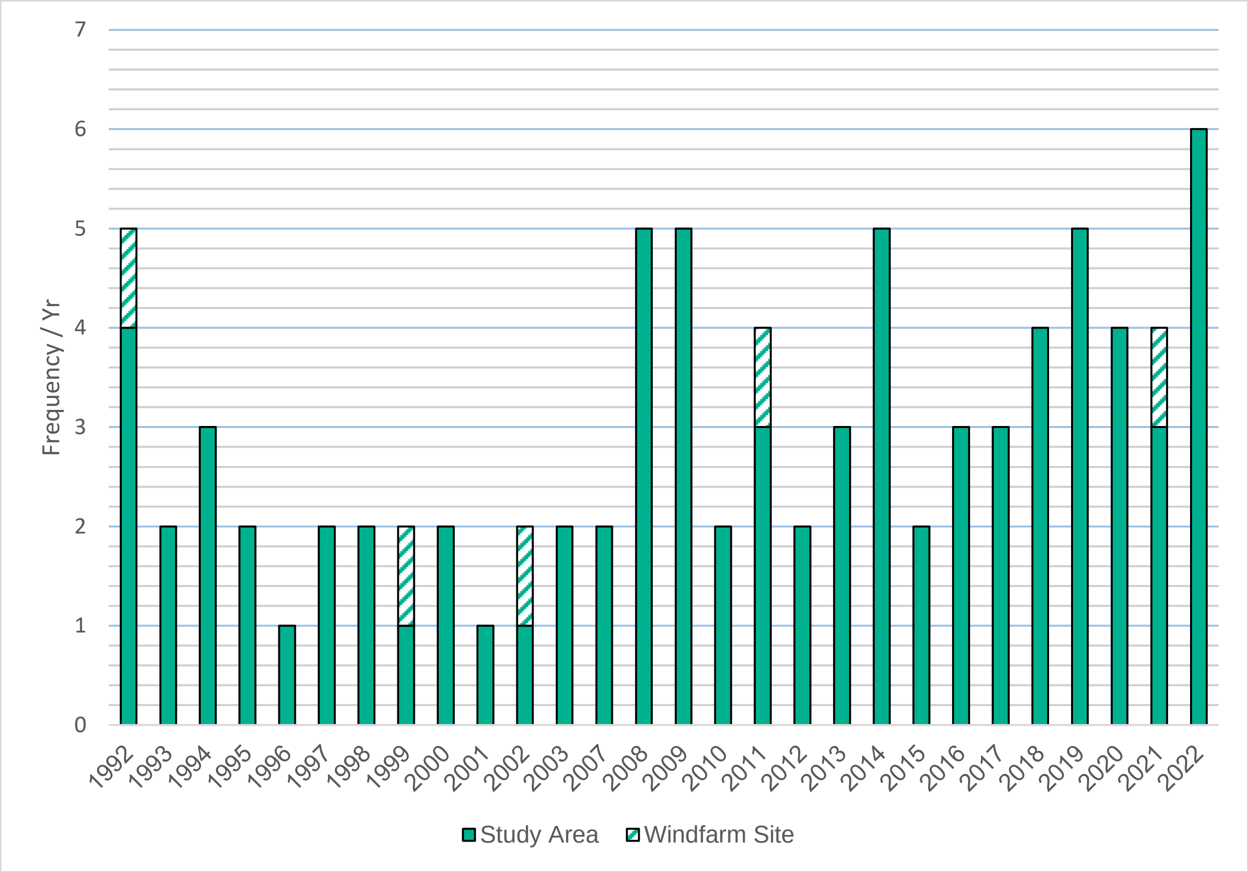


Figure 41: Incidents per year (note RNLI data applicable 2008-2022 only)

6.5.2.1.3 **Table 25** presents the base case annual accident frequency per vessel type and accident type for the study area.

6.5.2.1.4 In summary, the incident frequencies across the windfarm site and study area are low and mostly involve mechanical failure aboard recreational vessels.

Table 25: MAIB/RNLI accident frequencies in the study area per year (1992-2022)

	Cargo	Fishing	Passenger	Recreation	Tug & Service	Other	Total
Adverse Weather				2			2
Capsize/Flooding/ Foundering	1	3		1			5
Collision		1		1	3		5
Contact		1			2		3
Fire/Explosion			2				2
Grounding		1		1			2
Mechanical/Damage		9		22			31
Missing				1			1
Near Miss	1	4				1	6
Personal Injury		2	1	4	8		15
Other				2	1		3
Total	**2**	**21**	**3**	**34**	**14**	**1**	**75**

7. FUTURE CASE TRAFFIC PROFILE

7.1 COMMERCIAL TRAFFIC

7.1.1.1.1 DfT data on UK port trade is presented in **Figure 42** and **Figure 43** and shows a decline in port freight in 2020, at both the national and port level, respectively. 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. Evidence of this can be seen in 2021 and 2022, which both exhibited an increase in national port freight tonnage.

7.1.1.1.2 Port freight activity at the Port of Liverpool steadily increased between 2014 and 2019, before undergoing a significant reduction in 2020, likely due to pandemic related restrictions. It should be noted that an increase in tonnage does not necessarily correlate with an increase in vessels. New build vessels are often larger, capable of carrying more cargo, and ports such as Liverpool have invested in shoreside infrastructure to better handle these larger vessels.

7.1.1.1.3 **Figure 44** shows projected freight traffic into UK major ports, produced by the DfT in 2019. Overall, port traffic is forecast to remain relatively flat in the short term, but is expected to 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.

7.1.1.1.4 The long-term growth in port traffic is driven by increases in unitised freight traffic, which compensates for decreases in other freight in the short term. Liquid bulk traffic (principally crude oil) has the largest forecasted decreases, continuing a historical trend. Similarly, general cargo is forecast to decrease, in line with the historic decreasing trend, which is likely driven by increased containerisation of goods. Dry bulk traffic is forecast to have a relatively large decrease in the short term, driven primarily by demand for coal being projected to fall. In the long term, dry bulk traffic is forecast to increase, with other forms of dry bulk (principally biomass), the largest category, continuing to increase as it has done historically. Motor vehicles, Twenty-foot Equivalent Unit (TEU) forecast for Lo-Lo and the unit forecast for Ro-Ro are all forecast to grow strongly, driven by economic growth.

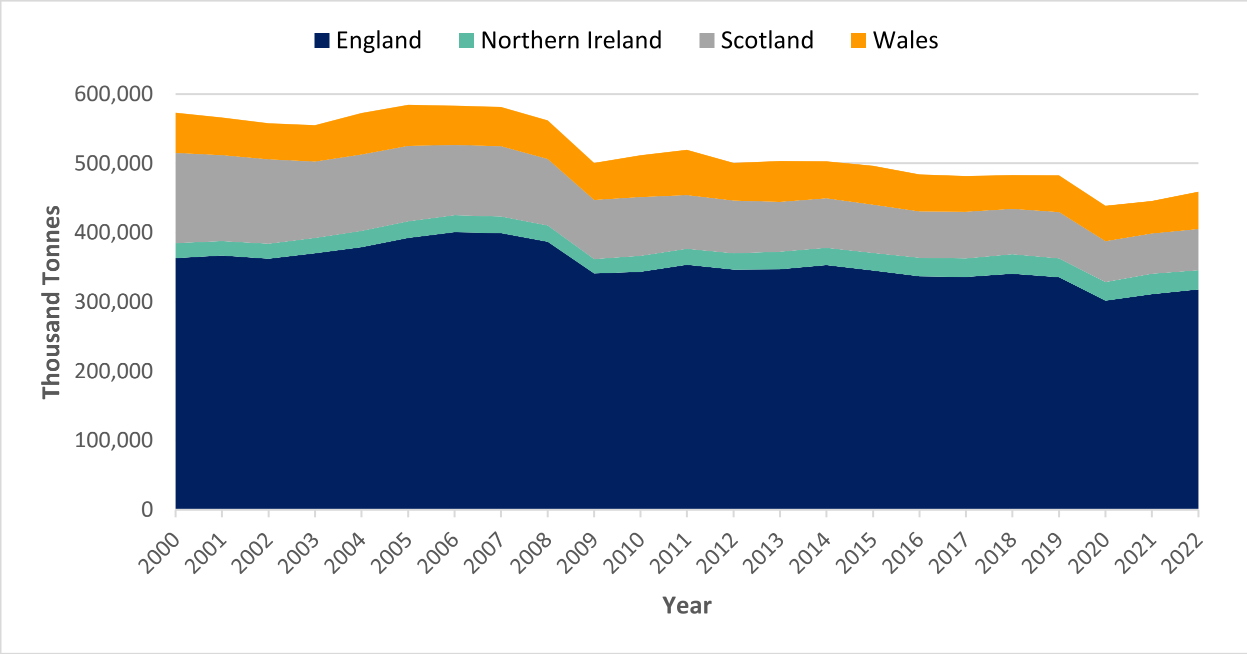


Figure 42: UK major port freight

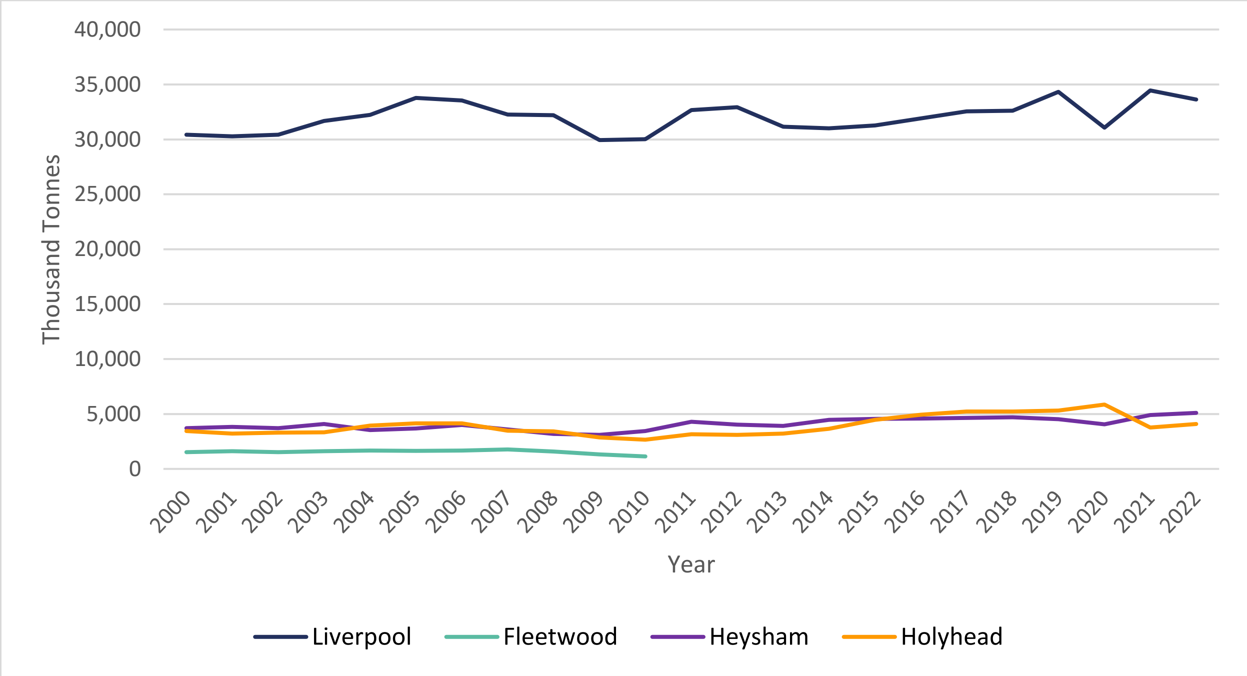


Figure 43: Port freight for UK major ports (Fleetwood ferry service closed at the end of 2010)

7.1.1.1.5 Other future changes that might occur could include the increased operation of autonomous vessels within UK waters. During the course of the NRA, autonomous or remote-controlled survey vessels were active within the windfarm site and no incidents were recorded. Regulatory bodies have insisted that any introduction of autonomous vessels into UK waters would have equivalent safety standards as conventional crewed vessels.

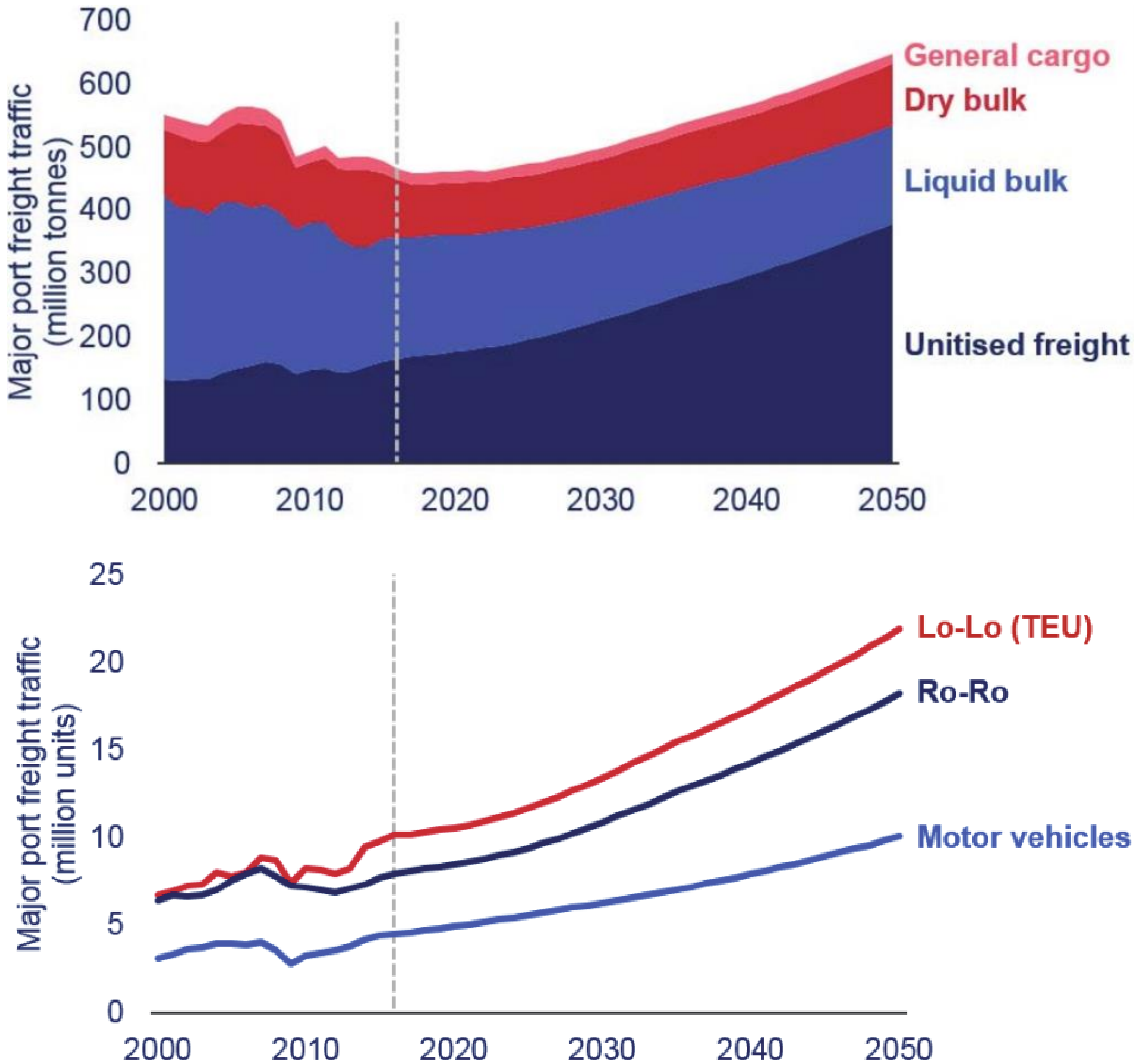


Figure 44: UK port freight projections (DfT, 2019)

7.2 FERRIES

7.2.1.1.1 Freight and passenger ferries account for a large proportion of vessel movements within the 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. For example, the AIS data for 2019 and the data for 2022 shows that Stena replaced several of their ferries with the new E-flex class. During consultation, each operator was asked on any potential future changes, noting that these were subject to change.

7.2.1.1.2 Seatruck has shown significant growth in demand, in 2018, and reported a 30% increase in volumes since 2015, with a 10% increase in 2017 alone[8]. The increase in unaccompanied trailer volumes between 2007 and 2018 was reportedly 250%[9]. A €100 million investment by Seatruck in 2018 was announced to increase capacity on the Warrenpoint to Heysham route by 30%.

7.2.1.1.3 Both of the IoMSPC vessels are twenty years old and will require replacement before 2035. The Ben-my-Chree will be replaced by the Manxman, which entered service in 2023. Consultation with IoMSPC determined that it is reasonable to assume that the Ben-my-Chree and Manxman will have similar handling and endurance capabilities. The Manannan is due for replacement before 31st December 2026[10]. This may be replaced by either a new fast craft or a fast conventional ferry.

7.2.1.1.4 Trends for passenger numbers are shown in **Figure 45** and show a gradual increase in passenger numbers across most routes (noting the exception of 2020 figures impacted by COVID-19). Liverpool-Dublin has had a steady decline, meanwhile Liverpool-Belfast has experienced an increase, this is especially the case in the years since the impact of COVID-19 during which time Stena Line replaced ferries with the new E-flex class. Notably, the Liverpool-Belfast passenger number were the least effected of these routes by COVID-19. Predicting how this trend may influence vessel schedules and routes is uncertain. Therefore, in the absence of definitive information, an assumption is made that vessel routes and schedules will be similar in 2035 to the existing baseline but with a likely increase in services.

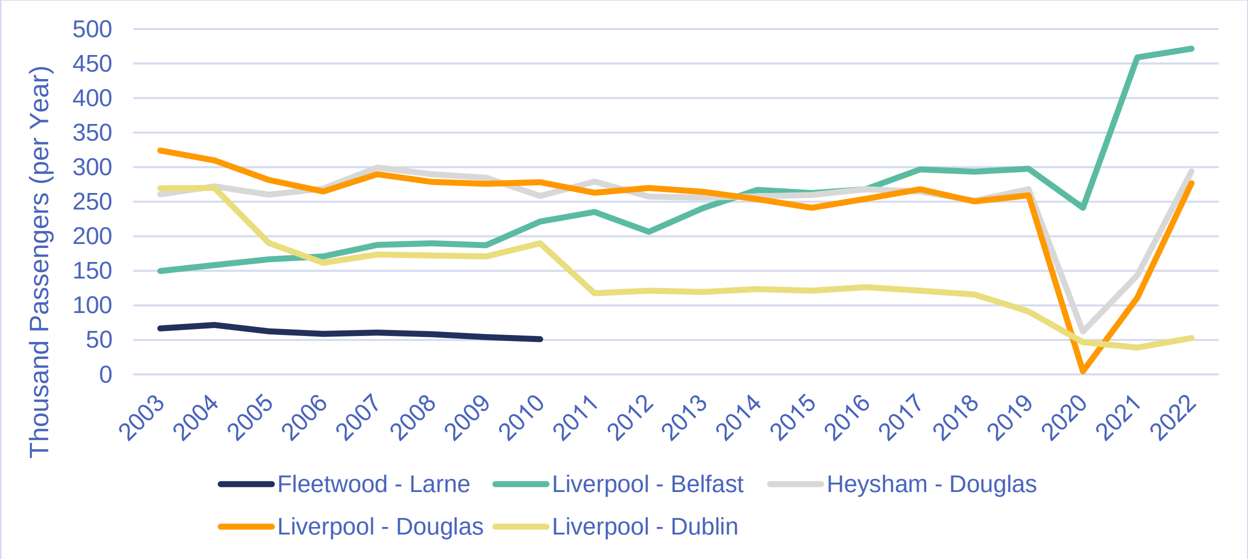


Figure 45: Passenger numbers (Fleetwood ferry service closed at the end of 2010). 2020/2021 figures heavily impacted by COVID-19

[8] https://www.seatruckferries.com/news/seatruck-surge-continues.
[9] https://www.seatruckferries.com/news/seatruck-boost-capacity-driver-shortages-fuel-unaccompanied-trailer-growth.
[10] https://www.tynwald.org.im/business/opqp/sittings/20182021/2019-GD-0009.pdf.

7.3 OIL AND GAS

7.3.1.1.1 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 decommissioning timelines have not been fully ascertained by the NRA team.

7.3.1.1.2 The Project overlaps with the Morecambe South gas fields (owned and operated by Spirit Energy Production UK Limited) and the Calder gas field (owned by Harbour Energy PLC and operated by Spirit Energy Production UK Limited on their behalf). These fields are supported by offshore infrastructure including platforms, pipelines, cables and wells. The South Morecambe gas field includes the platforms DP6, DP8 and the Central Processing Complex (CPC) and associated cable, pipeline and umbilical infrastructure. DP3 (chartered within the windfarm site) and DP4 were decommissioned and removed in 2023 meaning there are no further obstructions to navigation present. The CPC is located 0.9nm north of the windfarm site and is a hub complex made up of three platforms on jacket substructures (CPP1, AP1 and DP1). Calder CA1 is a small production platform with a single topside located 0.5nm to the mid-west of the windfarm site boundary.

7.3.1.1.3 There is a 500m safety zone around platforms and the Project has identified an embedded mitigation of a 1.5nm separation radius around platforms with an active helideck (within which no wind turbine generators or offshore substation platforms would be located). These are considered throughout the Project design process and in consideration of the developing layout scenarios. Oil and gas operators have also noted access requirements for Platform Supply Vessels (PSV) and Emergency Rescue and Recovery Vessel (ERRV).

7.3.1.1.4 The International Guidance for Offshore Marine Operations (IGOMO) state that vessels should plan for vessel passing distance of at least 1nm (1.8km) from each platform and operations, which might be in progress in its immediate vicinity.

7.3.1.1.5 Future decommissioning operations of oil and gas platforms will require a jack-up barge, or heavy lift vessel, followed by a drilling rig, estimated to be on site six+ months per platform, and supported by service vessels. Within the South Morecambe gas field, a platform supply vessel currently operates three days a week and an ERRV operates 365 days/year. The NRA team understands that future vessel movements will continue for ERRVs during decommissioning, whilst there is a potential increase for seven days/week operations for the platform supply vessel.

7.3.1.1.6 The Project is located within areas designated for gas storage and carbon capture storage (CCS). An Agreement for Lease (AfL) with The Crown Estate was awarded for the Gateway Gas Storage Facility in 2018, which covers offshore rights in the east of the Irish Sea. No development activities have taken place to date and the storage facility is located 4km to the northeast of the windfarm site, with no direct overlap.

7.3.1.1.7 In 2020 ENI UK Limited were awarded a carbon dioxide (CO_2) appraisal and storage licence covering an area located within the Liverpool Bay area. Under the licence, Eni plans to reuse and repurpose depleted hydrocarbon reservoirs (the Hamilton, Hamilton North and Lennox fields) and associated infrastructure to permanently store

CO_2 captured in northwest England and north Wales. These fields are located 10km to the south of the windfarm site and there is no direct overlap.

7.3.1.1.8 Rights for the exploration and appraisal of potential carbon dioxide storage sites were granted by the North Sea Transition Authority in 2023 for an area overlapping with the windfarm site (East Irish Sea Area 1). This area contains the Spirit Energy proposed Morecambe Net Zero Cluster Project which would provide a carbon storage and hydrogen production cluster if a permit is sought and granted, however detailed plans for this potential project are not currently available.

7.3.1.1.9 A related question to Round 4 North Sea and Irish Sea developments is whether oil and gas vessels would navigate through or around an OWF. It is noted that the IGOMO Section 8.15 recommends that courses are planned so that, where practical, the vessel passes at the distance of at least one nautical mile from each facility. However, the familiarity and manoeuvrability of offshore supply ships or ERRVs may facilitate navigation within large OWFs. This assessment has assumed that there is sufficient space, in suitable conditions, for in-field navigation to take place.

7.4 FISHING

7.4.1.1.1 Fishing within the Irish Sea is important for both the UK and Isle of Man fisheries. There is limited information available for future fishing vessel activity on which reliable assumptions can be made.

7.4.1.1.2 Within the study area, UK fisheries primarily target non-quota shellfish species, namely queen scallop, whelk, king scallop, and lobster. Therefore, fishing fleets are unlikely to be impacted by quota transfers following the UK's withdrawal from the European Union. Market changes have the potential to impact fishing activity in the study area, however, fishing activity in the area is not anticipated to change significantly, with both local and foreign vessels continuing fishing activity in the area.

7.5 RECREATIONAL

7.5.1.1.1 The RYA Water Sports Participation Survey (see **Figure 46**), conducted in 2019, found that the proportion of adults participating in boating activities has fluctuated between 6% and 8% between 2002 and 2018. Between 2008 and 2018, the proportion participating in yacht cruising, motor boating and power boating has remained consistent at 0.8%, 1.1% and 0.7% respectively. More recent data published in the 2021 Water Sports Participation Survey is significantly influenced by COVID-19, with a significant variation between 2021 and 2022 due to national/local lockdowns.

7.5.1.1.2 Therefore, it is unlikely that there will be a significant change in the number of recreational users due to macro trends.

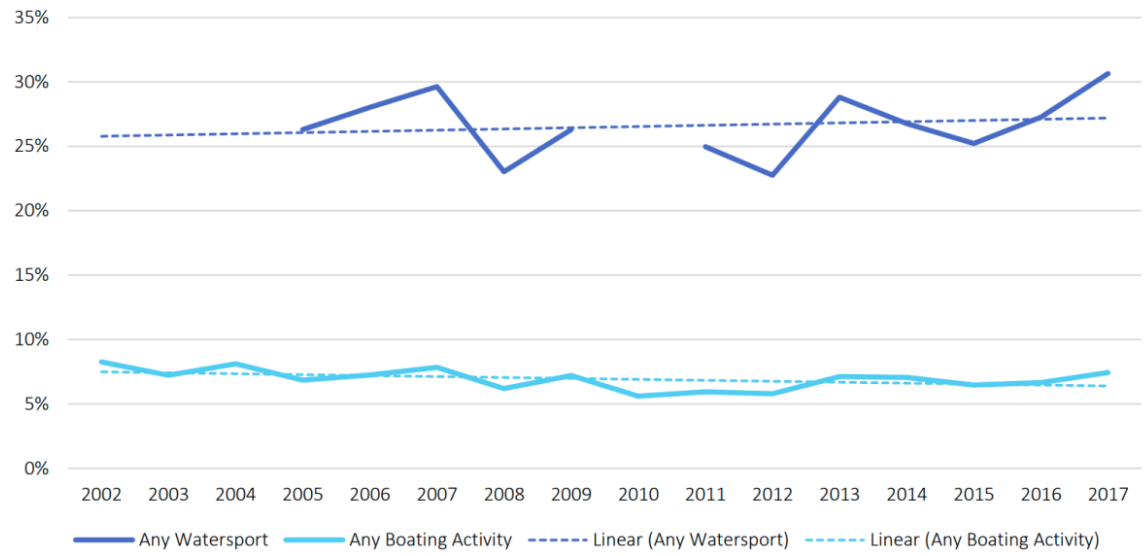


Figure 46: Recreational participation (Watersports Survey)

7.6 PROJECT OPERATIONS

7.6.1.1.1 The Project will require additional vessel movements to perform operational maintenance and inspection activities (see **Section 4.7**). The O&M base for the Project is not known at the time of assessment, therefore an assumption of 776 crew transfer vessel movements per year from north-west of England has been made. Major or significant maintenance will be managed in line with company operating procedures and the project embedded risk controls measures as documented at **Section 4.9**.

8. POTENTIAL IMPACT ASSESSMENT

8.1 IMPACT IDENTIFICATION

8.1.1.1.1 Following consultation with stakeholders, analysis of data and a review of guidance, 11 potential impacts of the Project were identified on shipping and navigation as documented in **Table 26**.

Table 26: Potential impacts

Number	Impact	Description
1	Impact of windfarm site on ferry vessel routeing	The Project could necessitate deviations to ferry routeing increasing distances resulting in additional cost and time for the passage.
2	Impact of windfarm site on commercial vessel routeing	The Project could adversely impact routeing of commercial vessels, making services unviable.
3	Impact of windfarm site on risk of allision/contact	The presence of the Project could increase the risk of allision or contact between navigating vessels and surface structures.
4	Impact of windfarm site on risk of collision	The Project could increase the risk of collision between navigating vessels, such as through the creation of choke points or increased vessel movements.
5	Impact of Project on search and rescue	The Project design could inhibit search and rescue access for vessels or aircraft during an emergency.
6	Impact of Project on visual navigation and collision avoidance	The presence of the Project could block or hinder visual navigation which could increase the risk of collision, allision or grounding.
7	Impact of Project on communications, radar and positioning systems	The Project infrastructure could interfere with shipboard or land-based equipment essential to communications or positioning.
8	Impact of windfarm site on risk of snagging	Snagging of vessels with inter-array and platform link cables.

8.1.1.1.2 No identified shipping and navigation impacts have been scoped out of the assessment.

8.2 IMPACT ON FERRY ROUTEING

8.2.1 Introduction

8.2.1.1.1 OWFs can impact vessel routeing by creating an obstruction in otherwise navigable waters that requires a deviation of an established vessel route. For regular runners, such as ferries, this has the potential to result in a significant increase in costs or make schedules unviable. Furthermore, impacts on routeing may result in increased safety related risks, which are considered **Section 8.4** and **8.5**.

8.2.1.1.2 During consultation, ferry operators raised several existing operational constraints, which should be considered in conjunction with an increased distance to clear an OWF:

- **Schedules:** Existing schedules are developed to maintain consistent arrival and departure times per 24-hour period. This may not be achievable with increased transit times on some routes.
- **Increased fuel:** Increased transit distance necessitates an increase in fuel burn, which has a direct additional cost to operators. Furthermore, this would increase the environmental impact of their operations through increased emissions.
- **Hours of Rest:** The Maritime Labour Convention requires 10 hours of rest in any 24-hour period, in a maximum of two separate periods, of which at least six hours must be uninterrupted. Existing schedules enable this requirement to be met, but increased transit duration could make compliance with the convention impossible, without compromising schedules or hiring additional crew.
- **Turn-around times:** Turn-around times within ports are constrained to enable safe loading and unloading. During busy periods, it may not be possible to reduce this duration to make up lost time, due to increased transit duration.
- **Reduced Vessel Speed:** Vessels operating in routes, performing additional turns or encountering other vessels more frequently may need to reduce speed, compounding any additional transit distance on vessel schedules.
- **Safe Manning:** Navigation in routes between offshore windfarms could be treated as constrained navigation and require additional senior officer presence on the bridge for greater proportions of crossings.

8.2.1.1.3 Berth/port constraints are also an additional consideration. Several of the ferry ports have clear operational constraints where delays might result in missing arrival windows.

- **Heysham:** Has a tight entrance requiring a significant alteration of course, which in combination with strong tides and wind conditions, makes approaching the harbour and berthing challenging. The harbour is dredged but occasionally arrival at spring low tides is not achievable with sufficient under keel clearance, requiring amendments to timetables.
- **Douglas:** Berthing in certain wind conditions is challenging and may result in cancellations.

- **Warrenpoint:** Is tidally constrained.
- **Belfast:** There is a limitation on availability of berths given the number of vessels operating on a route at the port.
- **Liverpool**: Constrained by lock timings and other vessel movements.
- **Dublin:** Dublin has recently relocated freight terminals further from the seaward entrance, increasing transit duration.

8.2.2 Ferry routeing in normal metocean conditions

8.2.2.1.1 Passenger or freight ferry services for IoMSPC and Stena Line have passage plans that pass through or in close proximity to the windfarm site (see **Section 6.4.12**). Therefore, the development of the windfarm site would necessitate re-routeing of these ferry services. It is recognised that previous projects in the Irish Sea (Barrow, Ormonde, Walney, WODS) have each impacted upon ferry routeing since 2004 (Anatec, 2016). Operators have had to adjust their passage plans to accommodate previous projects and the nature of these projects has not made any existing routes unviable.

8.2.2.1.2 **Figure 47** and **Figure 48** show the basecase passage plans (i.e. current passage plans as provided by ferry operators) and futurecase passage plans (i.e. the deviated routes around the windfarm site) for the IoMSPC and Stena Line ferry services, respectively. Futurecase passage plans were developed by the NRA team, which includes a master mariner, by reviewing the existing passage plans (e.g. to determine passing distances of 1.5nm).

8.2.2.1.3 **Table 27** summarises the annual transit count for each ferry service route, and the additional transit distance between the basecase and futurecase passage plans, as a result of deviating around the windfarm site. The key findings of this analysis are summarised within the following sections for each ferry operator.

8.2.2.1.4 IoMSPC ferry routes:

- The route between Liverpool and Douglas would be constrained by the presence of the windfarm site. The basecase passage plan is 2.3nm clear of the southwestern corner of the windfarm site and would be unaffected, however, as shown in **Figure 47**, a small proportion of westward transiting vessels (12.8% of vessels in 2022) navigate north of Hamilton North Gas Field structure (110/13). The presence of windfarm site would require all IoMSPC Liverpool/Douglas services to navigate south of the 110/13
- The Heysham/Douglas route is unaffected by the windfarm site during normal conditions

8.2.2.1.5 Stena Line ferry routes:

- The Liverpool/Belfast (East of IoM) route splits to pass to the east and west of Calder CA1 as shown in **Figure 48**. The basecase passage plan to the west of the structure is clear of the southwest corner of windfarm site by 2.5nm. In 2019, one transit on this route intersected the windfarm site and three intersected in 2022. Vessels navigating to the east of the Calder CA1 are on westbound transits. In total, 153 transits utilised the eastern passage plan in 2019 and 196 transits were recorded in 2022. The presence of the windfarm site would require all Stena Line Liverpool/Belfast (East of IoM) services to navigate south of Calder CA1, along the existing operator passage plan. This results in no additional transit distance between the basecase and futurecase passage plan for the vessels passing to the west of Calder CA1, and an additional 1.6nm for vessels passing to the east
- The Liverpool/Belfast (West of IoM) route is unaffected by windfarm site

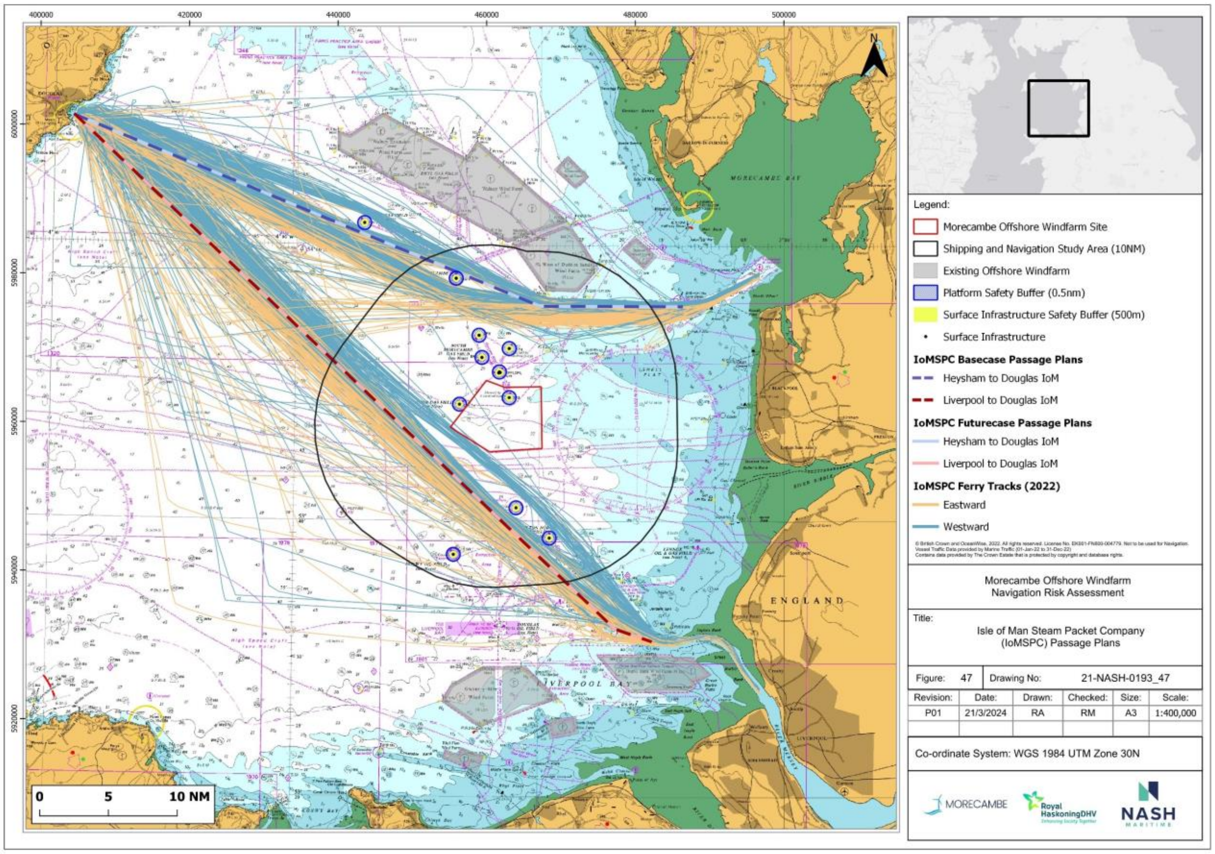


Figure 47: IoMSPC ferry basecase and futurecase passage plans

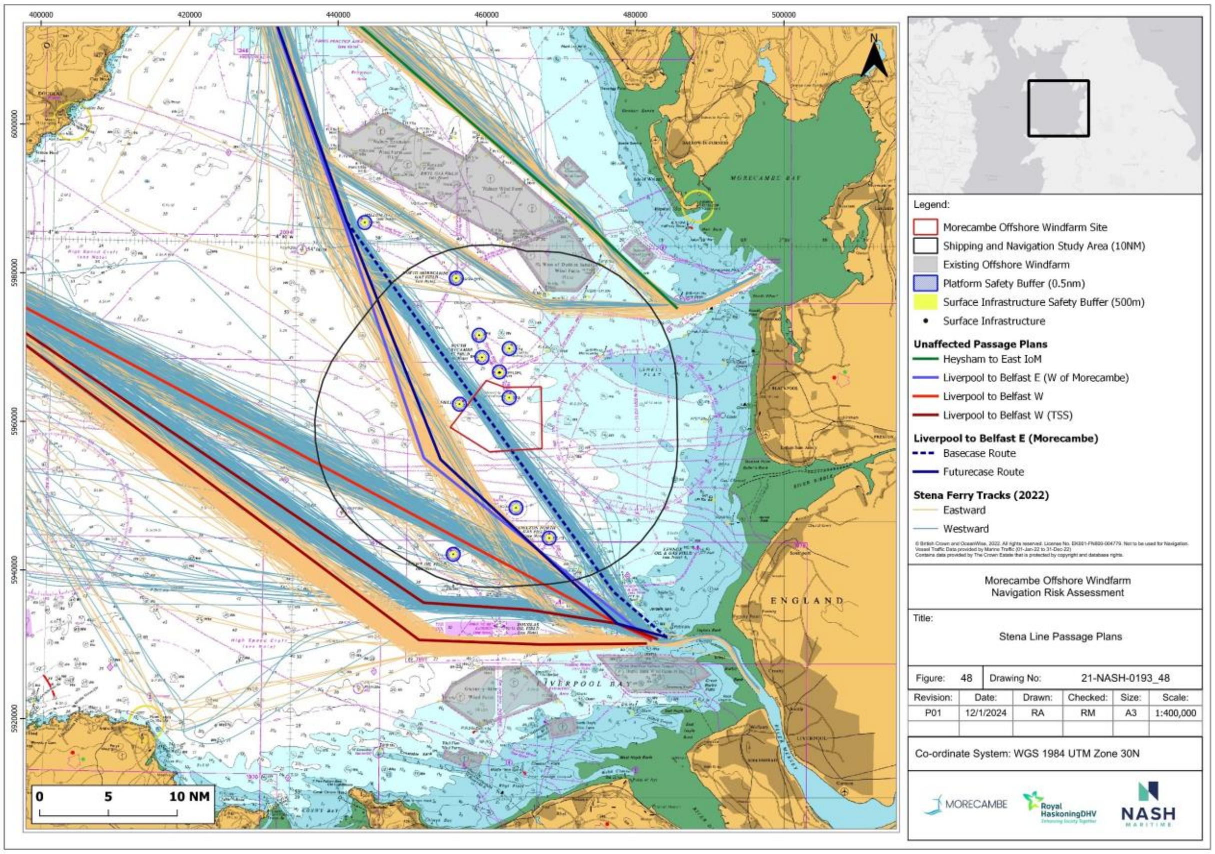


Figure 48: Stena Line ferry basecase and futurecase passage plans

Table 27: Impact on ferry passage plan routeing in normal metocean conditions

	Routes	Baseline Distance (nm)	Baseline Time (Minutes)	Service Speed (Knots)	Futurecase Distance (nm)	Additional Futurecase Distance (nm)	Additional Futurecase Time (Minutes)
IoMSPC	HEY - DOUG	46.8	225.0	13.2	46.8	0	0
				17.2			0
				28.8			0
	LIV - DOUG	56.9	165.0	28.8	56.9	0	0
				17.2			0
Stena	LIV - BEL W of IoM & No TSS	113.3	480.0	18.7	113.3	0	0
	LIV - BEL E of IoM (E of Calder)	113.9			115.5	1.6	5.1
	LIV - BEL E of IoM (W of Calder)	114.9			114.9	0	0
Seatruck	HEY - WAR	100.3	480.0	15.4	100.3	0	0
	HEY - DUB	109.3	480.0	15.0	109.3	0	0

8.2.3 Ferry routeing in adverse weather

8.2.3.1.1 **Section 8.2.2** was limited to an assessment of routeing in normal weather conditions. Where significant adverse weather is encountered, ferries may take less direct routes to take advantage of a lee from land masses, avoiding dangerous sea states or minimising the motions onboard. **Figure 49** shows futurecase adverse weather routes, including passage plans unaffected by the Project and the deviation to the Liverpool to Belfast (East of IoM) route with the windfarm site in situ. The 2019 and 2022 AIS data has been used to approximate the transit speeds and decision making in adverse weather (**Table 28**). Each revised futurecase passage plan was developed by the NASH project team, including master mariners, and account for existing decision-making principles and passage plans, where provided by operators (such as passing at least 1.5nm from a wind turbine) or that were obtained during consultation with operators. These were further developed during the navigation simulations involving Masters from each ferry company.

8.2.3.1.2 Stena Line Liverpool to Belfast (West of IoM) routes in adverse weather tend to transit to the south-west of the study area, towards the prevailing conditions, and are unaffected by the windfarm site.

8.2.3.1.3 There is infrequent use of the Liverpool to Belfast (East of IoM (East of Calder)) route during adverse weather with no vessels in 2019 and two in 2022. With the Project in place, these vessels may use the unaffected east of IoM (west of Calder) route however, they are more likely to follow the Liverpool to Belfast (West of IoM) adverse weather route which is not deviated by the Project.

8.2.3.1.4 If the vessels deviate to use the east of IoM (west of Calder) route, there will be an increased distance of 1.5nm, adding approximately 5.2 minutes to the 8 hour baseline journey time. This increases total delays from 0 – 30 minutes in the basecase to 5.2 - 35.2 minutes for the futurecase. However as noted above the route is not typically used in adverse weather conditions.

8.2.3.1.5 IoMSPC, Seatruck, and P&O adverse ferry routes are unaffected by the windfarm site.

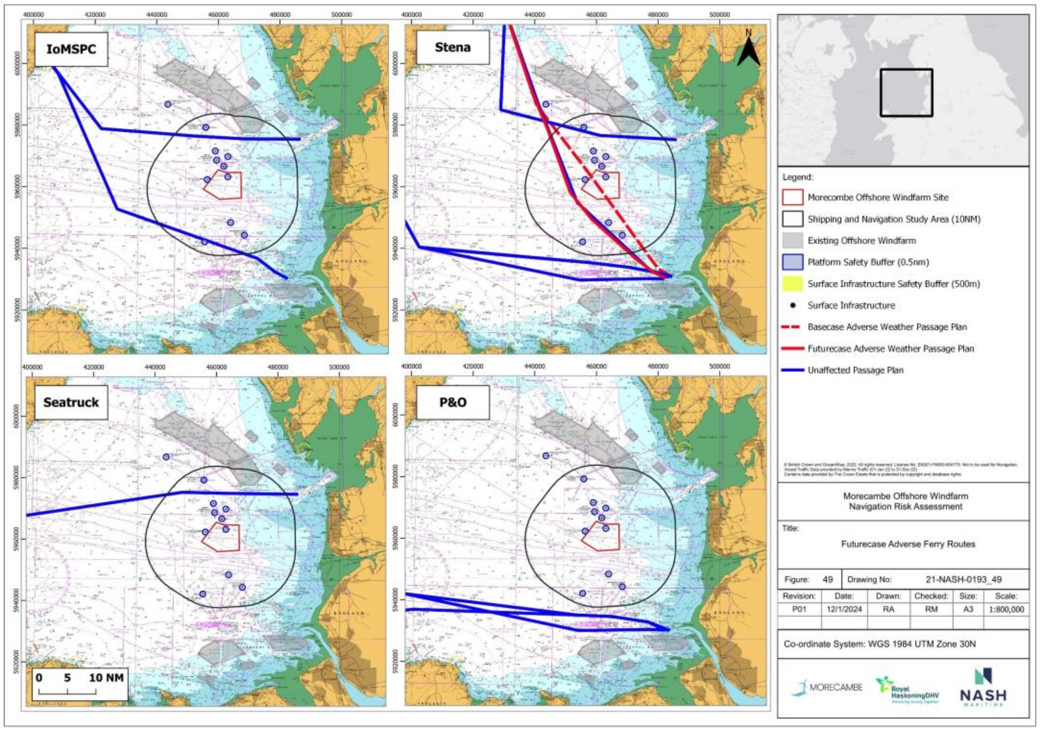


Figure 49: Impact on ferry routes in adverse weather

Table 28: Impact on ferry passage plan routeing in adverse metocean conditions

Operators	Routes	Baseline Adverse Distance (nm)	Baseline Adverse Time (Minutes)	Basecase Total Delays (Minutes)	Futurecase Distance (nm)	Additional Futurecase Distance (nm)	Additional Futurecase Time (Minutes)
IoMSPC	HEY - DOUG	50.1	225	+10 to +23	50.1	0	0
	LIV - DOUG	61.2	165	+10 to +33	61.2	0	0 0
Stena	LIV - BEL W of IoM & No TSS	121.2	480	+20 to +60	121.2	0	0
	LIV - BEL E of IoM (E of Calder)	114.0	480	+0 to +30	115.5	1.5	+5.2
	LIV - BEL E of IoM (W of Calder)	114.5	480	+0 to +30	114.5	0	0
Seatruck	HEY - WAR	102.0	480	+27	102.0	0	0
	HEY - DUB	110.8	480	+28	110.8	0	0

8.2.4 Summary

8.2.4.1.1 **Section 8.2** has described how the windfarm site may impact upon ferry operations and routeing in both normal conditions and adverse weather. Based on the analysis Stena is the only operator with routes directly impacted.

8.2.4.1.2 The results suggest that additional transit distances of 1.6nm and 1.5nm on the Stena Liverpool/Belfast (East of IoM) route (normal and adverse routes respectively) on a 113.9nm passage is not likely to adversely impact upon ferry operations.

8.3 IMPACT ON COMMERCIAL VESSEL ROUTEING

8.3.1 Introduction

8.3.1.1.1 OWFs can impact on vessel routeing by creating an obstruction in otherwise navigable waters that requires a deviation of their route. For commercial vessels, this has the potential to result in increased transit time and cost. Furthermore, impacts on routeing may result in increased risks, which are considered in **Sections 8.4** and **Section 8.5**.

8.3.2 Commercial vessel routeing in normal conditions

8.3.2.1.1 Several low intensity commercial routes (<1 vessel per day) crossing the Irish Sea have been identified as passing through, or in close proximity to, the windfarm site (see **Section 6.4.11**). Therefore, the development of the windfarm site would necessitate re-routeing of these transits.

8.3.2.1.2 **Figure 50, Figure 51,** and **Figure 52** show the basecase passage plans (i.e. current passage plans derived by the NRA team based on 2022 AIS vessel tracks) and futurecase passage plans (i.e. the deviated routes around windfarm site) of the following three commercial routes that are impacted by the windfarm site:

- Liverpool/East of IoM
- Heysham/Off Skerries TSS
- Barrow/Off Skerries TSS

8.3.2.1.3 **Table 29** summarises the annual transit count for each commercial route, and the additional transit distance between the basecase and futurecase passage plans, as a result of deviating around the windfarm site. The key findings of this analysis are summarised within the following sections for each route.

8.3.2.1.4 The passage plan between Liverpool/East of IoM is used by vessels transiting between the UK and Ireland/Europe. The route west of Calder CA1 platform intersects the western corner of the windfarm site, whilst the route east of Calder CA1 platform passes through the centre of the windfarm site (**Figure 50**). Of the 68 vessel tracks on these routes, 40% intersected the windfarm site, while 60% transited clear to the west. The futurecase passage plan proposes a minor deviation to the west to reroute traffic 1.5nm clear of the southwestern corner of the windfarm site. This results in an additional transit distance between the basecase and futurecase passage plan of 0.1nm for the westward route and 2.4nm for the eastern route.

8.3.2.1.5 The basecase passage plan for Heysham/Off Skerries TSS is a low-use route, with 17 transits per year passing to the south of the Calder and South Morecambe gas fields through the centre of the windfarm site (seven westbound transits and ten eastbound transits in 2022). The futurecase passage plans deviate vessels north of windfarm site to pass >1.8nm south of WODS Windfarm, and >1.25nm north of DP8 (South Morecambe gas field) (see **Figure 51**). The deviation results in an additional transit distance between the basecase and futurecase passage plan of 2.4nm for the eastward route and 1.4nm for the westward route.

8.3.2.1.6 The route between Barrow/Off Skerries TSS is a low-use route, with 17 transits per year transiting through the windfarm site south of Calder CA1 and South Morecambe gas fields (four westbound transits and 13 eastbound transits in 2022). The futurecase passage plans deviate vessels north of windfarm site to pass >1.8nm south of WODS windfarm, and >1.25nm north of DP8 (**Figure 52**). The deviation results in an additional transit distance between the basecase and futurecase passage plan of 1.7nm for the eastward route and a reduction in transit distance of -0.4nm for the westward route.

8.3.2.1.7 A total of 34 commercial transits utilised routes between Heysham/Barrow and Off Skerries TSS in 2022 that intersect the windfarm site. Given the very low traffic intensity of the affected commercial routes, the impacts of the route deviations are minimal and therefore are unlikely to make operations unviable.

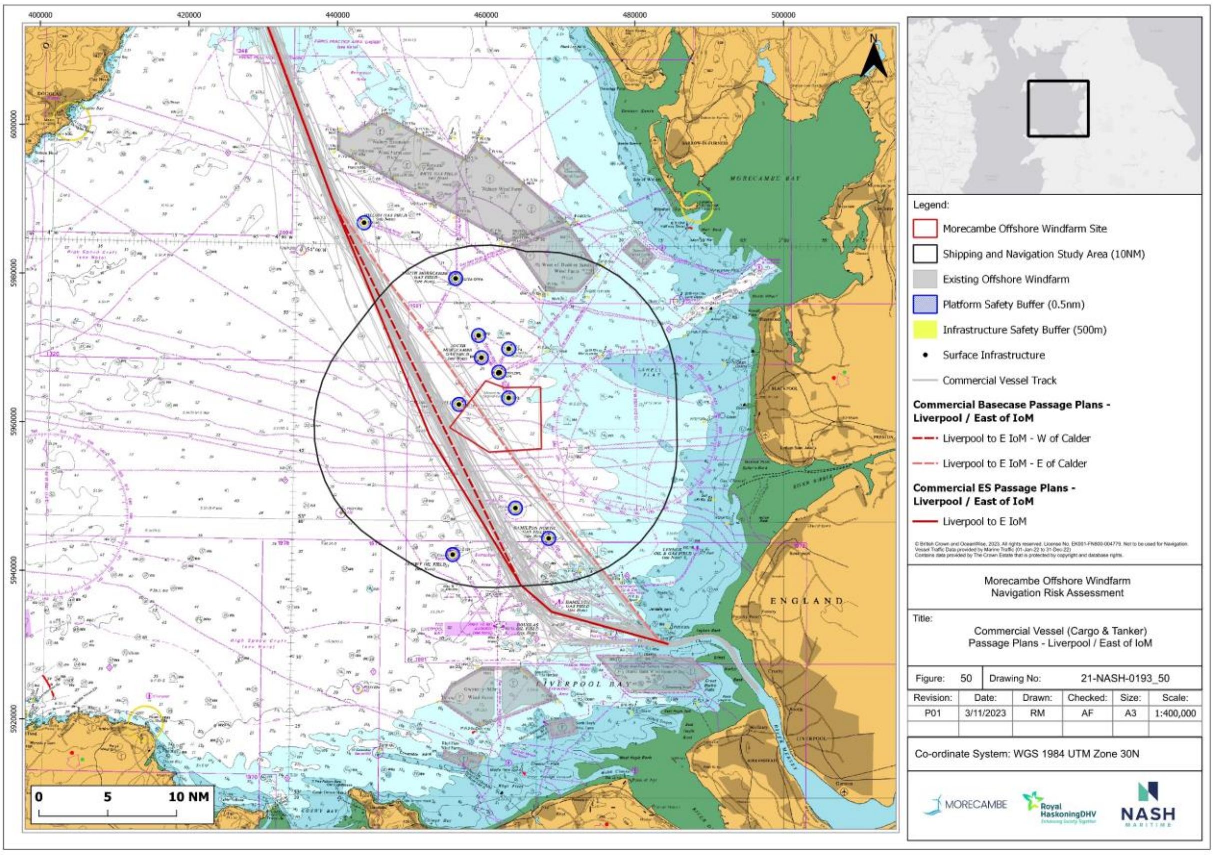


Figure 50: Liverpool/East of IoM commercial route basecase and futurecase passage plans

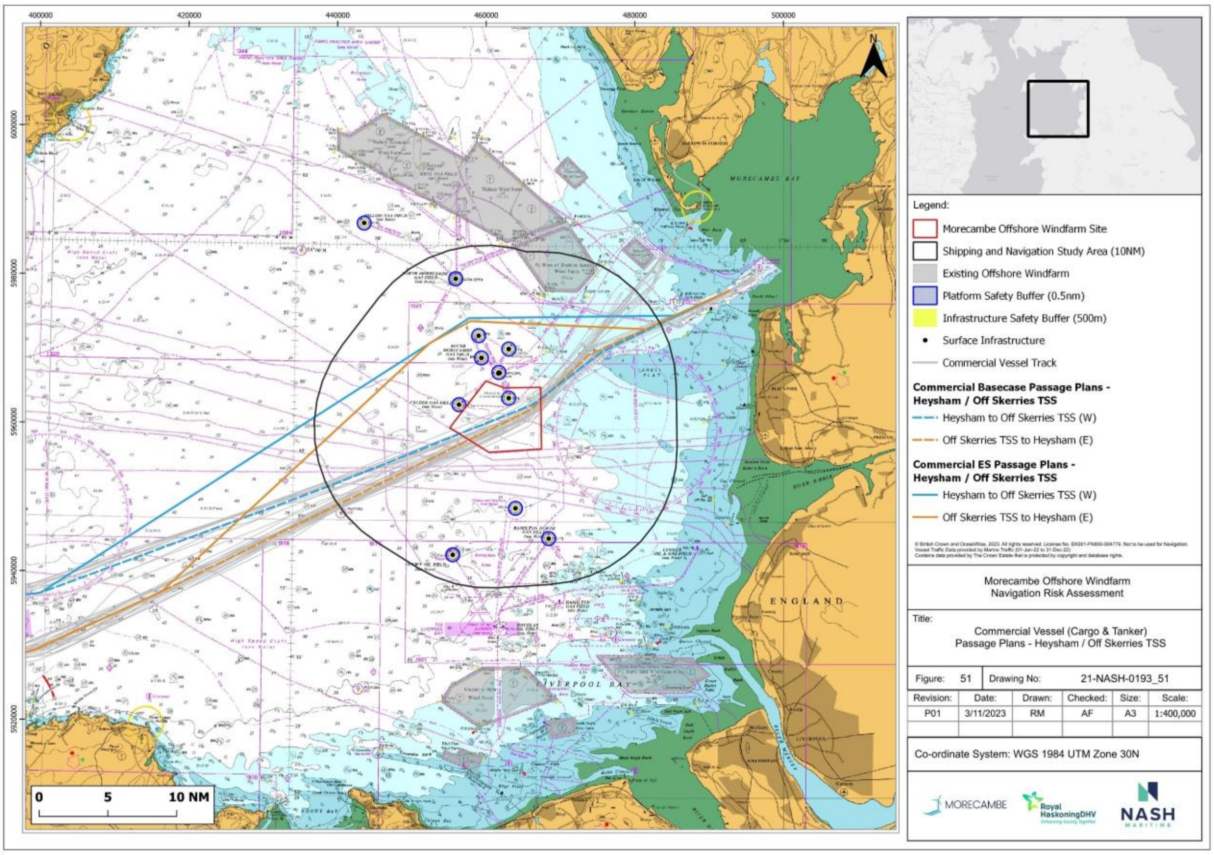


Figure 51: Heysham/Off Skerries TSS commercial route basecase and futurecase passage plans

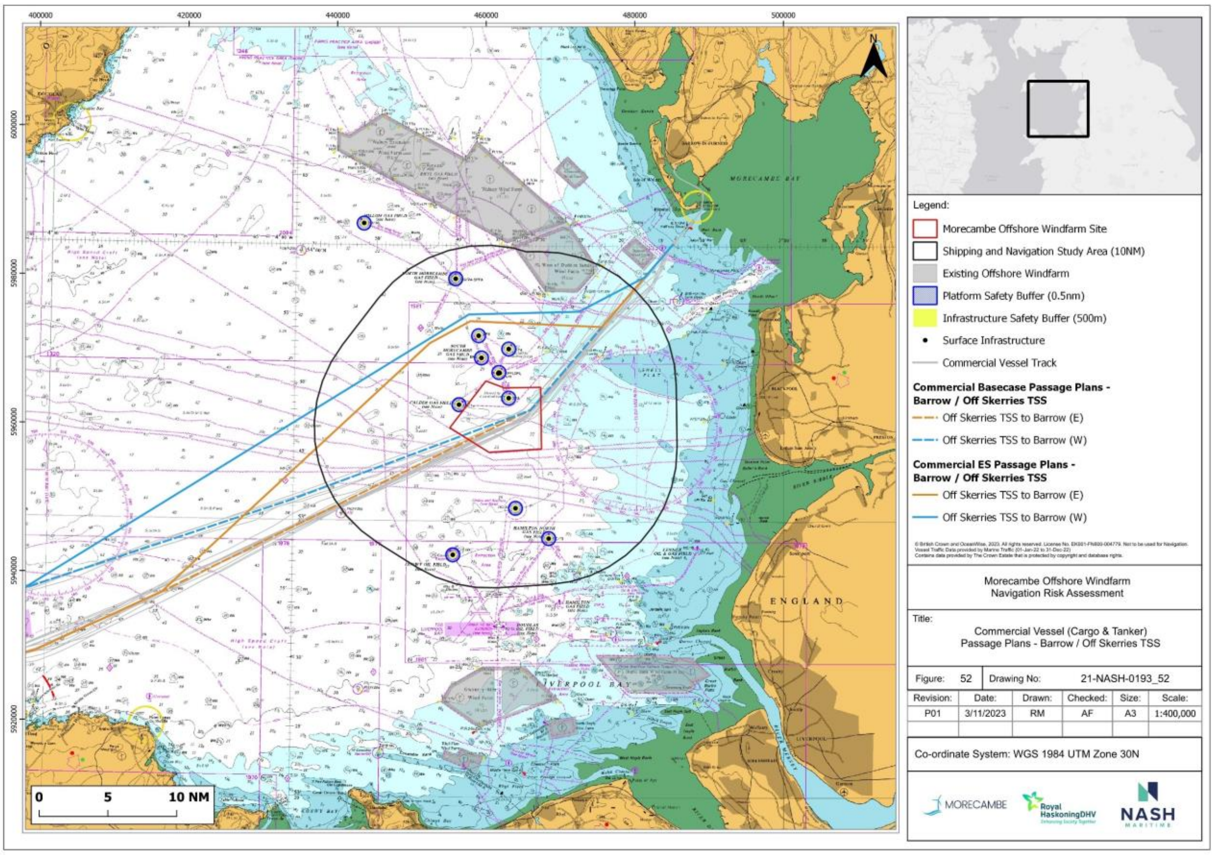


Figure 52: Barrow/Off Skerries TSS commercial route basecase and futurecase passage plans

Table 29: Impact on commercial passage plan routeing in normal metocean conditions

Passage Plan Route	Route Direction	Basecase Route Distance (nm)	Futurecase Route Distance (nm)	Additional ES Route Distance (nm)
Liverpool - East of IoM	East of Calder	70.1	72.5	+2.4
	West of Calder	72.4	72.5	+0.1
Heysham - Off Skerries TSS	Eastward	68.6	71.0	+2.4
	Westward	72.5	73.9	+1.4
Barrow - Off Skerries TSS	Eastward	67.4	69.0	+1.7
	Westward	71.8	71.4	-0.4

8.3.3 Commercial vessel routeing in adverse conditions

8.3.3.1.1 Analysis of adverse weather routeing in **Section 6.4.14**, during 2019 and 2022 named storms, did not identify any particular changes to typical routes. There was a greater demand for the anchorages along the Welsh coast, and no discernible impacts as a result of the windfarm site are identified regarding availability of anchorages for vessels to seek shelter in adverse weather. Some vessels were recorded loitering to the west of the study area, likely riding the conditions before they could berth. There is sufficient clear sea room to the west of the windfarm site to continue this practice.

8.3.4 Summary

8.3.4.1.1 Commercial shipping routes are concentrated into the Port of Liverpool and Heysham/Barrow, with minor deviations around the windfarm site required. All routes where deviation would be required are minor routes, with fewer than one vessel per day, and deviations are not considered to make such operations unviable. No significant impact on commercial ship operations in adverse weather was identified.

8.4 IMPACT ON RISK OF ALLISION

8.4.1 Introduction

8.4.1.1.1 The presence of new infrastructure in an area can increase the risk that a vessel may be involved in an allision with it. This risk is present for both vessels transiting within the windfarm site and adjacent to it.

8.4.1.1.2 To assess allision and collision risk within the study area, the IWRAP risk modelling tool has been utilised (see **Section3.3.2**). The IWRAP model was used to assess the likelihood of allision and collision for the basecase (current risk) and futurecase (risk with Project in place) scenarios. Oil and gas and other existing windfarm infrastructure is included in both basecase and futurecase scenarios (excluding DP3 and DP4 as these are now decommissioned and removed), whereas the futurecase scenario includes the presence of an indicative 30 turbine layout. Data used for the modelling includes all vessel types.

8.4.1.1.3 It should be noted that the IWRAP includes AIS from all vessel types to model the likelihood of a collision or allision. The majority of these would result in minor consequences. Furthermore, given underrepresentation of small craft using AIS, these respective return periods for all vessel types have not been presented on an individual basis. Risk (in return periods) is presented for ferries (passenger vessels) and commercial vessels (defined as cargo and tanker).

8.4.1.1.4 IWRAP modelling has a number of stages:

- Data Preparation:
- Vessel traffic legs are created that represent shipping routes and 2022 AIS data is used to determine the volume and types of traffic, and distribution across that leg
- These legs are connected into a network with waypoints where legs cross or join together
- Other hazards, such as bathymetry and fixed installations are inputted into the model
- Risk Calculation:
- Where these legs intersect with one another or physical hazards, the proportion of traffic on that leg at risk is calculated
- To account for the ability of the crew to avoid these hazards, a causation factor is used (in the order of 1 in 10,000) to represent the probability of human error or mechanical failure leading to an incident

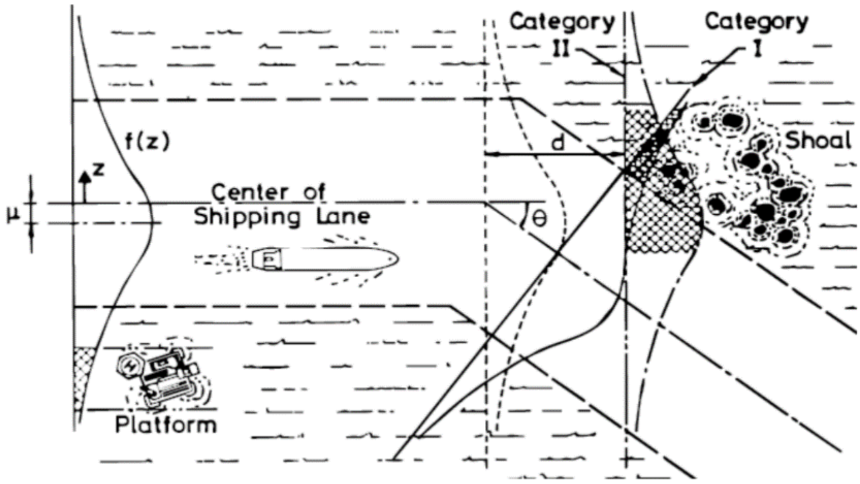


Figure 53: IWRAP traffic leg and grounding/allision calculation

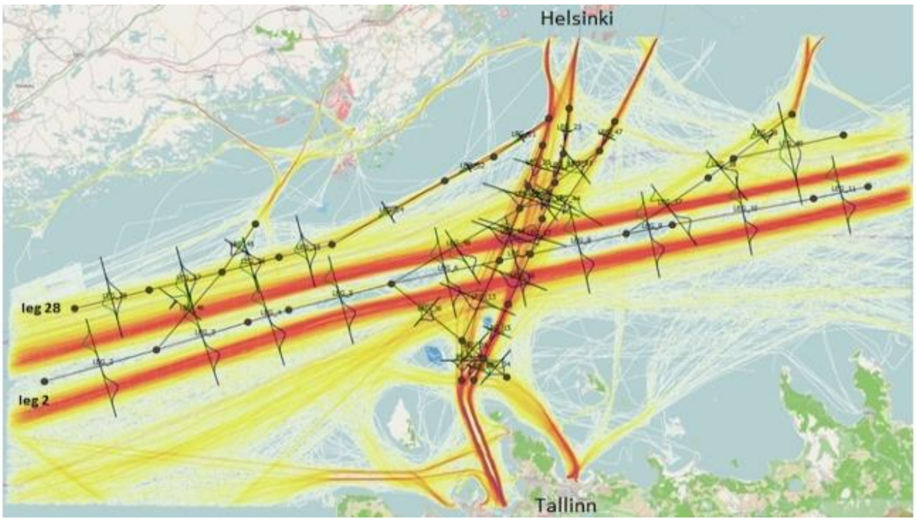


Figure 54: IWRAP MKII model example, Gulf of Finland (Source: IALA)

8.4.2 Ferries and commercial vessels

8.4.2.1.1 **Table 30** and **Figure 55** show the allision modelling results for ferries and commercial shipping. Given future traffic projections discussed in **Section 7**, the allision rate with a 15% estimated increase in traffic is given. The return period is derived from a 15% uplift of the future case probability value and converted to an updated return period.

8.4.2.1.2 The modelling shows the futurecase return periods are low, with 1 in 10,602 years for commercial vessels and 1 in 2,258 years for ferries, partly due to the greater manoeuvrability and familiarity of ferry bridge teams, which is contained within the causation probabilities for different vessels contained within the IWRAP model. The highest risk to the wind turbines within the windfarm site are the most westerly periphery WTG, primarily due to the proximity and density of passing vessels on existing and deviated commercial routes on passage between Liverpool and Belfast passing east of the IoM.

8.4.2.1.3 The basecase allision probability is greatest on the southern structures of the existing WODS OWF and the existing oil and gas platforms where there is the greatest traffic density. The rerouting of traffic in the futurecase has resulted in lower allision risk scores for Calder and South Morecambe DP8 with the Stena Line East of Calder route deviated west of the windfarm site and existing oil and gas infrastructure.

Table 30: IWRAP 30 turbine layout allision results (return periods in years)

	Hazard	Basecase (yrs)	Futurecase (yrs)	% Change	15% Traffic Uplift (yrs)
Allision	Ferries	1 in 2,936	1 in 2,596	13%	1 in 2,258
	Commercial	1 in 14,078	1 in 12,192	15%	1 in 10,602
	Total	1 in 1,912	1 in 1,699	13%	1 in 1,477

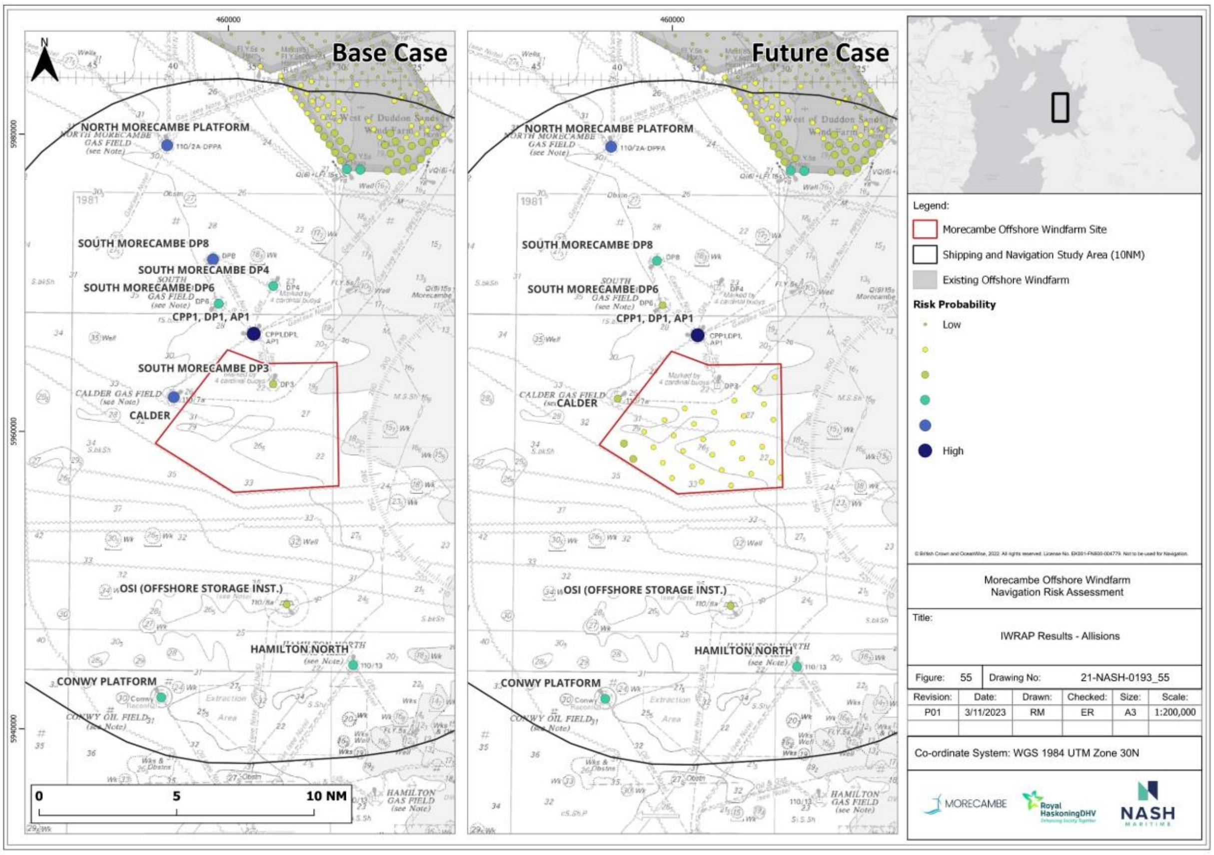


Figure 55: IWRAP allision results for the 30 turbine indicative layout

8.4.2.1.4 The results presented in **Table 30** and **Figure 55** are based on an indicative 30 turbine layout. To understand the sensitivity of layout design to allision risk, additional modelling has been undertaken to test the potential allision risk of an indicative 35 turbine layout and inclusion of two offshore substation platforms (OSPs). This would represent the MDS for maximum number of turbines as presented in **Table 11**.

8.4.2.1.5 The sensitivity modelling, presented in **Figure 56**, shows the futurecase return periods for the MDS layout, with 1 in 9,549 years for commercial vessels and 1 in 2,118 years for ferries (Table 31). This represents an increase in return period of 1,053 years for commercial vessels when compared to the 30 WTG layout (11% change), and an increase in return period of 140 years for ferries (6.6% change). These return periods are still considered to be low.

Table 31 IWRAP 35 turbine layout allision results (return periods in years)

	Hazard	Futurecase 30 WTG (yrs)	15% Traffic Uplift (yrs)	Futurecase 35 WTG + 2 OSP (yrs)	15% Traffic Uplift (yrs)	% Change
Allision	Ferries	1 in 2,596	1 in 2,258	1 in 2,436	1 in 2,118	6.6%
	Commercial	1 in 12,192	1 in 10,602	1 in 10,982	1 in 9,549	11.0%
	Total	1 in 1,699	1 in 1,477	1 in 1,587	1 in 1,380	7.0%

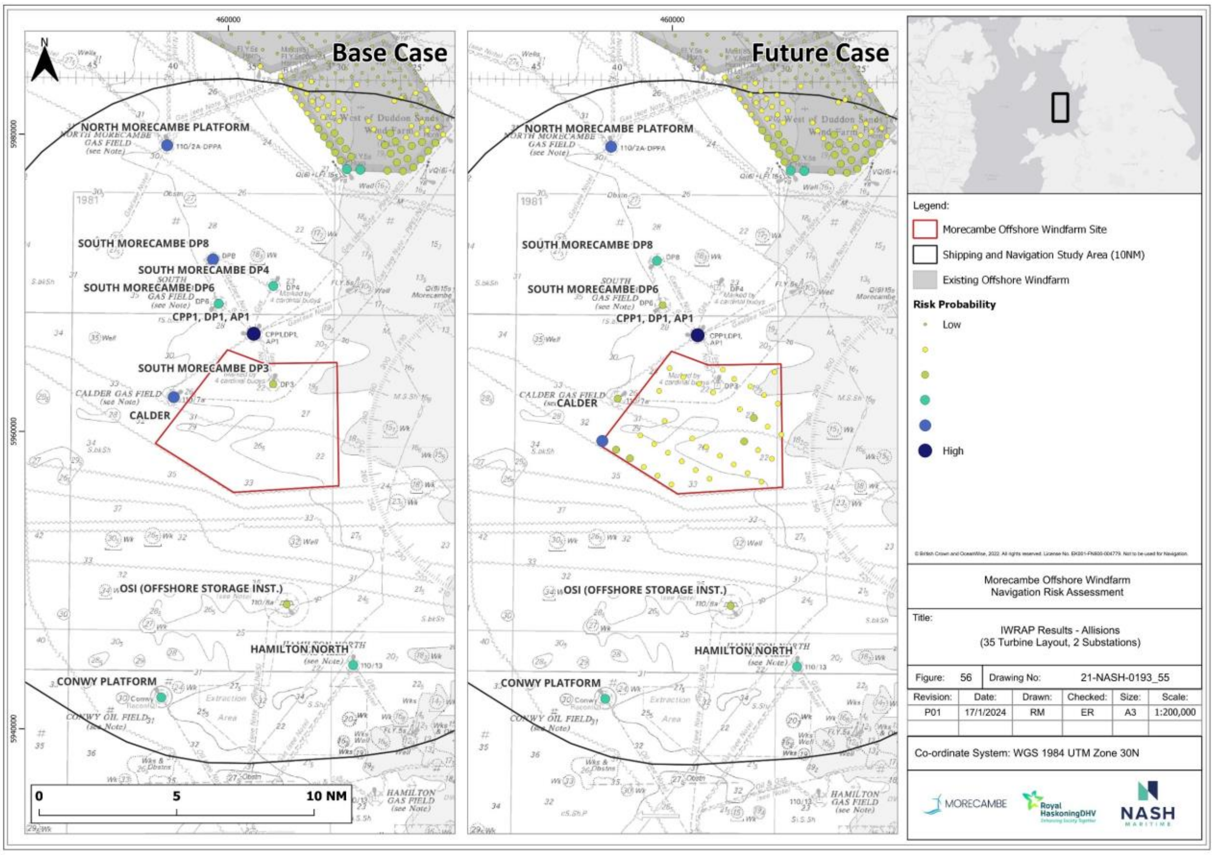


Figure 56: IWRAP allision results for the 35 turbine indicative layout

8.4.3 Project vessels

8.4.3.1.1 Historical analysis of incidents involving OWFs has identified that those vessels most likely to be involved in an allision with a WTG are Project construction and maintenance vessels with an allision between a WFSV and a WTG occurring approximately once every ten years in the UK (see **Section 6.5.1**). This is mainly due to their operational requirements meaning they are operating in close proximity to the WTGs.

8.4.4 Recreational

8.4.4.1.1 The windfarm site is located a considerable distance from the shore and, therefore, most recreational craft passing through the windfarm site would be engaged in offshore cruising. The vessel traffic survey and AIS analysis indicated that there is limited recreational activity at the windfarm site, however, there is still potential for them to pass through it. The site would be well marked and there is sufficient searoom to safely pass around the site, therefore, it is unlikely that a recreational vessel would contact a turbine. Were it to do so, a glancing blow with minor damage is the most credible outcome.

8.4.5 Fishing

8.4.5.1.1 Fishing vessel activity has been identified in the study area (see **Section 6.4.7**) and, given the minimum distance between turbines of 1,062m, there is potential for fishing to take place within the windfarm site. This means there is potential for a fishing vessel to be involved in an allision with a WTG, however, given the available searoom a glancing blow with minor damage is considered the most credible outcome, especially as trawling is unlikely in the area as most fishing is potting.

8.4.6 Consequences assessment

8.4.6.1.1 Given the historic infrequency at which vessels have allided with WTGs, there is some uncertainty to the degree of damage that would result from an allision. The degree of damage depends on the vessel characteristics, the type of allision (at speed or drifting), angle of allision (broadside or head on) and the engineering of the WTG. Several academic studies using finite element modelling have sought to explore this, including Biehl and Lehmann (2006), VINDPILOT (2008), Dai et al. (2013), Moulas et al. (2017) and Presencia and Shafiee (2018).

8.4.6.1.2 These studies suggest that:

- Ship allisions, even at low speeds, can cause significant damage to WTGs including deformation and buckling
- Some studies of in-field construction/maintenance vessels (up to 4,000 tons), with allisions at high speeds, did not result in WTG collapse
- Modelling of allisions with large commercial ships could result in holing of the vessels hull and cargo release
- Larger vessels (30,00139lludinglliding with the turbine might typically result in the tower collapsing away from the vessel

- However, some studies suggested that large commercial ships could result in the tower collapsing towards the vessel, with the damage likely to penetrate the deck.

8.4.6.1.3 To better understand the potential consequences of ship allision with WTGs, **Table 32** presents some case studies of past incidents and the resulting impacts to people, property and the environment. It can be concluded that where incidents have occurred, they have been at low speed, involve in-field project vessels and typically result in only minor damage or injuries. However, it is feasible that a serious allision with an OWF might result in turbine collapse, holing and eventual flooding of a vessel and potential loss of life.

Table 32: Case studies of allision

Date	Site	Vessel	Description
24-April-23	Gode Wind 1 (Germany)	Petra L – 74m 1,162 GT General Cargo	Currently under investigation by German authorities. Vessel struck turbine resulting in serious damage to the starboard bow of the vessel but was able to proceed to port. Turbine was taken out of service until the damage was assessed. There were no injuries.
31-Jan-22	Hollandse Kust Zuid	Julietta D – 190m 24,196 GT Bulk Carrier	Disabled vessel in a storm struck the foundation of a substation jacket that resulted in minor damage to both the vessel and jacket. There were no injuries or pollution.
23-Apr-20	Borkrum Riffgrund	Njord Forseti – 24m 137 GT	Vessel skipper not keeping proper lookout collided with wind turbine at speed. Vessel suffered significant structural damage.
10-Apr-18	AOWF (Baltic)	Vos Stone – 80m 4,956 GT Offshore Supply Vessel	Construction vessel casting off from a WTG lost control and was forced against the WTG due to adverse weather. Resulted in three minor injuries, dry dock to the vessel and minor damage to platform. There was no pollution.
21-Nov-12	Sheringham Shoal	Island Panther – 17m 22 GT CTV	CTV made heavy contact with unlit transition piece. Resulted in five injuries and damage to the vessels bow.
23-Apr-20	Borkum Riffgrund 1 (Germany)	Njord Forseti – 26m CTV	CTV made heavy contact with WTG. Resulted in three injuries (one seriously) and significant flooding of CTV through 0.5m crack in bow.
14-Aug-2014	Walney	OMS Pollux – Stand By Safety Vessel	Whilst conducting inspection work, the vessel collided with a turbine that resulted in no injuries, and minor leaking of marine gas.

Date	Site	Vessel	Description
06-Oct 2006	Scroby Sands	Jack up	Large jack-up barge collided with turbine resulting in damage to a turbine blade.

8.4.7 Summary

8.4.7.1.1 The construction of any windfarm will invariably increase allision likelihood, especially in areas where obstructions are not currently present. The east Irish Sea, however, already has various offshore infrastructure present, including offshore windfarms and O&G installations, and as such, vessels navigating this area are experienced in navigating around and between various types of infrastructure.

8.4.7.1.2 The allision risk profile is considered low, based on the IWRAP modelling and the consequence assessment, with return periods for allision modelled as 1 in 1,477 years for all vessel types in the future case with 15% uplifted traffic in the 30 WTG scenario, and 1 in 1,380 years for all vessel types in the future case with 15% uplifted traffic in the 35 WTG (plus 2 OSPs) scenario, which when consideration of consequence is taken into account (in which no fatalities have occurred from allision with OWFs for commercial vessels), a high consequence (e.g. single or multiple fatality event) is considered a remote possibility.

8.4.7.1.3 If oil and gas decommissioning proceeds, then allision risk will be significantly reduced due to a reduction in the presence of tug and service vessels in the area. However, the risk may be countered by potential developments in gas storage and CCS projects as described in **Section 7.3.** However, there is not sufficient information available on these projects with regards to vessel movements or potential obstructions to allow them to be assessed.

8.4.7.1.4 Allision for other vessel types, such as recreational craft and fishing vessels is also considered low due to the low density of these traffic types and the spacings between WTG which will be at least 1,060m.

8.5 IMPACT ON RISK OF COLLISION

8.5.1 Introduction

8.5.1.1.1 The presence of the windfarm site could change shipping routes, creating pinch points or increasing density of transiting vessels, which can increase encounters resulting in an increase in collision risk. The direction in which vessels are transiting also influences the risk of collision with vessels crossing other routes, or transiting head on, generally resulting in higher risk of collision. The presence of a new obstruction may also result in reduced area for a vessel to take action to avoid collision or reduce the options available to do so.

8.5.2 Ferries and commercial vessels

8.5.2.1.1 **Figure 57** and **Table 33** show the IWRAP collision modelling results for ferries (passenger) and commercial vessels (cargo, tanker). Given future traffic projections discussed in **Section 7**, the collision rate with a 15% estimated increase in traffic is given.

8.5.2.1.2 The modelling indicates an increase in the likelihood of collision across the Irish Sea from 1 in 1,176 years to 1 in 933 years for all vessel types. It is important to note that IWRAP is a probability model and does not apply consequences to collision, so return periods should be considered in relation to the range of possible outcomes of collision hazards.

8.5.2.1.3 The increase in ferry-ferry collisions, from 1 in 1,442 to 1 in 1,139 years, is driven by the concentration of Stena ferries on the Liverpool/Belfast East of IoM (East of Calder) route onto the West of Calder route which increases the likelihood of meeting situations. The 7% increase in commercial vs ferry collisions, from 1 in 19,949 to 1 in 16,226, is accounted for by the relatively low density of commercial vessel routes within the area affected by the windfarm site and therefore the minimal effect routeing changes would have on the overall risk profile. An increase in commercial vs commercial collisions, is largely accounted for the by the merging of Liverpool – East of IoM East and West of Calder routes onto a single route and the increased time that commercial vessels would spend interacting. However, the return periods are very low with <70 vessel transits in total on these routes in 2022.

8.5.2.1.4 As shown in **Figure 57**, the geographic distribution of collision probability is concentrated to the north of the study area, associated with the concentration of vessels bound to and from the ports of Heysham and Barrow passing to the south of the WODS and Walney windfarms. In the context of the diverted traffic for the model legs approaching/departing Liverpool (comprising of the Stena route passing east of the Calder Gas Field), the number of vessels transits changes as follows for the 2022 data:

8.5.2.1.5 Commercial vessels:

- **Leg 36:** 19 transits basecase, 28 transits futurecase
- **Leg 28:** 58 transits basecase, 67 transits futurecase

8.5.2.1.6 Ferry/passenger vessels:

- **Leg 36:** 600 transits basecase, 777 transits futurecase
- **Leg 28:** 187 transits basecase, 364 transits futurecase

Table 33: IWRAP collision results (return periods in years)

	Hazard	Basecase (yrs)	Futurecase (yrs)	% Change	15% Traffic Uplift (yrs)
Collisions	**Ferries vs Ferries**	1 in 1,442	1 in 1,310	10%	1 in 1,139
	Commercial vs Ferries	1 in 19,949	1 in 18,659	7%	1 in 16,226

Hazard		Basecase (yrs)	Futurecase (yrs)	% Change	15% Traffic Uplift (yrs)
	Commercial vs Commercial	1 in 3,631,510	1 in 2,518,855	44%	1 in 2,190,308
	Total	1 in 1,176	1 in 1,073	10%	1 in 933

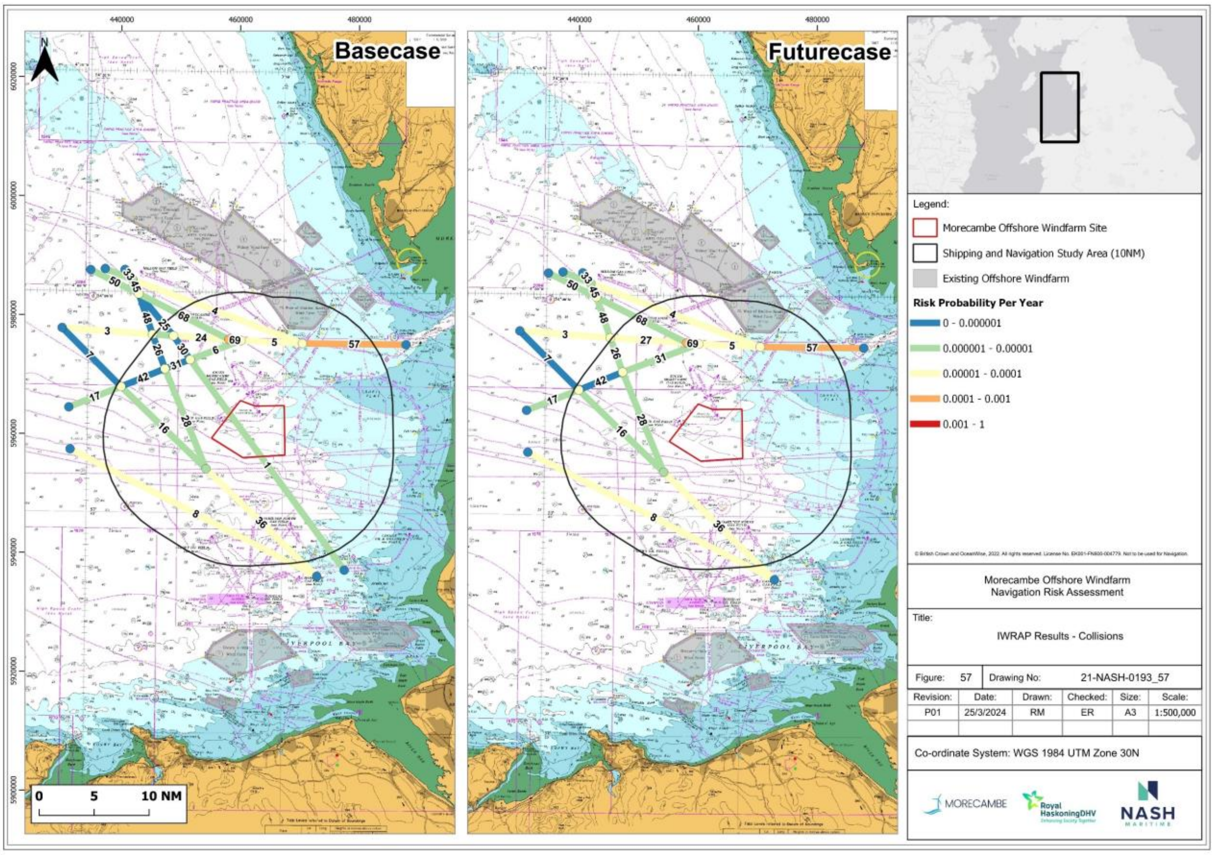


Figure 57: IWRAP collision modelling results

8.5.3 Project vessels

8.5.3.1.1 The routes that will be used by Project O&M vessels are not known and, therefore, assumptions have been made for the windfarm site. A clear additional risk of the Project is the additional vessel movements supporting its O&M activities and their interaction with other traffic. In particular, it is likely that multiple WFSVs will cross shipping routes and interact with other passing traffic, including ferries and fishing boats. The IWRAP modelling conducted identified that the risk of collision is greatest to northern extent of the study area. Were WFSVs to cross routes in these areas, they are at a heightened risk of being involved in a collision. Additional risk controls have been identified to deconflict WFSV movements with other passing traffic, such as through passage planning.

8.5.3.1.2 Navigating within the OWF is more challenging, due to the number of structures, however, most vessels of these are likely to be Project-related vessels, or fishing vessels familiar with O&M operations at other windfarms.

8.5.4 Recreational

8.5.4.1.1 The analysis of recreational vessel transits presented in **Section 6.4.6** identified relatively few cruising routes passing across the windfarm site. Most activity is concentrated near shore and/or clear of the windfarm site. The windfarm site shows a low density of AIS tracks, compared to adjacent waters, with the exception of southern section of the study area that shows low to moderate recreational activity.

8.5.4.1.2 Historically, evidence has suggested that recreational cruising vessels may choose to navigate through an OWF, and there are no restrictions on their ability to do so. However, the AIS data from 2022 reveals that 79% of cruising vessels sailing between Morecambe and Douglas avoided transiting through the existing offshore windfarms (Walney and WODS) by taking a longer southerly route. Much of this evidence has been collected from earlier Round 1 and 2 OWFs, where turbines were generally closer together. The greater turbine spacing and size of the Project will likely promote greater navigation through projects by recreational craft.

8.5.4.1.3 Vessels sailing along the routes between Liverpool to Douglas and Conwy to Morecambe would still be able to avoid transiting through the windfarm site without significantly increasing the passage time. All other identified routes are clear of the windfarm site.

8.5.4.1.4 Where yachts choose to navigate through the windfarm site, there is a risk of colliding with other craft, due in part to the reduced sea room between rows of turbines. This is partly exacerbated by the greater difficulty identifying other craft either visually or via radar, once within the windfarm site.

8.5.4.1.5 Where yachts choose to navigate adjacent to an OWF, they may be displaced into a waterway which is shared with large commercial vessels and, therefore, there is a greater risk of interactions which may lead to collision. The vessel traffic survey identified relatively few offshore cruising vessels navigating within the windfarm site, with no recreational vessels observed during winter and five observed during summer. Therefore, it would be reasonable to conclude that the increase in risk of collision would be minor.

8.5.5 Fishing

8.5.5.1.1 Large parts of the Irish Sea are regularly fished (see **Section 6.4.7**). The windfarm site could increase the risk of collision due displacement of activities into areas of higher density vessel traffic, resulting in more frequent encounters.

8.5.5.1.2 It is assumed that some commercial fishing activities could continue to take place within the windfarm site. However, during construction, fishing will be prevented where construction activities are taking place and would be required to relocate or bring to shore depending on available grounds and fishing preferences.

8.5.6 Consequences assessment

8.5.6.1.1 International studies have explored the consequences of collision between large vessels. The EMSA (2015) collision risk model developed for their FSA based on historical incidents estimated that 33% of struck RoPax vessels would result in water ingress and additionally 14% of those vessels would result in sinking (resulting in a probability of 4.6% for a struck RoPax to sink). The MSC 85-17-2 FSA gives probabilities of 16% of collisions being a serious casualty, of which 50% of struck vessels would flood, 22% would sink with a further 50% split between gradual sinking or rapid capsize (joint probability of the latter being 0.8%).

8.5.6.1.2 Analysis of MAIB data suggests that approximately 1% of collisions would result in loss of life. However, it is likely that as most collisions occur within ports and harbours, vessels are navigating at slower speeds than they may do in open sea. Furthermore, there are relatively few incidents in UK waters of significant loss of life following collisions or allisions involving large commercial shipping or ferries.

8.5.7 Summary

8.5.7.1.1 Based on the analysis provided, the collision risk changes as a result of the windfarm site for ferries and commercial vessels is very low, predominantly due to the low frequency of l vessel traffic in the area. Based on the IWRAP modelling for ferries and commercial vessels, then the likelihood post construction of the windfarm site is 1 in 933 years. When consequence is taken into account, specifically the MAIB data analysis which shows that 1% of collisions lead to a fatality, the return period for a fatality collision would be even lower.

8.5.7.1.2 The quantitative characterisation of collision risk for Project related vessels (primarily WFSV's) is limited due to O&M bases not being defined yet. However, any increase in risk could be mitigated by careful passage planning and communication with other vessels.

8.5.7.1.3 Recreational and fishing collision risk is considered low due to the low levels of these vessel types in the study area.

8.6 IMPACT TO SEARCH AND RESCUE

8.6.1 Introduction

8.6.1.1.1 In the unlikely event of an incident, SAR assets are required to access the site or surrounding area without risk to themselves. In particular, wind turbines can pose a hazard to SAR helicopters and, therefore, the design of the windfarm should be such to enable helicopter access safeguarding HM Coastguard obligations within the UK SAR Region. An ERCOP is required to facilitate information sharing regarding the OWF and SAR organisations. The principals of SAR access for OWFs are contained in MGN 654 Annex 5, and can be summarised as:

- **Lines of Orientation** – developers should maintain two lines of orientation for the windfarm layout unless a safety case is produced, and additional mitigation is proposed, that one line of orientation is tolerable. This allows multiple directions for aircraft entry and improves access, whilst a linear regular grid is both more efficient and safer for conducting SAR

- **SAR Lanes** – to be of sufficient width to enable safe transit of a SAR helicopter between the turbines. MGN 654 Annex 5 recommends turbine spacing (blade tips to blade tips) of greater than 500m
- **Helicopter Refuge Areas** – in larger developments (>10nm width, not applicable to the Project), a refuge area clear of turbines may be required to enable aircrews to reorientate themselves and change direction safely
- **Turbine Preparation** – to support winching of a casualty, the WTG needs to be configured to a specific position as requested by the SAR crew. This might include rotating the nacelle to 90 degrees from the wind, and both locking and positioning the blades to facilitate SAR access (e.g. Y configuration - see MGN654 Annex 5)

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

8.6.2 Summary

8.6.2.1.1 The Project has committed to two lines of orientation to facilitate SAR access. The spacing between the turbines would be greater than 1,000m and, therefore, helicopter access guidance is met. Furthermore, as with other similar projects, the first responders to incidents within the OWF are most likely to be project vessels, to some extent mitigating any loss in aerial asset effectiveness.

8.6.2.1.2 Specific layouts are subject to detailed engineering studies at a later date than when the NRA is conducted. Therefore, the DCO would typically stipulate that the MCA and Trinity House must agree to the design layout, in order to ensure that access of SAR assets is not compromised and confirm that principals contained in MGN 654 Annex 5 are followed.

8.7 IMPACT ON VISUAL NAVIGATION AND COLLISION AVOIDANCE

8.7.1 Introduction

8.7.1.1.1 MGN 654 notes that an OWF could block or hinder the view of other vessels or any navigational feature, such as the coastline or aids to navigation. This may result in “blind spots” between vessels, which could increase the risk of collision, by reducing the capability for early and effective collision avoidance.

8.7.1.1.2 Firstly, each individual WTG is approximately 10m in diameter above sea level and whilst vessels transit past the site, any two vessels would come into and out of visibility temporarily. Furthermore, there may be challenges identifying the vessels through radar (see **Section 8.8.2**) and targets would be visually less distinct amongst the turbines. For craft emerging from the OWF, most passing vessels would transit with sufficient safety buffer from the OWF in line with the MCA shipping route template (MGN654) (c.1.5nm), such that an emerging vessel at 15 knots would be visible for approximately six minutes. This would provide some opportunity to avoid a collision, however, would be significantly reduced beyond what would be the case pre-construction in open sea.

8.7.1.1.3 Secondly, the geometries of the OWFs could reduce the visible appreciation of other vessels, particularly where routes converge on the corners of sites. For example, vessels proceeding north to the east and west of the windfarm site may not have visual sight of one another until they meet at the north of the windfarm site. The COLREGs describe obligations for collision avoidance and the appreciation of navigational lights (port/starboard) are necessary in determining the correct response to crossing, overtaking and head-on situations. However, larger vessels would be identifiable from AIS (and tracked by radar/visual means) and, therefore, passing arrangements should be planned in accordance with COLREGs.

8.7.2 Summary

8.7.2.1.1 The spacing between turbines and density of traffic passing adjacent to the Project does not suggest that this impact would have a significant increase in risk. The risks of collision associated with Project O&M and oil and gas vessels emerging from the windfarm site could be managed through robust marine operating guidelines (see **Section 9.8**).

8.8 IMPACT ON COMMUNICATIONS, RADAR AND POSITIONING SYSTEMS

8.8.1 Introduction

8.8.1.1.1 MGN 654 notes that an OWF may have adverse impacts on the equipment used for navigation, collision avoidance or communications. Additionally, a pre-application request made by MOWL to the DIO for advice regarding the proposed development raised concerns by the MoD regarding the potential impact to military vessels operating in the area (see **Section 3.5.1**). A significant body of work has been conducted to examine the impacts on the equipment used for navigation, collision avoidance or communications in detail, and reference is made to the following studies:

- **QinetiQ (2004).** Results of the electromagnetic investigations and assessments of marine radar, communications and positioning systems undertaken at the North Hoyle Windfarm by QinetiQ and the Maritime and Coastguard Agency
- **BWEA (2007).** Investigation of Technical and Operational Effects on Marine Radar Close to Kentish Flats Offshore Windfarm
- Ocean Studies Board's Division on Earth and Life Studies (2022). Wind Turbine Generator Impacts to Marine Vessel Radar

8.8.1.1.2 **Table 34** provides a summary of these potential impacts, for which there are not anticipated to be any significant effects.

Table 34: Summary of impacts on equipment

Impact on	Overview
VHF	VHF is essential for the communication between vessels and shore. VHF radio waves could be blocked or interfered with by the presence of turbines. The 2004 QinetiQ study found no noticeable effect on VHF communications both ship-shore and ship-ship within or adjacent to the windfarm. A trial aboard SAR helicopters (MCA, 2005) also determined no significant impact on VHF direction finding capabilities. Therefore, no significant impact on VHF communications is anticipated.
AIS	AIS enhances the identification between vessels for collision avoidance. AIS signal could be blocked or interfered with by the presence of turbines. The 2004 QinetiQ study found no noticeable effect on AIS reception and no incidence of AIS degradation this have been reported Therefore, no significant impact on VHF communications is anticipated.
GNSS	Global Navigation Satellite System (GNSS), such as Global Positioning System (GPS), is used for satellite positioning systems and navigation. Satellite reception could be impacted by the presence of turbines. The 2004 QinetiQ study found no noticeable effect on GPS reception, even in very close proximity to the WTGs. Therefore, no significant impact on GPS is anticipated.
Marine Radar	See **Section 8.8.2**
Shore Radar	Similar to marine radars, shore radars could be impacted by the wind turbines. The windfarm site is well clear of any ports and harbours, and any VTS coverage. Therefore, no significant impact on shore radar for managing navigational safety is anticipated.
Noise	The sound generated by the WTGs could mask navigational sound signals from vessels or aids to navigation. Whilst turbines make an audible sound whilst

Impact on	Overview
	rotating, the low density of shipping and distance to other navigational marks makes this potential impact negligible. Furthermore, maritime regulations for audibility of a ship's whistle are well in excess of the typical WTG sound emissions even at very close range. Therefore, no significant impact on navigation safety from increased noise is anticipated.
Magnetic Compass	Compasses are used for vessel navigation. These are potentially impacted by electromagnetic interference from the WTGs or cables. The degree of this impact is related to the depth of water, cable design and alignment with the earth's magnetic field. However, cables for the windfarm will be buried wherever practical and cable protection applied where not possible to bury and therefore no impact is anticipated. It is possible that small vessel compasses could be impacted near to cable landfall. Although out of scope given the distance offshore of Project, it is considered likely that small craft would navigate visually near to cable landfall and therefore the impact on navigation safety would be reduced. Therefore, no significant impact on navigation safety from electromagnetic interference is anticipated.

8.8.2 Marine radar interference

8.8.2.1.1 Marine radar is used for both collision avoidance and vessel navigation. WTGs, like other structures, can result in spurious returns such as side lobes, echoes, reflections and blanketing. These effects were studied extensively in both the QinetiQ (2004) and BWEA (2007) studies. Both studies determined that the reduced capability to track small vessels within OWFs and the risk of losing acquired targets should be considered by mariners navigating adjacent to OWFs. Some of these effects can also be mitigated by careful adjustment of radar controls, such as Gain.

8.8.2.1.2 Based on this, the MCA developed a shipping route template (MGN 654) that placed the extent of these effects at 1.5nm, increasing as the vessels transit closer to the turbines. Intolerable impacts may be experienced up to 0.5nm from the OWF. Historical evidence and AIS analysis presented in **Section 6.4.2** suggests that most vessels pass more than 0.5nm from an OWF and therefore these effects are lessened. **Figure 58** shows how the Project boundaries relate to the region of potential radar effects. Routes passing within close proximity to these areas could impact on collision risk. However, existing routes pass within close proximity to other existing offshore windfarms such as WODS. Therefore, regular runners should be familiar with these effects.

8.8.2.1.3 To assess the potential impact of the Project on radar interference, a separate assessment has been commissioned by the Project (Appendix 17.2 Radar Early Warning System Technical Report Document Reference 5.2.17.2). The scope of the study is to understand the potential impact of the Project on nearby Radar Early Warning System (REWS) installations, used to monitor and protect offshore oil and gas assets from collision with errant vessels. The assessment also considers the impact on microwave communication links installed onboard offshore O&G

platforms and the effect of the rerouted traffic on alarm rates. The windfarm site is outside of all port limits, VTS and pilotage areas and therefore whilst shore-based radar may have partial coverage of the windfarm site, it would not be actively monitored. Therefore, the presence of the windfarm site would not compromise vessel traffic monitoring obligations.

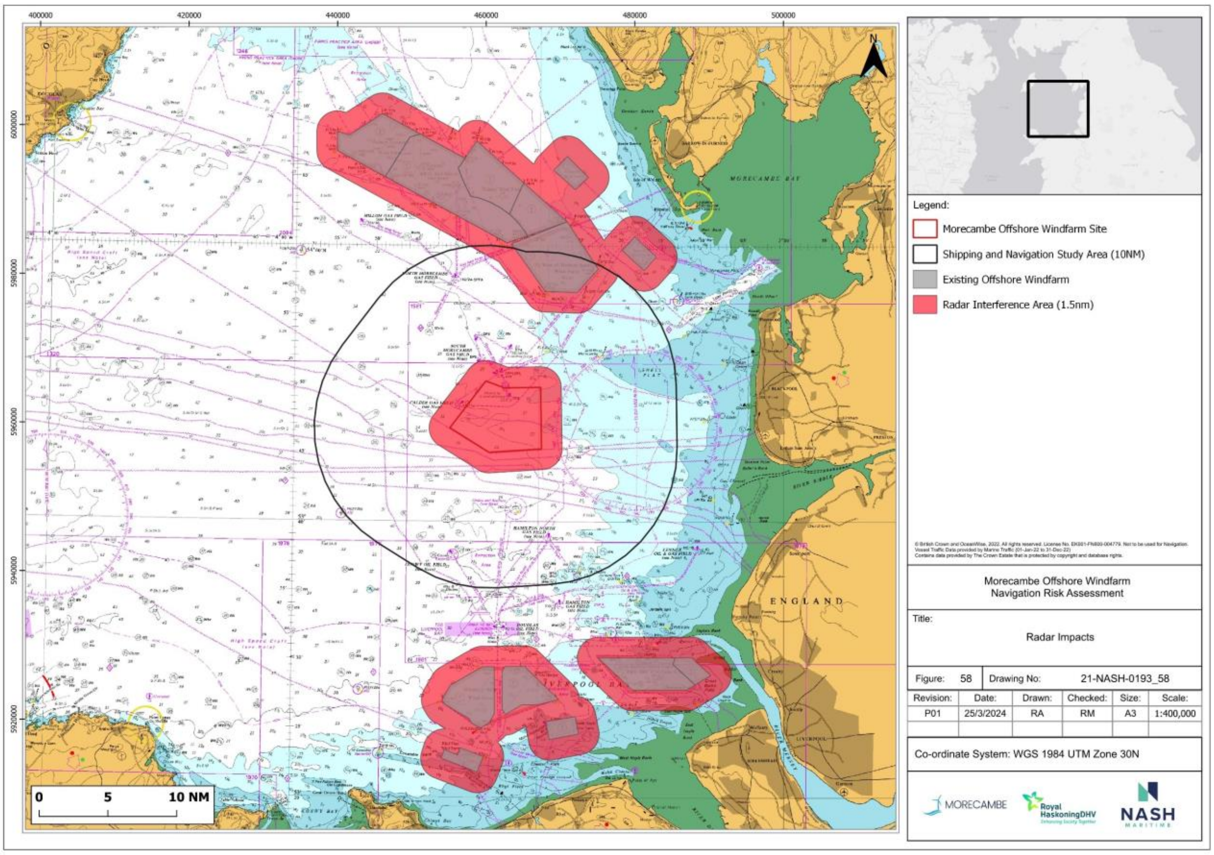


Figure 58: MGN654 radar impacts

8.8.3 Summary

8.8.3.1.1 In summary, there are no anticipated impacts on equipment as listed in **Table 34** as a result of the windfarm site. Impacts to marine radar may occur in close proximity to the turbines. However, mariners will maintain safe distance to minimise their effects.

8.8.3.1.2 The impact on radar interference is examined in more detail within the REWS study. The study concludes the impact of the Project on detection performance of nearby REWS installations is low and manageable without the need for further mitigation measures. Based on the modelled parameters for the communications links and turbines, the REWS study concluded that there will be no negative impact from the Project on microwave communication links with no mitigation measures needed.

8.8.3.1.3 The modelling results for the Project also indicate that the assessed REWS platforms will not experience a change in yearly alarm rates as a result of rerouted traffic.

8.9 IMPACT ON POTENTIAL SNAGGING

8.9.1 Introduction

8.9.1.1.1 Evidence of fishing activity was identified within the site area (**Figure 23, Figure 24,** and **Section 6.4.7**). The installation of inter-array cables, partially protected cables or platform link cables (in the event the windfarm site requires two offshore substations) during construction may increase anchor and fishing gear snagging risk. Subsea cables are both at risk of anchor or fishing gear strikes and can pose a hazard to navigating vessels where gear attached to the vessel becomes snagged.

8.9.2 Summary

8.9.2.1.1 In summary, were a fishing vessel to snag a 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, and potential fatalities. Cable burial (an embedded mitigation risk control measure) mitigates the risk of snagging post-construction, and the CBRA ensures these risks are adequately addressed for the types of gear used within the study area.

9. NAVIGATION RISK ASSESSMENT

9.1 INTRODUCTION

9.1.1.1.1 The NRA has been produced in accordance with MGN 654 and follows the IMO's FSA (see **Section 2.2.2**). The MGN 654 requires that the NRA contain a hazard log of shipping and navigation hazards caused or changed by the Project, which includes an assessment of risk with embedded controls (those controls designed and included in the Project which are commonly accepted as industry good practice – see **Section 4.9** for a list of embedded risk controls) in place, and an assessment of risk for the Project with possible additional risk controls (see **Section 9.8**) in place.

9.1.1.1.2 The development of the NRA, hazard log and associated risk scoring process is based on the following data, analysis, modelling and expertise of the NRA team:

- Project description (see Section 4)
- Overview of baseline environment (see Section 5)
- Description of existing marine activities (see Section 6)
- Future case vessel traffic profiles (see Section 7)
- Potential impact assessment (see Section 8)

9.1.1.1.3 In addition to above, a key component of the NRA is engagement with regulators and local stakeholders to confirm baseline shipping and navigation characteristics and elicit judgement on the levels of navigation risk with the Project in place.

9.1.1.1.4 The risk assessment methodology employed for the Project is the IALA SIRA process, which follows both the MCA MGN 654 guidance and is also endorsed by the IMO via SN.1/Circ.296 in December 2010. The following sections outline the:

- Overarching methodology of the risk assessment
- Details of the hazard workshops undertaken with stakeholders
- Process of hazard identification
- Results of the assessment of risk with the embedded risk controls (see **Section 4.9**) in place
- Possible additional risk control measures which may reduce risk to acceptable levels (see **Section 9.8**)
- The cumulative assessment of navigation risk posed by multiple projects proposed in the East Irish Sea (see **Section 10**)

9.1.1.1.5 The following assumptions apply to the hazard log and workshops:

- Operational scenario is 2035
- Construction scenario is 2028
- Embedded risk controls are included in the assessment of risk

- Possible additional risk controls are included in the assessment of risk
- The assessment is limited to the study area only

9.2 NRA METHODOLOGY

9.2.1.1.1 The assessment project methodology is based on the principles set out in IALA Guidelines 1018 and the IMO's FSA and is shown in **Figure 2**. Hazards are identified through, consultation and data analysis, before being assessed in terms of their likelihood and consequence. A risk matrix is utilised to identify the significance of each hazard with possible additional risk controls identified based on risk score to reduce the risks to acceptable levels. A description of the FSA process is as follows:

- **FSA Step 1: HAZID**: The NRA team identifies navigation hazards related to defined and agreed assessment parameters, such as geographic areas, marine operation, or vessel type. This is achieved using a suite of quantitative (e.g., statistical vessel traffic analysis) and qualitative (e.g. consultation with stakeholders) techniques which enables an evidentially robust identification of navigation hazards.
- **FSA Step 2: Risk Analysis:** A detailed investigation of the causes, including the initiating events, and consequences of the hazards identified in Step 1 is undertaken. This is completed using a risk matrix, and enables ranking of hazards based on navigation risk, and a determination of hazard acceptability tolerability. This process allows attention to be focused upon higher-risk hazards enabling identification and evaluation of factors which influence the level of risk.
- **FSA Step 3 & 4: Risk Controls Measures:** The identification of existing risk controls measures (which are assumed to be embedded in the assessment of navigation risk), and the identification of additional risk controls, not currently in place for the assessment parameters. Additional risk control measures are identified based on prioritising mitigation of higher-risk hazards. During this stage the risk control measures are grouped into a defined and thought-out risk mitigation strategies.
- **FSA Step 5: Findings:** The assessment findings are developed and documented into a technical report and then presented to the relevant decision makers in an auditable and traceable manner. The findings are based upon a comparison and a ranking of all hazards and their underlying causes; the comparison and ranking of risk control options as a function of associated costs

and benefits; and the identification of those risk control options which mitigate hazards to acceptable or ALARP.

9.2.1.1.2 The risk assessment process aims to ascertain risk levels and specify the requirement to apply possible additional control measures to mitigate risk to ALARP. The methodology consists of four aspects:

- Likelihood parameters (**Table 35**) – the expected frequency for which hazards occur, presented as a return rate per year. Five likelihood bands were chosen from between once in one year to once in less than 1000 years
- Severity parameters **(Table 36)** – the expected consequence of each hazard were it to occur. This has been scored separately for consequences to people (loss of life), environment (pollution), property (damage) and business (reputational/economic impacts)
- Risk matrix (**Table 37**) – based on the likelihood and each of the four severity scorings, risk scores were derived using a risk matrix
- Risk classification **(Table 38)** – based on the resulting risk score, the risk was classified from 'Negligible' and 'Acceptable' through to 'High Risk' and 'Unacceptable'

9.2.1.1.3 Having identified all relevant impacts and hazards as a result of the Project, a hazard log is constructed as described in MGN 654 Annex 1 (Annex D). Whilst there is no generally accepted standard for risk matrices, the following is proposed as suitable for the Project, meets IMO and IALA guidance, and is consistent with industry best practice.

9.2.1.1.4 Each hazard was scored for the likelihood of occurrence and expected consequence (in terms of people, property, environment, and business) for both "realistic most likely" and "realistic worst credible" occurrences. This is undertaken as the maritime industry has a range of hazard outcomes for the same hazards, with some hazards outcomes occurring frequently with low consequence (minor injuries or damage), and some outcomes of the same hazard occurring less frequently but with significantly higher consequence (loss of life/major pollution).

9.2.1.1.5 Severity of consequence with each hazard under both scenarios is considered in terms of damage to:

- People
- Property
- Environment
- Business

9.2.1.1.6 The combination of the frequency and consequence scores are then combined to produce a risk score (**Table 37**).

9.2.1.1.7 As such the assessment of risk is calculated eight times for each identified hazard; four times for the "realistic most likely" occurrence and consequence categories, and four times for the “realistic worst credible” outcome. An overall risk score is then calculated using an averaging function weighted to the highest risk score for the “realistic most likely” and the highest risk score for the “realistic worst credible”. The weighted averaging calculation is an average of:

- Average of all the “realistic most likely” risk scores
- Average all the “realistic worst credible” risk scores
- Highest individual score from the “realistic most likely” scores
- Highest individual score from the “realistic worst credible” scores

9.2.1.1.8 The tolerability of overall risk scores with regards to significance and acceptability is then defined based on the parameters defined in **Table 37**. Overall hazard scores can be scored as either:

- Acceptable
- Tolerable – if As Low As Reasonably Practicable
- Unacceptable

9.2.1.1.9 This NRA, in considering and assessing navigation risk within the study area, assumes that vessels will be compliant with international legislation such as the COLREGS and Standards of Training, Certification and Watchkeeping for Seafarers (STCW)), and National regulations and Guidance (e.g. UK Merchant Shipping Act 1995, and MCA Marine Guidance Notes).

Table 35: Frequency of occurrence criteria

Rank	Definition	Description	Definition
1	Remote	Remote probability of occurrence within the study area and few examples in wider industry.	<1 occurrence per 1000 years
2	Extremely unlikely	Extremely unlikely to occur within the study area and has rarely occurred in wider industry.	1 per 100 – 1000 years
3	Unlikely	Unlikely to occur within the study area during Project lifecycle and has occurred at other OWFs.	1 per 10 – 100 years
4	Reasonably probable	May occur once or more during the Project lifecycle.	1 per 1 – 10 years
5	Frequent	Likely to occur multiple times during the Project lifecycle.	Yearly

Table 36: Severity of consequence categories and criteria

Rank		Description			
	Definition	People	Property	Environment	Commercial and Reputation
1	Negligible	Minor injury.	Less than £10,000	Minor spill no assistance required.	Minimal impact on activities.
2	Minor	Multiple minor injuries.	£10,000-£100,000	Tier 1 Local assistance required	Local negative publicity. Short term loss of revenue or interruption of services to ports/OWF/O&G/ferries and other marine users.
3	Moderate	Multiple major injuries.	£100,000-£1million	Tier 2 Limited external assistance required	Widespread negative publicity. Temporary suspension of activities to ports/OWF/O&G/ferries and other marine users.
4	Serious	Fatality.	£1million-£10million	Tier 2 Regional assistance required	National negative publicity. Prolonged closure or restrictions to ports/OWF/O&G/ferries and other marine users.
5	Major	Multiple fatalities.	>£10million	Tier 3 National assistance required	International negative publicity. Serious and long term disruption to ports/OWF/O&G/ferries and other marine users.

Table 37: Risk matrix

Risk Matrix							
Severity of Consequences	**Major**	5	5	10	15	20	25
	Serious	4	4	8	12	16	20
	Moderate	3	3	6	9	12	15
	Minor	2	2	4	6	8	10
	Negligible	1	1	2	3	4	5
			1	2	3	4	5
			Remote	**Extremely Unlikely**	**Unlikely**	**Reasonably Probable**	**Frequent**
			Frequency Occurrence				

Table 38: Tolerability and risk ratings

Hazard Risk Score	Hazard Risk Rating	Tolerability	Description
0 – 4	Negligible Risk	Broadly Acceptable	Generally regarded as not significant and adequately mitigated. Additional risk reduction should be implemented if reasonably practicable and proportionate
4.1 – 6	Low Risk		
6.1 – 12	Medium Risk	Tolerable (if ALARP)	Generally regarded as within a zone where the risk may be tolerable in consideration of the Project. Requirement to properly assess risks, regularly review and implement risk controls to maintain risks to within ALARP where possible.
12.1 – 20	High Risk	Unacceptable	Generally regarded as significant and unacceptable for Project to proceed without further review.
20.1 – 25	Extreme Risk		

9.3 HAZARD WORKSHOP

9.3.1.1.1 The first hazard workshop was held in Liverpool on the 10 October 2022. This workshop informed the Project NRA and PEIR that was published for statutory consultation in April 2023. It was attended by representatives from ferry operators, regulators, commercial bodies, oil and gas and the fishing community. The hazard workshop process was undertaken as follows:

- Development of a draft initial hazard log by the NASH Project team
- Identification of shipping and navigation stakeholders, made up of statutory regulators and local users and determination of workshop dates to maximise attendance

- Provision of detailed pre-read information related to the Projects, baseline vessel traffic and an assessment of likely changes brought about by the Projects as well as the draft hazard log
- A pre-hazard workshop webinar to review the collated data, NRA methodology and the draft hazard log (conducted on 3 October 2022)
- At the workshop:
- The Project team introduced the material and methodology.
- Each hazard was reviewed in turn, with each attendee invited to discuss amongst their tables and score their personalised hazard log. Stakeholders were encouraged to fill out the comments section of each hazard to provide a higher level of description regarding their scores.
- Each hazard score was then reviewed as a group with differences in scoring discussed, before a consensus was sought.
- Once each hazard discussion had come to a close, the summary spreadsheet was 'locked' to capture the concluding scores of the discussion.
- Risk controls were reviewed and appropriate additional risk controls discussed.
- Update of hazard risk scores based on the findings of the hazard workshop for inclusion in the NRA.

9.3.1.1.2 Following the Project windfarm boundary change post-PEIR, a second hazard workshop was held in Liverpool on the 29 September 2023. This workshop followed an identical structure and methodology to the first workshop and was attended by many of the same stakeholder groups and included representatives from ferry operators, regulators, commercial bodies, oil and gas, ports, fishing community and recreational users. The second workshop informed the findings presented in this NRA.

9.3.1.1.3 A full summary of both workshops is available in **Appendix C**.

9.4 HAZARD IDENTIFICATION

9.4.1.1.1 This assessment considers all identified hazards of the Project on shipping and navigation receptors. In developing the hazard log, consideration was given to Project phases, areas, hazard types and vessel types.

9.4.1.1.2 Five hazard types were identified and are detailed in **Table 39**.

Table 39: Hazard types

Hazard #	Hazard Types	Definition
1	**Collision**	Collision between two vessels underway (also includes striking of an anchored or moored vessel)
2	**Allision (Contact)**	Vessel makes contact with Fixed or Floating Object (FFO) (e.g. WTGs/substation / O&G Installation etc.)
3	**Grounding**	Vessel makes contact with the seabed/shoreline or underwater assets
4	**Snagging**	Vessel fishing gear or anchor snags a subsurface hazard (e.g. Inter-Array Cabling or other sub-surface infrastructure)
5	**Vessel Emergency**	Emergency onboard vessel that requires SAR response. This could include fire, explosion, flooding or capsize

9.4.1.1.3 For the purpose of the NRA, seven vessel types were identified as described in **Table 40**. Given the excessive number of combinations of vessel types for collision hazards, vessel types 3, 4, 5 and 6 have been grouped and defined as 'Small Craft' for some hazard types. This reflects the broadly similar consequences that could be expected following an incident, whilst maintaining a manageable number of hazards.

Table 40: Vessel type definitions

Vessel #	Vessel Types / Receptors	Includes
1	Ferry & Passenger	Passenger Ferry Freight Ferry Cruise Ship
2	Cargo & Tanker	Cargo (Container, Bulk, Reefer, General etc.) Tanker (Oil, Chemical etc.)
3	Tug & Service[11]	Tugs Offshore Supply Vessels Standby Rescue Vessels Pilot Boats Non-Morecambe OWF Crew Transfer Vessels SAR Vessels Other Service Vessels
4	Fishing[9]	Trawlers Fishing Boats
5	Recreational[9]	Yachts Pleasure Boats Motor Cruisers

[11] Vessel ID 3, 4, 5, 6 are grouped together for some hazards and defined as "Small Craft".

Vessel #	Vessel Types / Receptors	Includes
6	Small Project[9]	Morecambe OWF Crew Transfer Vessels Morecambe OWF Survey Vessels Other Morecambe OWF workboats
7	Large Project	Jack-up Barges Cable Layer Heavy Lift Vessels

9.4.1.1.4 Three areas were identified for the risk assessment and are summarised in **Table 41**.

Table 41: Risk assessment areas

Area #	Areas	Detail
1	Windfarm Site	Within the windfarm site
2	Windfarm Site + 10nm	Within the study area
3	Route from O&M Base and windfarm site	Route between O&M base and windfarm site used by Morecambe OWF Project vessels (O&M base assumed to be Heysham / Barrow)

9.4.1.1.5 Three Project phases were identified for the risk assessment:

- Construction – defined as “C” in the hazard logs
- Operation and Maintenance – defined as “O” in the hazard logs
- Decommissioning – defined as “D” in the hazard logs

9.4.1.1.6 In total, 23 hazards were identified which are summarised in **Table 42**.

Table 42: Hazard identification

Hazard Id #	Project Phase	Hazard Type	Hazard Title
1	C/O/D	Collision	Collision: Ferry & Passenger ICW. Cargo & Tanker or other Ferry & Passenger
2	C/O/D	Collision	Collision: Cargo & Tanker ICW. Other Cargo & Tanker
3	C/O/D	Collision	Collision: Ferry & Passenger or Cargo & Tanker ICW. Small Craft
4	C/O/D	Collision	Collision: Small Craft ICW. Small Craft
5	C/D	Collision	Collision: Large Project ICW. Ferry & Passenger or Cargo & Tanker
6	C/D	Collision	Collision: Large Project ICW. Small Craft
7	C/O/D	Allision	Allision: Ferry & Passenger
8	C/O/D	Allision	Allision with OWF: Cargo & Tankers

Hazard Id #	Project Phase	Hazard Type	Hazard Title
9	C/O/D	Allision	Allision: Tug & Service
10	C/O/D	Allision	Allision: Fishing
11	C/O/D	Allision	Allision: Recreational
12	C/D	Allision	Allision: Large Project
13	C/O/D	Allision	Allision: Small Project
14	C/O/D	Snagging	Snagging: Fishing
15	C/O/D	Snagging	Snagging: Recreational
16	C/O/D	Snagging	Snagging: Ferry & Passenger & Cargo & Tanker
17	C/O/D	Snagging	Snagging: Large Project, Small Project and Tug & Services.
18	C/O/D	Collision	Collision: Small Project ICW. Ferry & Passenger, Cargo & Tanker
19	C/O/D	Collision	Collision: Small Project ICW. (Other) Small Craft
20	C/O/D	Allision/ Grounding	Allision/Grounding: Small Project
21	C/O/D	Vessel Emergency	Vessel Emergency - Ferry & Passenger, Cargo & Tanker and Large Project
22	C/O/D	Vessel Emergency	Vessel Emergency - Small Craft
23	C/O/D	Allision	Allision with O&G Infrastructure: Cargo & Tankers

9.5 KEY STAKEHOLDER NAVIGATION CONCERNS

9.5.1.1.1 At the hazard workshops, stakeholders were invited to describe their key concerns regarding the Project. These are summarised in **Table 43**.

Table 43: Key stakeholder navigation concerns identified in the first (2022) hazard workshop - (*) indicates whether concern has been mitigated or reduced between the first workshop and second (2023) hazard workshop due to Project changes

Organisation	Concerns
Isle of Man (IoM) Steam Packet Company	• Increase in WFSV traffic may impact Heysham-Douglas route. • Concern about condensing traffic into the 'corridor' between the north of windfarm site and WODS Windfarm.* • Southwest corner of windfarm site impacts Liverpool-Douglas route and reduces sea room - will increase collision and allision risk.* • Windfarm site minimises the adverse weather route options for Manannan.* • Radar interference from the turbines – may obscure WFSVs exiting the windfarm site.
Seatruck Ferries	• Heysham-Liverpool route may have higher likelihood of collision with inshore vessels e.g. fishing or recreational. • Concentrating traffic into the 'corridor' between the north of windfarm site and WODS Windfarm.*
Stena Line	• Commercial impact of ferry route deviation around the windfarm site.* • Southwest corner of windfarm site impacts Liverpool-Belfast (east of IoM) route and reduces sea room – will increase collision and allision risk.* • Morecambe construction phase will overlap with the O&G decommissioning phase - will increase service vessel traffic in 'corridor' between the north of the windfarm site and WODS Windfarm. • Radar interference from the turbines (particularly at night and in poor visibility) – may obscure WFSVs exiting the windfarm site.*

Organisation	Concerns
Maritime Coastguard Agency	• Increased traffic density in the 'corridor' between the north of the windfarm site and WODS Windfarm, and at the southwest corner of the windfarm site. Will increase risk profile.*
IoM Department of Infrastructure	• Echoes what was said by the ferry operators.*
Fisheries Liaison Officer	• If the cod quota is increased (albeit this hasn't been done in the last 15 years), there will be an increased amount of beam trawler traffic and fishing activity in the Morecambe windfarm site.
UK Chamber of Shipping	• Morecambe construction phase will overlap with the O&G decommissioning phase. This may considerably increase the amount of service vessel traffic in the region. • Increased risk of tanker and cargo collision and/or allision at southwest corner of the windfarm site. This risk may be further increased by radar interference from the turbines (particularly at night and in poor visibility) – may obscure WFSVs exiting the windfarm site.*
Spirit Energy	• Traffic will be displaced to the north of the windfarm site, toward existing O&G infrastructure. • Reduced collision detection and less able to see traffic coming from the west. • O&G service vessels transiting through the windfarm need access routes. • O&G decommissioning vessels are large (up to 300m) and difficult to manoeuvre with challenging angles of approach (possibly through the windfarm).

9.6 HAZARD SCORING

9.6.1.1.1 The identified hazards were assessed by the NRA team and a draft hazard log was prepared and presented at the workshop. The draft hazard log was then refined based on the findings of the hazard workshops for which stakeholders were invited to attend and score hazards (see **Appendix C** for more details).

9.6.1.1.2 It should be noted that the embedded risk controls as described in **Section 4.9** and summarised in **Table 12,** are considered as being in place in the baseline assessment of risk.

9.7 HAZARD RESULTS

9.7.1.1.1 **Table 44** summarises the result of the risk assessment for the 23 hazards identified. In total:

- 16 hazards were assessed as Medium Risk – Tolerable (if ALARP)
- 4 hazards were assessed as Low Risk – Broadly Acceptable
- 3 hazards were assessed as Negligible Risk – Broadly Acceptable

9.7.1.1.2 Those hazards assessment as "Medium Risk", can only be considered Tolerable if they are assessed as being as low as reasonably practicable - ALARP. The determination of ALARP can only be made once all possible additional risk control measures are identified and applied to relevant hazards and a determination of risk control effectiveness made in regard to cost.

9.7.1.1.3 The full hazard log is available in **Appendix D**.

Table 44: Hazard summary list

ID	Baseline Rank	Phase	Area	Hazard Title	Score	Rating
23	1	C/O/D	Windfarm Site + 10nm	Allision with O&G Infrastructure: Cargo & Tankers	9.8	Medium Risk - Tolerable (if ALARP)
3	1	C/O/D	Windfarm Site + 10nm	Collision: Ferry & Passenger or Cargo & Tanker ICW. Small Craft	9.8	Medium Risk - Tolerable (if ALARP)
5	3	C/D	Windfarm Site + 10nm	Collision: Large Project ICW. Ferry & Passenger or Cargo & Tanker	9.2	Medium Risk - Tolerable (if ALARP)
2	4	C/O/D	Windfarm Site + 10nm	Collision: Cargo & Tanker ICW. other Cargo & Tanker	8.9	Medium Risk - Tolerable (if ALARP)
18	5	C/O/D	O&M Route	Collision: Small Project ICW. Ferry & Passenger, Cargo & Tanker	8.8	Medium Risk - Tolerable (if ALARP)
8	6	C/O/D	Windfarm Site + 10nm	Allision: Cargo & Tankers	8.7	Medium Risk - Tolerable (if ALARP)
1	7	C/O/D	Windfarm Site + 10nm	Collision: Ferry & Passenger ICW. Cargo & Tanker or other Ferry & Passenger	8.4	Medium Risk - Tolerable (if ALARP)
7	8	C/O/D	Windfarm Site + 10nm	Allision: Ferry & Passenger	8.1	Medium Risk - Tolerable (if ALARP)
9	9	C/O/D	Windfarm Site + 10nm	Allision: Tug & Service	7.8	Medium Risk - Tolerable (if ALARP)
21	9	C/O/D	Windfarm Site + 10nm & O&M Route	Vessel Emergency - Ferry & Passenger, Cargo & Tanker and Large Project	7.8	Medium Risk - Tolerable (if ALARP)
4	11	C/O/D	Windfarm Site + 10nm	Collision: Small Craft ICW. Small Craft	7.6	Medium Risk - Tolerable (if ALARP)

ID	Baseline Rank	Phase	Area	Hazard Title	Score	Rating
22	12	C/O/D	Windfarm Site + 10nm & O&M Route	Vessel Emergency - Small Craft	7.4	Medium Risk - Tolerable (if ALARP)
6	13	C/D	Windfarm Site + 10nm	Collision: Large Project ICW. Small Craft	7.4	Medium Risk - Tolerable (if ALARP)
19	14	C/O/D	O&M Route	Collision: Small Project ICW. (Other) Small Craft	6.7	Medium Risk - Tolerable (if ALARP)
10	15	C/O/D	Windfarm Site + 10nm	Allision: Fishing	6.6	Medium Risk - Tolerable (if ALARP)
14	16	C/O/D	Windfarm Site	Snagging: Fishing	6.4	Medium Risk - Tolerable (if ALARP)
12	17	C/D	Windfarm Site + 10nm	Allision: Large Project	4.9	Low Risk - Broadly Acceptable
13	18	C/O/D	Windfarm Site + 10nm	Allision: Small Project	4.8	Low Risk - Broadly Acceptable
20	18	C/O/D	O&M Route	Allision / Grounding: Small Project	4.8	Low Risk - Broadly Acceptable
17	20	C/O/D	Windfarm Site	Snagging: Large Project, Small Project and	4.6	Low Risk - Broadly Acceptable
16	21	C/O/D	Windfarm Site	Snagging: Ferry & Passenger & Cargo & Tanker	4.1	Negligible Risk - Broadly Acceptable
11	22	C/O/D	Windfarm Site + 10nm	Allision: Recreational	3.8	Negligible Risk - Broadly Acceptable
15	23	C/O/D	Windfarm Site	Snagging: Recreational	3.5	Negligible Risk - Broadly Acceptable

9.7.1.1.4 The highest scoring hazard relates to a cargo vessel or a tanker being involved in an allision with the oil and gas infrastructure in the study area. This hazard has an overall risk score of 9.8 which means it is classed as a ‘Medium’ risk. Based on discussion with current O&G operators allision risk in the basecase is a concern, and detailed mitigation measures are currently in place for each installation based on safety cases. This hazard was considered to have high consequences for both the worst credible and most likely scenarios but, given the embedded risk control measures that are applicable, is judged to have a low frequency of occurrence. The basis for this hazard is that the windfarm site will constrain the navigable area in the vicinity of the oil and gas infrastructure which may increase the vessel density and the risk of allision. However, the number of vessels deviated is low and the vessels are deviated from a course (currently passing through the windfarm site) that already takes them close to O&G installations. Additionally, it is likely that fewer O&G structures would be in place as decommissioning is understood to be planned before the Project would be operational.

9.7.1.1.5 The second highest scoring hazard is a collision of a ferry, passenger, cargo or tanker – commercial vessels with small craft, during construction, operation and maintenance, or decommissioning, which has an overall risk score of 9.8/25 and scores as “Medium” risk. It should be noted that in the context of the windfarm site, it is anticipated that commercial vessels passing would do so at a safe distance of up to 1.5nm, and that with the low level of recreational and fishing vessels in the area, this hazard predominately relates to windfarm site related vessels such as WFSV, CTV's, and oil and gas associated supply ships and standby safety vessels, which will be transiting to and from northwest England ports, and therefore collision risk would be predominantly present when on transit to/from the windfarm site to the north/west of the windfarm site.

9.7.1.1.6 Large Project vessels in collision with ferry, passenger, cargo and tanker vessels during construction, operation and maintenance, or decommissioning, was ranked three and scored as "Medium" risk. At this stage of the Project, the details of the Large Project vessel movements are not well defined, though it is anticipated that these vessel types will navigate in accordance with national and international conventions and, whilst engaged with the construction, will be subject to the embedded risk controls measures for construction.

9.7.1.1.7 Collision between a cargo vessel or tanker with another cargo vessel or tanker was ranked as the fourth highest hazard with a 'Medium' risk. The level of risk associated with this hazard is due to the frequency of transits of these types of vessels through the study area and the level of consequences which may occur if two larger commercial vessels were to collide. The presence of the Project displaces some of the current cargo vessel and tanker routeing which will increase density of other routes affecting this hazard.

9.7.1.1.8 Collision of a small Project vessel with a commercial vessel (ferry, passenger, cargo, tanker) received a score of 8.8/25 'Medium' risk which makes it the fifth ranked hazard. At this stage of the Project, the operation and maintenance port has not been confirmed, however, the small Project vessels will be using similar routes to commercial vessels in some areas and crossing routes in others to approach the windfarm site. When navigating close to the windfarm site, there is potential for commercial vessels to not identify Project craft leaving the site, due to the WTG affecting radar and line of sight, leading to a close quarters situation. Therefore, this risk is predominantly present adjacent to the windfarm site.

9.8 ADDITIONAL RISK CONTROL OPTIONS

9.8.1.1.1 During the hazard workshop in 2022, a number of potential, additional risk control options were identified, which could reduce the risk scores further and their effectiveness discussed. The possible additional risk controls relevant to the Project which have been adopted and now included as embedded risk control measures, as listed in **Section 4.9,** are presented in **Table 45**.

9.8.1.1.2 The additional risk controls were reviewed with all stakeholders at the second hazard workshop in September 2023 and no further additional risk controls were identified as being required for the Project with agreement from the stakeholders attending the workshop. This means that where risks are scored as Medium, they can be considered to be ALARP and therefore Tolerable.

Table 45: Adopted additional risk control options since PEIR (embedded controls informing the NRA)

ID	Title	Description
1	Layout Design	To increase manoeuvring space and reduce impact on operators, revision of project boundaries could include: • Realignment of Morecambe western boundary to minimise impact to passage plan routes of ferries and commercial vessels, minimise course changes for vessels navigating north south.
2	Site Layout	Project commitment to two lines of orientation to support internal navigation and SAR.
3	CTV Passage Planning	Develop coordinated passage plans for CTVs that minimises impact on other traffic, could include: • Specified passage plans; • Agreed passing protocols/CPA for interactions with commercial shipping (e.g. no crossing within 5nm ahead of commercial vessel underway); • Reporting protocols to be established prior to crossing corridors; • Dissemination of passage plans and operations to regular runners and ferry services; and • Restricted visibility protocols.
4	Continued Engagement	Maintain the MNEF to facilitate information sharing and management/identification of additional risk controls: • Identify near misses and investigate incidents, disseminating learnings. • Coordinate construction activities.
5	Recreational/Fishing Liaison	Ensure nominated persons are able to coordinate and communicate project activities to recreational and fishing user groups. This includes during specific events (regattas).

9.8.1.1.3

10. CUMULATIVE ASSESSMENT

10.1 INTRODUCTION

10.1.1.1.1 During early consultation for the Project, stakeholders raised concerns regarding the cumulative impacts of the Morecambe Offshore Windfarm Generation Assets, the Morgan Offshore Wind Project Generation Assets and the Mona Offshore Wind Project (the 'Projects'). In particular, it was noted that the presence of all three Projects would result in corridors between them that had greater impacts on navigation safety and commercial operations than each Project would have in isolation.

10.1.1.1.2 In reference to this, the developers (Morecambe Offshore Windfarm Ltd, Morgan Offshore Wind Project Ltd and Mona Offshore Wind Project Limited) commissioned a joint CRNRA. The aim of the CRNRA was to assess cumulative risk and enable stakeholders to engage with and understand the potential effects of the proposed Projects. This assessment involved undertaking an NRA in compliance with guidance, undertaking vessel traffic analysis and modelling, consultation with operators and regulators, full bridge navigational simulations and a hazard workshop. Adopting a regional (collaborative) approach to assessment enabled individual Projects to quantify and manage the cumulative impacts in a coordinated, consistent and efficient manner. This was undertaken at an earlier stage in the assessment than usual, to ensure that the potential impacts of all three schemes are understood as early in the process as possible.

10.1.1.1.3 The objectives of the CRNRA were tailored to address stakeholder concerns, namely, the formation of routes between the three array (windfarm site) areas during the operation and maintenance phases of the projects. Other cumulative impacts associated with different project phases were not directly considered within the CRNRA but it was concluded that this did not undermine the assessment. The potential impacts of the construction and decommissioning phases are assessed within the Environmental Statement chapters for the respective projects and are largely consistent with operational impacts given the necessary exclusion of traffic from the construction areas.

10.1.1.1.4 The shipping and navigation study area of the CRNRA is defined as the region of the east Irish Sea bounded by the Isle of Man to the northwest and the Welsh and English coasts to the south and east respectively (**Figure 59**). The CRNRA assumed the consenting and construction/operation of the Awel-y-Mor Offshore Wind Farm and decommissioning of some oil and gas structures (DP3 and DP4 from the South Morecambe gas field).

10.1.1.1.5 The CRNRA was initially undertaken to accompany and inform the PEIR assessments for the Projects, informed by vessel traffic analysis and modelling, consultation with operators and regulators, bridge navigational simulations and a hazard workshop undertaken in October 2022.

10.1.1.1.6 The initial CRNRA that accompanied the PEIRs concluded that there was insufficient searoom between the three windfarm sites for safe navigation and therefore unacceptability high risks would result. In particular, collision risk was shown to be high for ferries in collision with other large commercial vessels and with small craft operating between the windfarm sites. Furthermore, it was concluded that the Projects would necessitate appreciably large deviations during normal and adverse weather conditions to impact on operator schedules and timetables.

10.1.1.1.7 Following review of these findings and Section 42 PEIR consultation responses received, all three Projects made commitments to address these impacts, particularly through changes to site boundaries and increasing the lines of orientation (see **Section 4.9** and **Figure 59**).

10.1.1.1.8 The CRNRA was updated to account for these changes made by the Projects through additional data collection, navigation simulations and a further hazard workshop in September 2023. The results of this updated CRNRA informs the Project Environmental Statement. The Morgan and Morecambe Offshore Wind Farms Transmission Assets, including possible offshore booster station search areas associated with the Morgan export cable corridor, unknown at the time of the initial CRNRA, were also included as a further project as part of the updated CRNRA.

10.1.1.1.9 The results of the updated CRNRA are outlined in Appendix 14.2 Cumulative Regional Navigational Risk Assessment (Document Reference 5.2.14.2) and summarised in **Section 10.2** below.

10.1.1.1.10 Immediately prior to finalisation of the CRNRA, a Scoping Report was issued in October 2023 for the Isle of Man OWF, named as Mooir Vannin OWF (Mooir Vannin OWF, 2023). At the time of assessment there was insufficient information available to include this project within the main assessment of the CRNRA (which was undertaken prior to the issuance of the Scoping Report). However, ongoing liaison between the Projects and Mooir Vannin Offshore Wind Farm Limited provided some preliminary information which has been used to prepare an Addendum to the CRNRA, which considers the additional cumulative effects were the Mooir Vannin OWF to be developed.

10.2 SUMMARY OF CUMULATIVE IMPACTS

10.2.1 Potential impacts of Projects

10.2.1.1.1 An assessment of the potential impacts of the Projects on recognised sea lanes essential to international navigation determined that access to the TSSs in the CRNRA study area would be maintained.

10.2.1.1.2 The CRNRA noted additional cumulative impacts on ferry routeing above those described in **Section 8.2**.

10.2.1.1.3 With regards to the IoMSPC routes, minor deviations of less than two minutes would be required in normal conditions to pass clear of both the Mona and Morgan windfarm sites. During adverse weather, the presence of the Mona windfarm site would impact upon the Liverpool to Douglas route, increasing transit time by a further 13 minutes, a total delay of at least 23 minutes. The Morgan windfarm site would impact upon on the Heysham to Douglas route, increasing transit time by a further 24 minutes on top of an existing delay of between 10 and 23 minutes.

Neither adverse weather route is substantially impacted by the various Projects collectively, as opposed to the impacts of the Project in isolation.

10.2.1.1.4 With regards to the Seatruck routes between Heysham and Ireland, the presence of the Mona and Morgan windfarm sites would compress traffic through the gap between these sites. The impact on the Heysham to Dublin route was negligible and on the Heysham to Warrenpoint route, a deviation of less than five minutes would be required. During adverse weather routeing, which typically occurs further west at present, the impacts would be minor.

10.2.1.1.5 With regards to the Stena routes between Liverpool and Belfast, the route to the west of the Isle of Man would be impacted by the Mona windfarm site, and the route east of the Isle of Man would be impacted by the Morgan windfarm site and Morecambe windfarm site. The passage to the east of the Isle of Man would necessitate a route around both the Morecambe windfarm site and the Morgan windfarm site. The additional distance and service speed would result in approximately 13 to 16 minutes of additional transit time under normal conditions dependent on which route through the Morecambe gas field had previously been taken. During adverse weather for routes to the east of the IoM an additional detour into the prevailing weather around the south and west of the Mona windfarm site would necessitate an additional 70 minutes of transit between projects, likely making the east of the Isle of Man route less favourable.

10.2.1.1.6 The potential presence of the Morgan Offshore Wind Project's booster station at the most westerly portion of the search areas would have a minimal impact on navigation safety but may increase the deviation of Stena Lines Liverpool to Belfast route were they to go east of the Isle of Man.

10.2.1.1.7 Impacts on the P&O route between Liverpool and Dublin were assessed as negligible, given that they pass clear of all four Projects.

10.2.1.1.8 The CRNRA concluded that the cumulative impacts of the four Projects on ferry passage planning in normal weather conditions was minor, given the total transit time, existing variation in timetables and turnaround times in port was significantly greater than the necessary deviations around the Projects. However, during infrequent adverse weather, the additional deviations around the Projects to maintain safe transit would increase schedule impacts by between 13 and 70 minutes (dependent on route). This is likely to result in increased delays and cancellations of services.

10.2.1.1.9 The impacts on cargo/tanker vessel routeing were less than those of ferries. The principal routes in the Irish Sea into Liverpool would route to the southwest of the Mona Project and impacts to less trafficked cargo/tanker routes were assessed in a similar manner between the individual assessment and cumulative assessments (**Section 8.3**). Minor cargo/tanker routes with less than one vessel a day would be deviated between the Projects, but the increase in distance would not be large given the length of voyages these vessels undertake.

10.2.1.1.10 The impacts on small craft routeing would be greater where their activities are offset from the windfarm sites were they to choose not to navigate through the windfarms. However, the spacing between wind turbines in the Projects is likely to be sufficient to enable safe internal navigation by small craft.

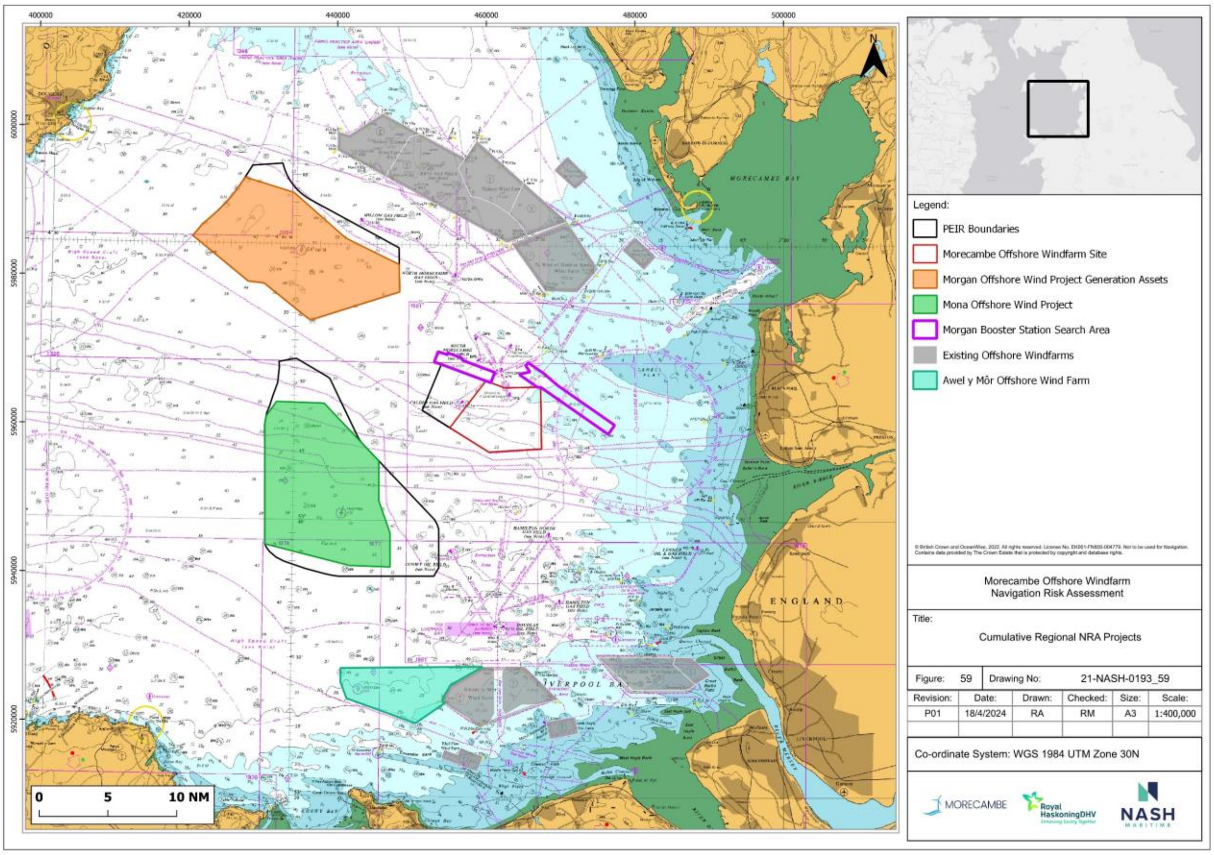


Figure 59: Cumulative projects, showing changes in boundaries of Projects since PEIR

10.2.2 Navigation safety

10.2.2.1.1 It was noted that the presence of the Projects increased the constraint on routes between them, but that each route was of sufficient width to meet both MCA and PIANC guidance, even following sensitivity analysis with greater vessel numbers:

- Mona windfarm site and Morgan windfarm site corridor at 6nm wide by 5.5nm in length
- Mona windfarm site and Morecambe windfarm site corridor at 5.7nm wide by 5.0nm in length
- Morgan windfarm site and Walney windfarm site corridor at between 4.4nm and 5.3nm wide by 11.5nm in length

10.2.2.1.2 Analysis of vessel concurrency demonstrated that, with the exception of the route south of the Mona windfarm site, the likelihood of two commercial vessels meeting between the Projects was relatively low (<25% of transits). The likelihood of two or more commercial vessels was less than 3% for the route between Mona and Morgan Array Areas and less than 1% for the routes between Morgan Array Area and Walney OWF, and Mona and Morecambe Array Areas. Whilst there was shown to be an increase in meeting situations, this was not judged to be significant.

10.2.2.1.3 Through the additional navigation simulation sessions conducted in 2023 with the Irish Sea ferry companies, the amendments to the site boundaries of the Projects was tested. It was concluded that collision risk whilst navigating between and around the Projects was manageable with existing operational procedures in complex, worst credible traffic situations. Vessels could maintain desired CPAs from other vessels and structures.

10.2.2.1.4 Other impacts such as to emergency response, visual navigation, shipboard equipment, and oil and gas activities are largely consistent with the findings contained within the Morecambe Project NRA (see **Section 9**).

10.2.3 Summary of the CRNRA Hazard Workshop

10.2.3.1.1 The second hazard workshop held in September 2023 to inform the Environmental Statement was attended by representatives from ferry operators, regulators, commercial bodies, oil and gas operators, ports and fishing community.

10.2.3.1.2 During this hazard workshop (which considered embedded risk controls, including the boundary and other changes made by the Projects since PEIR), a consensus was reached that all hazards were either Medium Risk – Tolerable if ALARP or Low Risk – Broadly Acceptable. To derive the final scores for the CRNRA, the findings of the workshop (including hazard scoring by stakeholders) were considered with the analysis and wider assessment undertaken by the NASH Project team.

10.2.4 Key findings of the CRNRA

10.2.4.1.1 The CRNRA concluded that following the changes to the Morecambe, Mona and Morgan site boundaries post-PEIR, all hazards associated with the Projects have been reduced to either Medium Risk – Tolerable if ALARP or Low Risk - Broadly Acceptable. Whilst it was recognised that the construction of the Projects in otherwise navigable waters would increase the risks of collision and allision for navigating vessels, a consensus was reached with stakeholders during the hazard workshop that these risks were not unacceptable. In particular, the increase in searoom between the OWFs provides sufficient space for vessels to safely manoeuvre in complex realistic traffic situations and adverse weather in full compliance with the COLREGs and the practice of good seamanship.

10.2.4.1.2 Whilst additional risk control measures were identified, some of these (such as ship routeing or emergency towing vessels) were not adopted as it was concluded they were disproportionate to the risk reduction they may achieve and therefore all hazards could be determined to be ALARP without the need for additional mitigation. Therefore, the CRNRA concluded that all Medium Risks can be considered ALARP and therefore Tolerable and that no further risk controls are warranted.

10.2.4.1.3 Due to the release of the Scoping Report for the Mooir Vannin OWF in October 2023, after the completion of many of the activities undertaken to inform the CRNRA, an addendum to the CRNRA was prepared to consider the additional cumulative risks that might result to vessel traffic identified within the CRNRA

(**Appendix D** of the CRNRA). It was concluded that with the addition of Mooir Vannin OWF, there were likely to be impacts on ferry routes in typical and adverse conditions and unacceptable risk to navigation safety between the Morgan Array Area, Walney OWFs and the Mooir Vannin OWF. Given the location of Mooir Vannin OWF, the Project is not considered to contribute to these further impacts.

11. CONCLUSIONS AND RECOMMENDATIONS

11.1 CONCLUSIONS

11.1.1.1.1 The NRA has been conducted in compliance with all relevant legislation, policy and guidance (**Section 2 and 3**).

11.1.1.1.2 The NRA is an update to the NRA which accompanied the Project PEIR. The update accounts for changes to the Project design made following PEIR findings and consultation responses made in relation to cumulative shipping and navigation impacts. These design changes were principally the realignment of the western boundary of the Project site and a layout commitment to two lines of orientation, which were considered along with other embedded risk controls (**Section 4.9**).

11.1.1.1.3 The Project windfarm site would account for up to 35 wind turbines and up to two offshore substation platforms within the eastern Irish Sea, plus associated inter-array and platform link cabling.

11.1.1.1.4 The study area has predominately southwesterly wind and wave conditions (**Section 5.2**). Mean spring tidal current speeds of 0.45-0.75m/s (0.87-1.46kts) occur at the windfarm site on a flood tide and 0.45-0.60m/s (0.87-1.17kts) on an ebb tide. Reduced visibility might occur up to 43 days/year dependent on location within the study area.

11.1.1.1.5 SAR facilities, including RNLI stations and helicopter stations are located immediately adjacent to the study area throughout the Welsh, English and Isle of Man coastlines (**Section 5.6**).

11.1.1.1.6 The study area includes numerous AtoNs, and there are extensive existing activities including oil and gas, offshore wind, aggregate extraction and disposal (**Section 5.7**).

11.1.1.1.7 Analysis of historical vessel traffic data (**Section 6**) identified:

- Vessels of >200m pass through the windfarm site, these are predominately ferries. There are service vessels of <200m in length which pass through the windfarm site.
- Commercial cargo and tanker shipping predominately passes southwest/northeast and northwest/southeast through the windfarm site into Heysham/Barrow and Port of Liverpool, respectively. Routes within the wider study area pass north and south of the windfarm site. Routes are low frequency with <1 vessel/day.
- Ferry routes intersecting the study area are between Liverpool-Belfast/Dublin and Liverpool-Douglas, or between Heysham-Douglas and Heysham Dublin/Warrenpoint. Cruise ship transits also occur, to a lesser extent, between Douglas and Liverpool.

- Recreational vessel traffic is concentrated along the coast, particularly along the entrance to Liverpool, and around Holyhead, Douglas and Rhyl. Cruising routes exist between Liverpool and Isle of Man and Heysham and the Welsh coast.
- Service vessels associated with existing OWFs and oil and gas infrastructure account for a large proportion of vessel movements within the study area.
- Fishing activity in the study area primarily by vessels using static gear from ports in Wales and Fleetwood, with very little trawling activity. 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.
- Analysis of adverse weather routeing demonstrates that passenger vessels deviate from their usual routes to west of the study area (**Section 6.4.13**).
- Anchoring or loitering within the study area is at non-charted anchorage areas, notably around oil and gas infrastructure south of the windfarm site. No anchoring activity is evident within the windfarm site (**Section 6.4.15**).

11.1.1.1.8 Analysis of historical incident data identified that the majority of incidents within the study area occurred inshore, and adjacent to the approaches to the key ports (**Section 6.5**). There were four minor incidents recorded within the windfarm site involving fishing, recreational and service vessels. Analysis of incidents at other OWFs around the UK show that most accidents involve Project vessels contacting wind turbines or having incidents in transit between the arrays and O&M base.

11.1.1.1.9 An assessment of the future traffic profile within the study area (**Section 7**) determined that an increase in commercial vessel numbers of 15% by 2035 would be a reasonable assumption. There was little evidence of large changes to recreational or fishing vessel numbers. It is anticipated that oil and gas decommissioning will reduce vessel numbers, although there is uncertainty around the timing at which this would occur.

11.1.1.1.10 An assessment of the impacts of the Project on ferry vessel routeing determined that there would be necessary deviation of some IoMSPC (Liverpool to Douglas) and Stena Line (Liverpool to Belfast (East of IoM, east of Calder)) routes around the windfarm site. Basecase passage plans for both operators pass clear of the windfarm site. However, a small proportion of transits in 2019 and 2022 intersected the location of the windfarm site. Futurecase passage plans indicate that the Stena Line route between Liverpool/Belfast passing east of Isle of Man (east of Calder) is the only route affected adding an additional distance of 1.6nm.

11.1.1.1.11 During adverse weather, the assessment determined that Stena and IoMSPC routes tend to transit to the southwest of the study area, towards the prevailing conditions and are therefore unaffected by the Project.

11.1.1.1.12 An assessment of the impacts on small craft routeing determined that there is sufficient spacing between turbines to facilitate safe navigation for fishing and recreational craft. There may be some effect of offsetting these vessels into adjacent channels where vessel choose not to do so.

11.1.1.1.13 An assessment of the impacts of the Project on the likelihood of collision and allision for commercial vessels showed remote return periods, which is due to the generally low levels of vessel traffic in the study.

11.1.1.1.14 The Project has committed to two lines of orientation to facilitate SAR access. The layouts of the Project will be further assessed to ensure compliance with obligations for continued access for SAR assets.

11.1.1.1.15 Impacts to radar are inherent when navigating adjacent to OWFs and it is likely that these effects will be experienced in the vicinity of the windfarm site. The studies listed in **Section 8.8** and the distance in which vessels will be past the windfarm site mean that these impacts are considered to be tolerable. A REWS study has been undertaken to determine whether there is any impact to the system operated by the oil and gas infrastructure. The study concludes the impact of the Project on detection performance of nearby REWS installations is low and manageable without the need for further mitigation measures. The modelling results for the Project also indicate that the assessed REWS platforms will not experience a change in yearly alarm rates as a result of rerouted traffic.

11.1.1.1.16 An NRA was undertaken for the Project, supported through a hazard workshop in September 2023 attended by representatives from ferry operators, regulators, commercial bodies, oil and gas, ports, fishing community and recreational users.

11.1.1.1.17 In total 23 hazards were identified, split across different hazard types, vessel types, Project phases and areas.

11.1.1.1.18 16 of the hazards were assessed as Medium Risk – Tolerable if ALARP, including the risk of collision, allision, and snagging during construction, operation and maintenance, and decommissioning phases. The remaining seven hazards were assessed as Low Risk – Broadly Acceptable. Several hazards were scored in consideration of the human error on or mechanical failure of vessels transiting in close proximity to the windfarm site and the inherent risk of interaction between the vessel and the turbines.

11.1.1.1.19 Risk controls for the Project were reviewed with stakeholders at the hazard workshop. No further additional risk controls were identified for the Project. Therefore, the NRA concludes that where risks are scored as Medium, they can be considered to be ALARP and therefore Tolerable without the need for additional risk control measures.

11.1.1.1.20 A regional cumulative assessment (CRNRA) was undertaken in 2022 to assess the impacts of Mona Offshore Wind Project, Morgan Offshore Wind Project Generation Assets and Morecambe Offshore Windfarm Generation Assets on shipping and navigation. This CRNRA accompanied and informed the PEIRs for each project. The assessment identified that whilst there were some additional minor impacts on vessel routeing above what would be experienced on an individual Project basis, there were significant impacts on vessel safety due to the creation of narrow corridors between windfarms. The CRNRA determined that there were High Risk hazards between Mona and Morgan, and between Morgan and Walney.

11.1.1.1.21 The CRNRA was updated post-PEIR to account for designs changes made by the three projects following the PEIR findings and consultation responses made in relation to the cumulative impacts. These design changes were principally changes made to the boundaries of all three projects, a commitment to two lines of orientation and a reduction in the number of project vessel movements. The updated CRNRA also included consideration of the Morgan and Morecambe OWF Transmission Assets project.

11.1.1.1.22 The updated CRNRA, supported through a hazard workshop in September 2023 attended by representatives from ferry operators, regulators, commercial bodies, oil and gas operators, ports and fishing community, concluded that all hazards were either Medium Risk – Tolerable if ALARP or Low Risk - Broadly Acceptable. Appropriate risk controls were considered to be embedded in the design of each project and whilst additional risk control options were identified, it was agreed at the hazard workshop that these were disproportionate to the reduction in risk they might achieve. Therefore, the CRNRA has concluded that all Medium Risks can be considered ALARP and therefore Tolerable and no further risk controls are warranted.

11.1.1.1.23 Due to the release of the Scoping Report for the Mooir Vannin Offshore Wind Farm in October 2023, after the completion of many of the activities undertaken to inform the CRNRA, an addendum to the CRNRA was prepared to consider the additional cumulative risks that might result to vessel traffic identified within the CRNRA. It was concluded that with the addition of Mooir Vannin OWF, there were likely to be impacts on ferry routes in typical and adverse conditions and unacceptable risk to navigation safety between the Morgan Array Area, Walney OWFs and the Mooir Vannin OWF. Given the location of Mooir Vannin OWF, the Project is not considered to contribute to these further impacts.

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Appendix A MCA MGN Check List

MGN Section	Yes/No	Comments
4. Planning Stage – Prior to Consent		
4.5 Site and Installation Co-ordinates: Developers are responsible for ensuring that formally agreed co-ordinates and subsequent variations of site perimeters and individual OREI structures are made available, on request, to interested parties at relevant project stages, including application for consent, development, array variation, operation and decommissioning. This should be supplied as authoritative Geographical Information System data, preferably in Environmental Systems Research Institute format. Metadata should facilitate the identification of the data creator, its date and purpose, and the geodetic datum used. For mariners' use, appropriate data should also be provided with latitude and longitude coordinates in WGS84 (ETRS89) datum.		
4.6 Traffic Survey – includes		
All vessel types	✓	Analysis of all vessel types within the study area is contained within **Section 6**.
At least 28 days duration, within either 12 or 24 months prior to submission of the Environmental Impact Assessment Report	✓	An MGN654 compliant vessel survey (during 2021/2022) has been conducted and is described in **Section 6.3**.
Multiple data sources	✓	**Section 3.5** describes the vessel traffic, incident and secondary data sources used to inform the NRA.
Seasonal variations	✓	Seasonality has been accounted for within the 2x 14 day traffic surveys (**Section 6.3**) and is referenced throughout **Section 6**.
MCA consultation	✓	Consultation with the MCA has been conducted (see **Section 3.5.1/9.3**).
General Lighthouse Authority consultation	✓	Consultation with Trinity House has been conducted (see **Section 3.5.1/9.3**).
Chamber of Shipping and shipping company consultation	✓	Consultation with the Chamber of Shipping and ferry companies has been conducted (see **Section 3.5.1/9.3**).
Recreational and fishing vessel organisations consultation	✓	Consultation with the RYA and fishing groups has been conducted (see **Section 3.5.1/9.3**).
Port and navigation authorities consultation, as appropriate	✓	Consultation with Peel Ports has been conducted (see **Section 3.5.1/9.3**).
4.6.d Assessment of the cumulative and individual effects of (as appropriate):		
i. Proposed OREI site relative to areas used by any type of marine craft.	✓	Vessel traffic analysis within the study area is described in **Section 6**.
ii. Numbers, types and sizes of vessels presently using such areas	✓	Vessel traffic analysis within the study area is described in **Section 6**. This includes statistical analysis of vessel activity in **Section 6.3 / 6.4.9.**
iii. Non-transit uses of the areas, e.g. fishing, day cruising of leisure craft, racing, aggregate dredging, personal watercraft etc.	✓	Vessel traffic analysis within the study area is described in **Section 5.6 / 6.4**.
iv. Whether these areas contain transit routes used by coastal, deep-draught or international scheduled vessels on passage.	✓	Vessel traffic analysis within the study area is described in **Section 6.3**, including identification of key shipping routes in **Section 6.4.10.**

v. Alignment and proximity of the site relative to adjacent shipping routes	✓	Vessel traffic analysis within the study area is described in **Section 6.3**, including identification of key shipping routes.
vi. Whether the nearby area contains prescribed routeing schemes or precautionary areas	✓	Navigational features are highlighted in **Section 5**.
vii. Proximity of the site to areas used for anchorage (charted or uncharted), safe haven, port approaches and pilot boarding or landing areas.	✓	Navigational features are highlighted in **Section 5**. Analysis of anchoring activity is contained within **Section 6.4.15.**
viii. Whether the site lies within the jurisdiction of a port and/or navigation authority.	✓	Navigational features are highlighted in **Section 5**.
ix. Proximity of the site to existing fishing grounds, or to routes used by fishing vessels to such grounds.	✓	Analysis of fishing vessel activity is contained within **Section 6.4.7**.
x. Proximity of the site to offshore firing/bombing ranges and areas used for any marine military purposes.	✓	Navigational features are highlighted in **Section 5**.
xi. Proximity of the site to existing or proposed submarine cables or pipelines, offshore oil / gas platform, marine aggregate dredging, marine archaeological sites or wrecks, Marine Protected Area or other exploration/exploitation sites	✓	Navigational features are highlighted in **Section 5**.
xii. Proximity of the site to existing or proposed OREI developments, in co-operation with other relevant developers, within each round of lease awards.	✓	Navigational features are highlighted in **Section 5**. Future proposed OREIs are described in **Section 7**.
xiii. Proximity of the site relative to any designated areas for the disposal of dredging spoil or other dumping ground	✓	Navigational features are highlighted in **Section 5.**
xiv. Proximity of the site to aids to navigation and/or VTS in or adjacent to the area and any impact thereon.	✓	Navigational features are highlighted in **Section 5**.
xv. Researched opinion using computer simulation techniques with respect to the displacement of traffic and, in particular, the creation of 'choke points' in areas of high traffic density and nearby or consented OREI sites not yet constructed.	✓	The impact on vessel routeing is assessed within **Section 8.2 / 8.3**.
xvi. With reference to xv. above, the number and type of incidents	✓	Analysis of historical incident data is contained within **Section 6.5**.

to vessels which have taken place in or near to the proposed site of the OREI to assess the likelihood of such events in the future and the potential impact of such a situation.		
xvii. Proximity of the site to areas used for recreation which depend on specific features of the area	✓	Analysis of recreational traffic is contained within **Section 6.4.6.**
4.7 Predicted Effect of OREI on traffic and Interactive Boundaries – where appropriate, the following should be determined:		
a. The safe distance between a shipping route and OREI boundaries.	✓	The impact on vessel routeing is assessed within **Section 8.2 / 8.3**.
b. The width of a corridor between sites or OREIs to allow safe passage of shipping.	✓	The cumulative impacts of multiple OREIs is assessed within **Section 10**.
4.8. OREI Structures – the following should be determined:		
a. Whether any feature of the OREI, including auxiliary platforms outside the main generator site, mooring and anchoring systems, inter-device and export cabling could pose any type of difficulty or danger to vessels underway, performing normal operations, including fishing, anchoring and emergency response.	✓	The risks of snagging on project infrastructure are assessed in **Section** 8.9. Impacts on underkeel clearance are assessed in **Section 8.9.**
b. Clearances of fixed or floating wind turbine blades above the sea surface are not less than 22 metres (above MHWS for fixed). Floating turbines allow for degrees of motion.	✓	The project has committed as an embedded risk control measures that wind turbine blades will be 25 metres above the sea surface.
c. Underwater devices i. changes to charted depth ii. maximum height above seabed iii. Under Keel Clearance	x	The impact on UKC is not considered a concern due to water depths of the windfarm site – note the transmission assets are considered as part of a separate NRA.
d. Whether structure block or hinder the view of other vessels or other navigational features.	✓	Impacts on collision avoidance are considered within **Section 8.5**.
4.9 The Effect of Tides, Tidal Streams and Weather: It should be determined whether:		
a. Current maritime traffic flows and operations in the general area are affected by the depth of water in which the proposed installation is situated at various states of the tide i.e. whether the installation could pose problems at high water which do not exist at	✓	Analysis of tidal conditions are given in **Section 5.2.2**.

low water (LW) conditions, and vice versa.		
b. The set and rate of the tidal stream, at any state of the tide, has a significant affect on vessels in the area of the OREI site.	✓	Analysis of metocean conditions are given in **Section 5.2**. Collision and allision (**Section 8.4** and **8.5**) assessments consider the impact of metocean conditions.
c. The maximum rate tidal stream runs parallel to the major axis of the proposed site layout, and, if so, its effect.	✓	Analysis of metocean conditions are given in **Section 5.2.** Collision and allision (**Section 8.4** and **8.5**) assessments consider the impact of metocean conditions.
d. The set is across the major axis of the layout at any time, and, if so, at what rate.	✓	Analysis of metocean conditions are given in **Section 5.2.** Collision and allision (**Section 8.4** and **8.5**) assessments consider the impact of metocean conditions.
e. In general, whether engine failure or other circumstance could cause vessels to be set into danger by the tidal stream, including unpowered vessels and small, low speed craft.	✓	Analysis of metocean conditions are given in **Section 5.2**. Collision and allision (**Section 8.4** and **8.5**) assessments consider the impact of metocean conditions.
f. The structures themselves could cause changes in the set and rate of the tidal stream.	✓	No effect anticipated.
g. The structures in the tidal stream could be such as to produce siltation, deposition of sediment or scouring, affecting navigable water depths in the windfarm area or adjacent to the area	✓	Analysis of metocean conditions are given in **Section 5.2.**
h. The site, in normal, bad weather, or restricted visibility conditions, could present difficulties or dangers to craft, including sailing vessels, which might pass in close proximity to it.	✓	Adverse weather impacts are assessed within **Section 8.2.3 / 8.3.3**.
i. The structures could create problems in the area for vessels under sail, such as wind masking, turbulence or sheer.	✓	Analysis of metocean conditions are given in **Section 5.2**. Collision and allision (**Section 8.4** and **8.5**) assessments consider the impact of metocean conditions.
j. In general, taking into account the prevailing winds for the area, whether engine failure or other circumstances could cause vessels to drift into danger, particularly if in conjunction with a tidal set such as referred to above.	✓	Analysis of metocean conditions are given in **Section 5.2**. Collision and allision (**Section 8.4** and **8.5**) assessments consider the impact of metocean conditions.
4.10 Assessment of Access to and Navigation Within, or Close to, an OREI		

To determine the extent to which navigation would be feasible within the OREI site itself by assessing whether:		
a. Navigation within or close to the site would be safe: for all vessels, or for specified vessel types, operations and/or sizes. in all directions or areas, or in specified directions or areas. in specified tidal, weather or other conditions	✓	Impacts to vessel routeing are assessed in **Section 8.2 / 8.3**.
b. Navigation in and/or near the site should be prohibited or restricted: for specified vessels types, operations and/or sizes. in respect of specific activities, in all areas or directions, or in specified areas or directions, or in specified tidal or weather conditions.	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**.
c. Where it is not feasible for vessels to access or navigate through the site it could cause navigational, safety or routeing problems for vessels operating in the area e.g. by preventing vessels from responding to calls for assistance from persons in distress	✓	Impacts to vessel routeing are assessed in **Section 8.2 / 8.3**.
d. Guidance on the calculation of safe distance of OREI boundaries from shipping routes has been considered	✓	Vessel routes are identified in **Section 6.4.10**
4.11 Search and rescue, maritime assistance service, counter pollution and salvage incident response.		
The MCA, through HM Coastguard, is required to provide Search and Rescue and emergency response within the sea area occupied by all offshore renewable energy installations in UK waters. To ensure that such operations can be safely and effectively conducted, certain requirements must be met by developers and operators.		
a. An ERCOP will be developed for the construction, operation and maintenance, and decommissioning phases of the OREI.	✓	Impacts to search and rescue are considered within **Section 8.6**. Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
b. The MCA's guidance document Offshore Renewable Energy Installation: Requirements, Advice and Guidance for Search and Rescue and Emergency Response for the design, equipment and operation requirements will be followed.	✓	Impacts to search and rescue are considered within **Section 8.6**. Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**

c. A SAR checklist will be completed to record discussions regarding the requirements, recommendations and considerations outlined in the above document (to be agreed with MCA)	✓	Impacts to search and rescue are considered within **Section 8.6**. Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
4.12 Hydrography - In order to establish a baseline, confirm the safe navigable depth, monitor seabed mobility and to identify underwater hazards, detailed and accurate hydrographic surveys are included or acknowledged for the following stages and to MCA specifications:		
i. Pre-construction: The proposed generating assets area and proposed cable route	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
ii. On a pre-established periodicity during the life of the development	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
ii. Post-construction: Cable route(s)	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
iii. Post-decommissioning of all or part of the development: the installed generating assets area and cable route	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
4.13 Communications, Radar and Positioning Systems - To provide researched opinion of a generic and, where appropriate, site specific nature concerning whether:		
a. The structures could produce radio interference such as shadowing, reflections or phase changes, and emissions with respect to any frequencies used for marine positioning, navigation and timing (PNT) or communications, including GMDSS and AIS, whether ship borne, ashore or fitted to any of the proposed structures, to: i. Vessels operating at a safe navigational distance ii. Vessels by the nature of their work necessarily operating at less than the safe navigational distance to the OREI, e.g. support vessels, survey vessels, SAR assets. iii. Vessels by the nature of their work necessarily operating within the OREI.	✓	Impact on communications, radar and positioning systems are considered within **Section 8.8**.
b. The structures could produce radar reflections, blind spots, shadow areas or other adverse effects: i. Vessel to vessel;	✓	Impact on communications, radar and positioning systems are considered within **Section 8.8**.

ii. Vessel to shore; iii. VTS radar to vessel iv. Racon to/from vessel		
c. The structures and generators might produce sonar interference affecting fishing, industrial or military systems used in the area.	✓	Impact on communications, radar and positioning systems are considered within **Section 8.8**.
d. The site might produce acoustic noise which could mask prescribed sound signals.	✓	Impact on communications, radar and positioning systems are considered within **Section 8.8**.
e. Generators and the seabed cabling within the site and onshore might produce electro-magnetic fields affecting compasses and other navigation systems.	✓	Impact on communications, radar and positioning systems are considered within **Section 8.8**.
4.14 Risk mitigation measures recommended for OREI during construction, operation and maintenance, and decommissioning. Mitigation and safety measures will be applied to the OREI development appropriate to the level and type of risk determined during the EIA.The specific measures to be employed will be selected in consultation with the Maritime and Coastguard Agency and will be listed in the developer's Environmental Statement. These will be consistent with international standards contained in, for example, the Safety of Life at Sea (SOLAS) Convention - Chapter V, IMO Resolution A.572 (14)3 and Resolution A.671(16)4 and could include any or all of the following:		
i. Promulgation of information and warnings through notices to mariners and other appropriate maritime safety information dissemination methods.	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
ii. Continuous watch by multi-channel VHF, including Digital Selective Calling.	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**.
iii. Safety zones of appropriate configuration, extent and application to specified vessel.	✓	Embedded risk controls are outlined in **Section 4.9.** Possible additional risk controls are proposed in **Section 9.8**
iv. Designation of the site as an Area to be Avoided.	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
v. Provision of AtoN as determined by the GLA	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
vi. Implementation of routeing measures within or near to the development.	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
vii. Monitoring by radar, AIS, CCTV or other agreed means	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
viii. Appropriate means for OREI operators to notify, and provide evidence of, the infringement of safety zones.	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**

ix. Creation of an Emergency Response Cooperation Plan with the MCA's Search and Rescue Branch for the construction phase onwards.	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
x. Use of guard vessels, where appropriate	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
xi. Update NRAs every two years e.g. at testing sites.		Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
xii. Device-specific or array-specific NRAs	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
xiii. Design of OREI structures to minimise risk to contacting vessels or craft	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**
xiv. Any other measures and procedures considered appropriate in consultation with other stakeholders.	✓	Embedded risk controls are outlined in **Section 4.9**. Possible additional risk controls are proposed in **Section 9.8**

Appendix B Meeting Minutes

Introductory meeting with Ferry Operators - Morecambe Offshore Wind Farm

Date: 07/02/2022

Time: 14:00 – 15:15
Location: Online meeting

Meeting called by:	Flotation Energy (FE)	**Type of meeting:**	Online meeting
Facilitator:	Kirstine Wood (FE)	**Note taker:**	R Marlow / E Rogers (NASH)
Attendees:	As below	**Apologies:**	Robert Merrylees, Kane Taha

Organisation:

Sea Truck Ferries
- Alistair Eagle (AE) – Chief Executive
- Steve Olbison (SO) – Marine Superintendent

Stena Line Ferries
- Michael Proctor (MP) – Safety and Security Superintendent

Isle of Man Steam Packet Company
- Tyrone Dwyer (TD) – Marine Manager

Flotation Energy (FE)
- Adam Payne (AP) – Senior Offshore Consenter
- Kirstine Wood (KW) – Stakeholder Engagement Lead
- Paul Boath (PB) - Head Engineer

NASH

- Ed Rogers (ER) - Shipping and Navigation - Project Director
- Rich Marlow (RM) - Shipping and Navigation - Project Manager

Agenda

1. Overview of the Morecambe Offshore Windfarm and our approach to Scoping
2. Understand how best to engage with Ferry Operators/shipping
3. Identification of key impacts from a Ferry Operators/shipping perspective
4. Agree way forward for NRA assessment methodology

Supporting presentation: FLO-MOR-PPT- 20220207- NASH Ferries Briefing

Minutes

1. Overview of the Morecambe Offshore Windfarm and our approach to Scoping

KW talked through slides 2-9 of the presentation providing an overview of the Morecambe Offshore Windfarm Project.

Due to the delayed Offshore Transmission Network Review (OTNR) Holistic Network Design (HND); we still do not have a confirmed grid connection point or connection date. It is unlikely a grid connection will be offered to us until at least July 2022. For this reason, the Project will be submitting a scoping request for the windfarm only site this month.

AE explained that there was a need to consider cumulative issues relating to existing and future windfarms. So there is a need to consider planned developments such as BP Morgan / Mona; as well as extensions to existing windfarms in the area. The impact of future Crown Estate Leasing Rounds were noted too.

TD expanded on this - there are several ongoing and planned developments. The Irish Sea is becoming very busy. The Steam Packet Company want full involvement in the project from the start as the project will affect business (commercial and safety) and both standard and adverse weather routes.

PB noted the existing presence of oil and gas infrastructure in the project area that naturally limited existing shipping and navigation as well. The existing infrastructure was a key reason why the site was chosen, as traffic will already be diverting.

AE and **MP** spoke about the need to balance all other and future sites especially in relation to the balance of safety and commercially viable ferry operations.

The Project agreed to work with ferry operators to determine the cumulative impact. This is recorded in Action 1.

2. Understand how best to engage with Ferry Operators/shipping

ER talked through slides 10-11 which focused on early engagement with ferry operators.

There was general agreement amongst the ferry companies that The Crown Estate did not consult them during Leasing Round 4.

AE & **MP** noted that engagement with ferry operators should have been undertaken much earlier and that site boundaries should be orientated to exclude / minimise impact to ferry routes (later in the meeting AE also noted the Renewables NPS policy test for shipping and understood ferry routes).

3. Identification of key impacts from a Ferry Operators/shipping perspective

ER talked through slide 13. The project had already noted a number of key issues and these were discussed with the following points recorded:

- Significant concern about the cumulative impact of developments in the Irish Sea will have on the timing and costs of their routes

All ferry operators agreed that the cumulative impact of developments was the most significant issue – especially in relation to Morgan / Mona site.

- There is a need to fully understand Morecambe OWF site location to determine impact that would have on existing ferry routes.

MP and **AE** suggested that to help them engage, future maps should show

- Morecambe Project Site
- Morgan / Mona Project Site
- Nautical Chart
- Historic AIS data tracks showing key routes

The project agreed to this, and it is recorded as action 2.

All attending ferry operators also agreed to the sharing of passage plans (which have already been shared with the Nash Morgan / Mona project team) and they gave their explicit permission for Nash to share these with the Morecambe Project team.

- Ferry Operators keen to be seen as a body of stakeholders (not individual companies)

it was agreed to continue meeting as a group, but that in the future it may be necessary to break out into specific operators as the Project progresses.

- Concern over time commitment (and expenditure) for engagement.

Agreed to meet as a group, including the UK Chamber of Shipping. However, it was acknowledged that as the Project progresses this may not always be appropriate.

- Keen to understand how much collaborative work can be undertaken with Morgan and Mona Forum.

The Project is meeting with the Morgan / Mona Project Team to see how they can collaborate and reduce the consultation burden on stakeholders

4. Agree way forward for NRA assessment methodology

ER Talked through slides 14-21.

MP asked whether Bridge Simulation would be undertaken to inform the Navigation Risk Assessment for the Morecambe OWF site. **ER** responded that at this point in time the evidential level of assessment was not defined but would be developed as data was collected and analysed, in partnership with understanding the site boundary adopted for the DCO submission.

MP noted that if simulator exercises were to be undertaken then they needed to include:

- Different vessels operated on the routes
- Normal and limit state conditions
- Configurations of windfarms
- 3rd party vessels (accounting for high density shipping periods. For example, following adverse weather)

ER gave an overview of the project Shipping and Navigation Scope of work related to

- Vessel Traffic Surveys
- Consultation
- Navigation Risk Assessment

MP noted that the duration of the vessel traffic survey was not sufficient to inform seasonality / adverse weather routing of ferries, and also 3rd party vessel impacts.

ER noted that vessel traffic surveys are in line with MGN654 guidance from the MCA

A discussion was had on additional AIS only vessel traffic analysis to inform the routing of vessels.

RM gave an overview of the vessel traffic survey. Seatruck requested Notices to Mariners distribution list included key individuals. Other attendees were asked to advise the project if they would also like to see individuals added to the distribution list (see action 5).

Next Steps

It was agreed that the Project's approach to engage ferry operator together and at early stage was useful and should continue.

AE asked if there are any further sites from Round 4; or other initiative that they are not aware of? He explained that whilst safety is a concern; commercial issues are a real impact. Ferries run on tight schedules. It is not enough to say "this is a case of 'a small diversion and it will be ok'. Schedule impacts on crew rest on a schedule which already offers limited downtime. Diversions will be an issue for established routes.

ER confirmed that Morgan, Mona and Morecambe are the only R4 projects in the Irish Sea.

Actions

Ref	Action	Whom	When	Progress	Status
1	Agree cumulative scenarios for navigation risk assessment through liaison with Morgan/Mona OWFs.	Morecambe OWF			
2	Issue updated site plots inc. other OWF sites (existing and proposed) and consider addition of AIS data to plots.	NASH			
3	Operator passage plans – NASH to seek these from NASH Morgan / Mona project team with agreement of ferry operators.	NASH			
4	Nash to share contact details as Shipping and Navigation Consultants to attendees.	NASH			
5	Operators to share email addresses for Notices to Mariners if different to current contacts.	Ferry Operators			

Introductory meeting with Chamber of Shipping and Steam Packet - Morecambe Offshore Wind Farm

Date: 09/02/2022

Time: 14:00 – 16:00
Location: Online meeting

Meeting called by:	Flotation Energy (FE)	**Type of meeting:**	Online meeting
Facilitator:	Kirstine Wood (FE)	**Note taker:**	R Marlow / E Rogers (NASH)
Attendees:	As below	**Apologies:**	N/A

Organisation:

Isle of Man Steam Packet Company
- Kane Taha (TD) – Operations Director

Chamber of Shipping
- Robert Merrylees (RM) – Policy Manager

Flotation Energy (FE)
- Kirstine Wood (KW) – Stakeholder Engagement Lead

NASH

- Ed Rogers (ER) - Shipping and Navigation - Project Director
- Rich Marlow (RJM) - Shipping and Navigation - Project Manager

Agenda

1. Overview of the Morecambe Offshore Windfarm and our approach to Scoping
2. Understand how best to engage with Ferry Operators/shipping
3. Identification of key impacts from a Ferry Operators/shipping perspective
4. Agree way forward for NRA assessment methodology

Supporting presentation: FLO-MOR-PPT- 20220207- NASH-Ferries Briefing

Minutes

1. Overview of the Morecambe Offshore Windfarm and our approach to Scoping

KW talked through slides 2-9 of the presentation providing an overview of the Morecambe Offshore Windfarm Project.

Due to the delayed Offshore Transmission Network Review (OTNR) Holistic Network Design (HND); the project does not have a confirmed grid connection point or connection date. It is unlikely a grid connection will be offered to us until at least July 2022. For this reason, the Project will be submitting a scoping request for the windfarm only site this month.

RM commented that he was unsure how a Navigation Risk Assessment will be delivered with so many other projects running concurrently. This is not a project that can be assessed in isolation. **KT** and **ER** noted that cumulative issues are a key issue and will need to be fully addressed.

RM asked whether the Maritime Navigation Engagement Forum established for the Morgan/Mona project can be extended to include Morecambe project. **KW** confirmed that Project is meeting with the Morgan / Mona Project Team to see how they can collaborate.

KT question what the criteria was for assessing Shipping and Navigation impacts from offshore windfarms such as the Morecambe project?

ER responded that the primary focus is navigation safety first followed by commercial impacts and that policy on assessing Shipping and Navigation impacts is derived from the National Policy Statement (NPS) for Renewable Energy Infrastructure (EN-3) Section 2.6 - Offshore Wind Farm Impacts – Navigation and shipping[1]. The impact the project will have on safe of navigation will be determined in the autumn once the assessment has been completed.

KT asked if risk can be quantified, and if so, how.

ER responded that quantification of risk is determined through the NRA process, which will adhere to Maritime and Coastguard Agency Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response (MGN 654 M + F)[2].

RM commented that there will need to be a consideration on implementing navigable corridors, refining red line boundaries and safety exclusion zones as part of the shipping and navigation assessment.

The Project agreed to work with ferry operators and Morgan / Mona project to determine input criteria to cumulative impacts for Morecambe project. This is recorded in ***Action 1***.

2. Understand how best to engage with Ferry Operators/shipping

ER talked through slides 10-11 which focused on early engagement with ferry operators.

RM highlighted the need for the Project to promote open, host and transparent engagement with all stakeholders; adding that discussions need to cover the cumulative impact of Morgan/Mona, existing wind farms and Round 3 extension projects.

3. Identification of key impacts from a Ferry Operators/shipping perspective

[1] 1940-nps-renewable-energy-en3.pdf (publishing.service.gov.uk)
[2] MGN 654 (M+F) (publishing.service.gov.uk)

ER talked through slide 13. The project had already noted a number of key issues and these were discussed with the following points recorded:

- Significant concern about the cumulative impact of developments in the Irish Sea will have on the timing and costs of their routes.

RM identified that loss of scheduling, timetabling and scheduling with other logistics are significant issues, commenting that it is not only ferries affected by deviations.

KT asked for NASH's view on the impact of historic ferry services resulting from the construction of an offshore wind farm. **ER** responded that acceptability of impacts to historic ferry routes should be assessed based on the policy defined in NPS EN-3 and to the requirements of Statutory Guidance - MGN 654. The project has committed to following these requirements and to undertaking a robust and transparent assessment of the risk.

- There is a need to fully understand Morecambe OWF site location to determine impact that this would have on existing ferry routes.

RM suggested that analysis of AIS data will aid the identification of regular users of the area as key consultees, noting that that there needs to be open dialogue with other users such as cargo and Oil and Gas operators in addition to ferry operators. **ER** agreed and the project has agreed to undertake additional data collection and analysis.

- Ferry Operators keen to be seen as a body of stakeholders (not individual companies)

It was agreed to continue meeting as a group, but that in the future it may be necessary to break out into specific operators as the Project progresses and if impacts occur are more clearly defined by individual operators.

- Concern over time commitment (and expenditure) for engagement.

Agreed to meet as a group. However, it was acknowledged that as the Project progresses this may not always be appropriate.

- Keen to understand how much collaborative work can be undertaken with Morgan and Mona Forum.

The Project is meeting with the Morgan / Mona Project Team to see how they can collaborate and reduce the consultation burden on stakeholders

4. <u>Agree way forward for NRA assessment methodology</u>

ER Talked through slides 14-21.

ER gave an overview of the project Shipping and Navigation Scope of work related to

- Vessel Traffic Surveys
- Consultation
- Navigation Risk Assessment

KT questioned why the summer survey was scheduled for July, noting that this short period of survey will not capture additional ferry traffic, such as shuttle services, that are run during May/June to coincide with events on the Isle of Man.

ER noted that vessel traffic surveys are in line with MGN654 guidance from the MCA.

ER confirmed that the NRA will be supported and informed by additionally procured AIS data that will cover a longer duration than that of the survey data – likely to 1 year of AIS.

RM agreed that 1 years' worth of AIS is commonly used to illustrate wider trends, and the project should acquire as much AIS as possible.

RM highlighted further datasets to be used as part of the assessment including anchoring activities, incidents (20 years of MAIB/RNLI), RYA coastal atlas and discussions with BMAPA for dredging activities.

RM raised a concern over the scheduling of the NRA HAZID prior to completion of the summer vessel traffic survey. If scheduling is down to the pressure to submit PEIR in January 2023, **RM** queried whether there was an opportunity for PEIR submission to be pushed back (e.g. 2-4 weeks) to enable summer survey completion, followed by HAZID and consultation that enables findings of the summer survey to be shared.

KW noted an action to discuss PEIR submission dates with the wider Project team. This is recorded in ***Action 2***.

The Project agreed to procure, process and analyse additional AIS data to generate regional/site-wide tracks by vessel type, operator and determine regular runners. This is recorded as ***Action 3***.

Vessel Traffic Survey

RJM gave an overview of the vessel traffic survey.

RM stated he would like to see routing analysis based on data wider that the 10nm collected during the vessel traffic survey. **ER** responded that supporting AIS data will enable broader area analysis to be undertaken.

KT asked whether future increases in traffic will be considered in the assessment. **ER** confirmed that the MCA guidance (MGN 654) mandates that consideration is given to the life of the project and that future projections of traffic will be assessed.

KT confirmed that the Steam Packet fleet will increase by 50% over the next two years. In 2023, a new hybrid vessel will be added to the fleet to help meet environmental targets and dates. **KT** highlighted concerns that increased steaming distances due to route deviation caused by offshore wind farms will have an impact on ferry design and associated emissions. Additionally, another vessel is to be developed, but the type/design of this vessel is dependent on lengths of ferry routes.

Next Steps

It was agreed that the Project's approach to engage ferry operator together and at early stage was useful and should continue.

RM highlighted the need for exchange of data and information between the Project and Morgan/Mona.

Actions

Ref	Action	Whom	When	Progress	Status
1	Agree cumulative scenarios for navigation risk assessment through liaison with Morgan/Mona OWFs.	Morecambe OWF		In progress	
2	Discuss PEIR submission dates with the wider Project team	Morecambe OWF		In progress	
3	Procure, process and analyse additional AIS data	NASH		In progress	
4					
5					

Project Update - Morecambe Offshore Wind Farm

Date: 09/08/2022
Time: 14:00 – 15:45
Location: Online meeting

Meeting called by:	NASH Maritime (NM)	**Type of meeting:**	Online meeting
Facilitator:	Edward Rogers (ER)	**Note taker:**	R Marlow (RXM)
Attendees:	As below	**Apologies:**	Robert Hunter / Tyrone Dwyer (Isle of Man Steam Packet Company (IoMSP))

Sea Truck Ferries
- Alistair Eagles (AE) – Chief Executive Officer
- Steve Cole (SC) – Chief Officer

Stena Line Ferries
- Michael Proctor (MP) – Safety and Security Superintendent

Isle of Man Steam Packet Company
- Kane Taha (KT) – Operations Director

Chamber of Shipping (CoS)
- Robert Merrylees (RM) – Policy Manager (Safety & Nautical) & Analyst

Maritime & Coastguard Agency (MCA)
- Nick Salter (NS) – Offshore Renewables Lead Marine Licensing and Consenting
- Vinu John (VJ) - Navigation Policy Advisor

Trinity House (THo)
- Trevor Harris (TH) – Navigation Policy Advisor

Flotation Energy (FE)
- Kirstine Wood (KW) – Communications Manager

NASH
- Ed Rogers (ER) - Shipping and Navigation - Project Director
- Rich Marlow (RM) - Shipping and Navigation - Project Manager

Agenda

1. Provide an update of the shipping and navigation project timeline, including survey, consultation and HAZID
2. Present ferry operator passage plans alongside full-year AIS ferry track data and other vessel types
3. Refine understanding of passage planning and adverse weather routing

Supporting presentation

FLO-MOR-PPT-20220809-NRA_Project_Update

Minutes

1. Meeting Objectives

ER provided a summary of the presentation objectives.

AE commented on cumulative effects of other projects in the area and the difficulties of providing comment on individual projects without knowing the cumulative effect of other schemes both planned and unplanned in the area. **AE** noted the new Carbon Intensity Index for shipping and the requirements to reduce emissions, adding projects requiring ferry services to deviate and add mileage will make meeting environmental targets increasingly difficult. **ER** agreed on the complexity of the cumulative issues, confirming discussion of these at the end of the presentation.

2. Morecambe Offshore Wind Farm project update

ER provided a general briefing on the project, confirming the Scoping Report had been issued and was in the public domain. **AE** requested explanation of PINS (Planning Inspectorate) and PEIR. **KW** summarised the process and provided the following link: The process | National Infrastructure Planning (planninginspectorate.gov.uk)

Generation:

- Morecambe Offshore Windfarm requested a formal Scoping Opinion from the Planning Inspectorate in relation to the Morecambe Offshore Windfarm Generation Assets on 23 June 2022 (link to Scoping Report).
- Morecambe Offshore Windfarm has received a Scoping Opinion from the Planning Inspectorate for the 'generation assets' (which covers the wind turbines, offshore substation(s) and inter-array cables of the projects. The Scoping Opinion can be accessed here.
- We currently expect the first round of non-statutory community consultation for the Morecambe project will start in Autumn 2022.

Transmission:

- National Grid Electricity System Operator (NGESO) was tasked with assessing options to improve the coordination of offshore wind generations connections into the national grid under the Offshore Transmission Network Review. NGESO concluded in their review that Morecambe and Morgan will share a grid location at Penwortham. Further details can be found here A Holistic Network Design for Offshore Wind | National Grid ESO
- We are currently undertaking extensive site selection work to inform where the subsea cables from the windfarms will come ashore. These offshore cables will be

joined to onshore cables in an underground chamber at the landfall; and then onshore cables will be routed underground to Penwortham, where they will connect into the national grid.

ER noted the transmission site (export cable route) is being considered under a separate application, as requested by NGESO. **KW** confirmed that although the Offshore Windfarms are being developed by separate companies; we intend to work together to share offshore and onshore export cable corridors and a grid connection location (the electricity transmission works) following the publication of National Grid Electricity System Operator's Pathway to 2030 Holistic Network Design Report.

To support this coordinated approach, the Projects consider that the most appropriate consenting option for the coordinated electricity transmission works is for them to be treated as projects of national significance in their own right alongside both wind farm arrays (the generation assets). This approach will ensure that the transmission infrastructure for both projects will be presented in the same application, allowing environmental effects to be fully understood and maximizing opportunities to reduce impacts.

RM requested confirmation of timelines for the project. **KW** confirmed PEIR submission 2023 and Development Consent Order (DCO) submission 2024.

RM queried whether the Scoping Report for the Cable Route will be shared with consultees once complete. **KW** confirmed the report will be available to all interested parties via Flotation Energy's Document Control process.

ER summarised the process for submission of the Navigation Risk Assessment (NRA), confirming the first iteration of the NRA will be appended to the PEIR. Updates to the project between PEIR and Environmental Statement (ES) submission will need to be reflected in an updated NRA for the final submission.

KT commented on the use of 2019 to inform PEIR chapter compared with traffic profile changes resulting from Morecambe, Morgan and Mona projects. **ER** confirmed a combination of historical data from 2019 and data collected during vessel traffic surveys in 2022 are used to inform the traffic baseline. Future vessel traffic activity will be the focus of the cumulative assessment to determine where and how ships will be deviated. **KT** questioned how future vessel traffic can be understood. **ER** confirmed collaborative work is underway between the Morecambe, Mona and Morgan teams to understand site layouts and baseline vessel traffic. Once this is understood, judgement and assessment around changes to vessel routing as a result of site layouts will be made. **KT** asked if this information will be shared. **ER** confirmed future vessel routing determined through modelling will require practitioner and local knowledge, with opportunity to feed into this during consultation and hazard workshops in Sept-22.

RM commented on the timing of the hazard workshops to allow view of summer survey data and analysis. **ER** confirmed delay of hazard workshops until end of Sept-22 to allow adequate time for analysis and sharing of the summer survey data prior to the workshops.

NS requested confirmation of winter survey completion dates, noting ES submission of 2024 and the two-year window requirement between survey and DCO submission. **ER** confirmed completion end Feb-22, allowing up to Q1 2024 for submission. **ER** confirmed early engagement with MCA should the validity period be exceeded.

3. Actions from the previous meeting

ER summarised actions from the previous meeting. **ER** confirmed both cumulative and individual project NRAs to be completed in support of the DCO submission.

RM requested information regarding project design parameters. **KW** commented that a design parameter table can be provided (see **Action 1**).

ER commented the overall area of the project is 125km², with an aspiration to develop 75km² of that area.

4. Vessel traffic analysis

ER summarised the analysis to be presented, based on the 2019 AIS data and provided passage plans.

ER confirmed one Stena Line route between Liverpool and Belfast passes through the Project (approximately 153 movements), and another passes west (approximately 377 movements).

MP suggested movement numbers from 2019 do not include movements by three additional vessels now in service. **ER** asked if these vessels use the routes as presented. **MP** confirmed they do, providing approximately a 50% increase in the movement numbers presented.

MP highlighted the impact of the project to the Liverpool to Belfast route, adding the primary concern is safety, along with additional sea miles. The slide just shows Stena tracks, and not other vessels with lots of passengers all being shoehorned into a smaller space.

AE noted concerns with the consenting process, particularly lack of The Crown Estate (TCE) engagement with operators of regular ferry services when offering lease areas. A couple of minutes additional steaming time might make a route unviable. Also need to consider carbon taxation, environmental requirements, and routes operators might want to use in the future. **NS** confirmed MCA was not involved in TCE Round 4 site selection but is a consultee in the planning process.

RM added TCE went against one of their defining principals in releasing areas through which >1000 commercial vessel movements a year occur, and CoS is engaging with TCE on future leasing in the Celtic Sea and other rounds.

RM questioned the decommissioning schedules for the fixed assts and platforms in the Irish Sea and how does this factor into the PEIR. **ER** suggest there is a plan for decommissioning but has changed due to global macro-economic factors. The published plan is that there will be decommissioning, but this might change. As more clarity on this arises, information in the PEIR will be updated for the ES submission.

KT requested a view from MCA on Article 60 Section 7 of UNCLOS and if this is considered by TCE. **NS** confirmed the Energy Act and Energy Policy is a more relevant and useful piece of legislation relevant to the UK. **NS** suggest TCE consider Section 7, but the Article is aimed at planning decision-makers as a tool for them to use when it comes to making final decisions.

ER presented IoMSP routes. KT noted the passage plan lines through the Morecambe site do not match the vessel tracks. **ER** confirmed the passage plan was generated using information provided to NASH by IoMSP and may represent a straight line between two waypoints. **KT** suggested the passage plan lines are moved to reflect the 2019 tracks. **ER** confirmed NASH cannot do this but can update the passage plan if one exists that better represents the routes.

ER asked if there was a particular reason vessel masters transit one side or the other of the offshore infrastructure south of the project. **KS** confirmed the decision is down to master discretion or other traffic on the day. **ER** queried whether there are plans to upgrade the fast ferry between Liverpool and Douglas in the future. **KT** confirmed no plans for the next 3 or 4 years, but confirmed the construction of a new Ro-Ro conventional vessel being built in Korea. This will be an additional vessel transiting the Liverpool/Douglas route. **ER** asked if an indication of traffic volume uplift can be provided. **KT** offered to provide this information separate (see **Action 2**).

ER presented the tracks for Seatruck vessels. **AE** commented if just Morecambe, then impact is negligible, but the outcome of Morgan and Mona is not known - if in place then, passage plans may need to be rerouted through Morecambe.

AE highlighted more transits were undertaken in 2019 than shown on the figure, and suggested it may be useful for all operators on the call provide actual vessel movement figures for the year (see **Action 3**). **AE** confirmed on Heysham/Warrenpoint route, 1096 sailings were undertaken in 2019 (+9% of number presented on the slide) (see **Action 4**).

NS suggested producing a plot with all passage plans presented. **ER** confirmed this will be undertaken and added to the slide deck (see **Action 5**).

ER presented the commercial vessel tracks. **RM** requested a table of total vessel counts for all commercial vessels passing through the site. **ER** confirmed this will be provided (see **Action 6**). **RM** commented vessels transiting through the site on a daily basis will have to be displaced, leading to vessel-to-vessel interaction, but it is unknown where this displacement and potential interaction with other vessels is going to occur or what the elevated risk is.

ER presented vessel tracks for fishing vessels. **RM** questioned if NASH were looking into different types of fishing and active vs transiting vessels. **ER** confirmed that speed of vessels would be used to determine active vs transiting vessels. Information regarding types of fishing can be elicited from separate consultants working on fisheries aspects for the project. Information including AIS, VMS, radar and visual observations from surveys and consultation will be used to determine a qualitative understanding of fishing activities in the area. **RM** asked if this information will be available during the hazard workshops. **ER** confirmed VMS, data and surveys will be available - a plot of fishing vessels by speed can be produced and shared prior to the workshops.

ER presented recreational vessel tracks and Royal Yachting Association (RYA) Coastal Atlas. **ER** confirmed the low levels of recreation in the area, noting the RYA have not determined this as a project of concern.

ER presented tug and service vessel tracks. **RM** asked whether the number of service vessels intersecting the site is available. **ER** commented that this hasn't been extracted as these vessels are not engaged on typical transits and vessels might weave in and out of the site multiple times on the activity it's undertaking, so it is difficult to quantify number of vessels or turns. **ER** confirmed this can be looked at and information presented for the hazard workshops.

SC commented the numbers of tug and service vessels will increase once the project is in place, with risk increasing due to the concentration of vessels in one place. **ER** agreed, highlighting Morgan/Mona projects will also contribute to this increase in risk.

5. Adverse weather routing

ER presented adverse weather routes by operator, displaying routes taken by vessels based on varying wind speeds and significant wave heights. **MP** commented the tracks displayed do not take into account direction of the vessel. **ER** suggested the tracks could be coloured by heading – **MP** confirmed this would help during hazard workshops as the image isn't useful in it's current form. **ER** commented on this, stating what is apparent from the plot is vessels are not diverting through the site in adverse weather that wouldn't otherwise be going through. **MP** acknowledged this.

ER presented the same analysis for IoMSP. **KT** queried the parameter units presented for wave height. **ER** confirmed values represent significant wave height, which is the average of the top third wave heights. **KT** noted the figure reflects typical adverse routing undertaken by vessel masters (to the west of Mona). However, routing to the east of Morecambe would be used during southerly or west-south-westerly wind to take advantage shelter from the Welsh coast.

ER presented the same analysis for Seatruck. **AE** commented while routing presented is correct in the current environment, future adverse routing is dependent on the outcome of other projects in the area.

RM commented on the inconsistent use of Mona boundaries in the presentation. **ER** confirmed all figures will be updated using the Mona boundary submitted for scoping (see **Action 7**).

6. Discussion

ER presented a slide itemising discussion points from the information presented. Based on the analysis of AIS data, **ER** noted the extent of identified impacts to ferry routing by Morecambe and surrounding projects. **RM** requested the word 'impact' be replaced with 'deviation' as impact takes into account other factors, whereas the analysis presented is based on potential deviations to passage plans. **ER** confirmed this would be updated (see **Action 8**).

AE interjected, suggesting 'impacts' to ferry operators is too difficult to determine due to unknowns regarding other projects. Referencing the recent Celtic Sea floating leasing round, **AE** further commented that operators cannot be confident a floating project wouldn't be proposed to the west of Morgan and Mona, and the potential impact to operations that would pose. **KT** requested 'in isolation' to be added to the slide to make clear the reference to deviations is based on Morecambe only (see **Action 9**).

RM asked what cruise ship activity looked like in the area. **ER** confirmed cruise ship activity is minimum in terms of Morecambe, suggesting a figure be produced illustrating cruise tracks and added to the presentation (see **Action 10**). **AE** commented on the impact of cruise ship incidents and the scale of the impact – if a ferry has an incident, 40 people might be onboard, but if a cruise ship has an incident there could be 4000 people onboard so the number of potential casualties is somewhat different.

RM mentioned it useful for a single figure to be included that displays all vessel types from the 2019 data. **ER** confirmed this would be produced and added to the presentation (see **Action 11**), also suggesting high-resolution images be provided along with the slide deck (see **Action 12**).

7. AoB

ER confirmed a hazard workshop is scheduled in September covering individual and cumulative projects. A pack will be prepared for hazard workshops and distributed in due course.

AE questioned what the process is for objecting to offshore wind projects in the Irish Sea. **ER** commented the DCO process allows interested parties to register their concerns or objections over various phases of the project, such as the scoping phase. **ER** asked if **AE** had submitted comments on the scoping report. **AE** confirmed no objections had been provided as the process is not clear. **AE** requested advice on what they and other ferry operators should be doing and when to raise objections.

NS added comment from a consultee perspective, advising operators to continue providing feedback to NASH, however formal objections cannot be submitted until the final DCO application has been submitted. Once submitted and accepted by PINs, the examination procedure begins and consultees will be invited to become Interested Parties which guarantees involvement within the process and ensure all views are heard. Consultees will be invited to submit written representations to provide comment on the NRA and Shipping and Navigation ES chapter. The examination process beyond this is led by the PINS examiners.

AE requested conformation that no deadlines for providing comment on the project had been missed. This was confirmed by **NS**, with the same applying to Morgan and Mona. **KW** provided a link to the PINs website detailing the process for consultee involvement.

Regarding hazard workshops, **RM** requested a date to be finalised as soon as possible to ensure as many consultees as possible can be available to attend. **ER** confirmed this will be firmed up in due course, with the workshop taking place over the course of a whole day (see **Action 13**).

Actions

Ref	Action	Whom	When	Progress	Status
1	Provide project design parameters table	NASH		Complete	Complete Scoping Report, Section 6 Description of the Project pages 47, 50 and 52.
2	Provide estimate vessel transits per year for new IoMSP Ro-Ro conventional cargo vessel	IoMSP	End Aug-22	In progress	On-going
3	Provide vessel fleet transits for 2019	Stena / Seatruck / IoMSP	End Aug-22	In progress	On-going
4	Further analysis of 2019 ferry route data to ensure sailing by all vessels in fleets are captured	NASH	End Aug-22	In progress	On-going
5	Produce single figure displaying all operator passage plans	NASH		Added to slide deck	Complete
6	Produce table of commercial vessels intersecting the site	NASH		Added to slide deck	Complete
7	Update GIS figure using the Mona scoping boundary	NASH			Complete
8	Replace use of 'impact' with 'deviation' on discussion points slide	NASH			Complete
9	Add 'in isolation' to ferry route deviation bullet point on discussion slide	NASH			Complete
10	Produce figure illustrating cruise ship tracks using 2019 AIS data	NASH		Added to slide deck	Complete
11	Produce figure of all vessel tracks from 2019 AIS data, coloured by type	NASH		Added to slide deck	Complete
12	Provide high-resolution images from the presentation	NASH			Complete
13	Provide indicative dates for hazard workshop	NASH	End Aug-22	In progress	On-going

Project Update meeting with Maritime & Coastguard Agency and Trinity House - Morecambe Offshore Wind Farm

Date: 03/03/2022

Time: 14:00 – 15:00
Location: Online meeting

Meeting called by:	NASH Maritime (NM)	**Type of meeting:**	Online meeting
Facilitator:	Ed Rogers (NM)	**Note taker:**	R Marlow (NM)
Attendees:	As below	**Apologies:**	Trevor Harris (Trinity House)

Organisation:

Maritime & Coastguard Agency (MCA)

- Nick Salter (NS) – Offshore Renewables Lead Marine Licensing and Consenting
- Vinu John (VJ) - Navigation Policy Advisor

Trinity House (TH)

- Stephen Vanstone (SV) – Navigation Services Officer

Flotation Energy (FE)

- Kirstine Wood (KW) – Stakeholder Engagement Lead
- Archie Fowden (AF) – Offshore Consenter

NASH Maritime (NM)

- Ed Rogers (ER) - Shipping and Navigation - Project Director
- Rich Marlow (RM) - Shipping and Navigation - Project Manager

Agenda

1. Overview of the Morecambe Offshore Windfarm and Scoping Report
2. Identification of key impacts from an MCA / TH perspective
3. Agree way forward for NRA assessment methodology
4. Understand how best to engage with MCA / TH going forwards

Supporting presentation: FLO-MOR-PPT-20220303-MCA-TrinityHouse

Minutes

1. Overview of the Morecambe Offshore Windfarm and approach to Scoping

KW talked through slides 4-9 of the presentation providing an overview of the Morecambe Offshore Windfarm Project.

Due to the delayed Offshore Transmission Network Review (OTNR) Holistic Network Design (HND); the Project does not have a confirmed grid connection point or connection date. It is unlikely a grid connection will be offered until at least July 2022. For this reason, the Project originally planned to release a scoping report for the windfarm only site in February 2022, however release of the report has now been delayed.

NS asked when the Scoping Report will now be released. **KW** responded that at present we do not know when scoping will be submitted. **NS** commented that it is useful to know when consultation will be for planning purposes.

2. Key issues

ER ran through the initial shipping and navigation scope and schedule, confirming that the winter vessel traffic survey had been completed. **ER** noted that the survey did experience weather downtime due to the February storms, although 14 days in total had been collected for AIS, radar and visual means.

ER confirmed that an additional early scope of work had been identified, including early stakeholder engagement, which had commenced. This consultation includes ferry operators and Chamber of Shipping (which have been completed), with MoD, RNLI, RYA, Ports and Health & Safety Executive scheduled.

Following the ferries consultation, NASH received passage plans for key routes passing near to or through the Project. **ER** confirmed that NASH are currently using these alongside 1 year of AIS data from 2019 to help identify issues that will need to be addressed.

ER ran through slides 13-20 providing an overview of vessel traffic by vessel type and by ferry operators Stena Line, Steam Packet and Sea Truck. **ER** commented that the Project area is complex and made more complex by Morgan and Mona. The area is dense in terms of vessel traffic activity with various vessel routing schemes and existing infrastructure present in and around the surrounding area.

ER confirmed that one Stena Line route between Liverpool and Belfast passes through the Project, and another passes to the west. **ER** noted that NASH is establishing reasons for the trajectory of these two routes, which could be weather related. Two high speed Steam Packet routes between Liverpool and Douglas pass the west of the Project. Vessel traffic analysis illustrates that tracks intersect through the Project on one of the routes. Sea Truck routes pass north and south of the Project. However, **ER** acknowledged that the key issue to be assessed is the cumulative effects of the Project with Morgan/Mona and the implications for future passage planning.

ER provided an overview of other vessel types. Two commercial routes (vessels not related to ferries) pass through the Project in different directions, including a reasonable number of cargo vessels, including two regular runners. **ER** commented on the low levels of fishing activity but emphasised that the winter vessel traffic survey picked up scallop dredgers to the south of the Project. **ER** confirmed the survey did not pick up any recreational traffic, indicating the area is not used for recreation but rather transiting through the site. Tug and service craft are present in the area supporting oil and gas platform activities. **ER** noted that future activity is likely to be localised related to the scheduled decommissioning of the platforms.

NS asked how many platforms will be decommissioned. **KW** noted an action to discuss decommissioning platforms with the wider Project team. This is recorded in ***Action 1***.

ER commented that considerable feedback on the project had been received through consultation with the ferry operators and Chamber of Shipping with the main issue being the cumulative impacts and how future traffic will dissect and potentially intersect the Project. **ER** confirmed that NASH are also shipping and navigation lead on the Morgan/Mona project.

SV questioned how open the Morgan/Mona project is with Morecambe. **KW** responded that the Project has listed all areas they are happy to collaborate on and are currently going through an agreement stage. **ER** added that NASH are seeking an agreement with Morgan/Mona to collaborate but need to establish confidentiality and commercial agreements. **ER** advised that both projects will seek to use the same data sources and ensure consistent methodologies are used.

ER asked if MCA or TH had any comments. **NS** confirmed that all main issues had been covered. **NS** added that if the Morgan/Mona and the Project are to go ahead, there will likely need to be changes to the Red Line Boundaries, further commenting that although MCA appreciate the Project needs to consider capacity, all projects are concerning to the ferry companies.

ER suggested possible benchmarking of vessel traffic using 2021 / 2022 AIS data to establish changes post-COVID and whether this would be acceptable to MCA. **NS** confirmed this would be useful.

3. <u>Next steps</u>

ER ran through the latest scope and schedule for the NRA, summer survey and consultation and confirmed that appropriate key ports (based on routes) are scheduled for consultation on 10-March 2022. **ER** asked if a proposal for a commercial and safety shipping assessment – although not yet committed to by the Project – was an appropriate next step. **NS** confirmed this would be a sensible approach.

NS questioned the HAZID date of Sept-22 despite slide 11 specifying May/July-22. **ER** responded that the dates in slide 11 were originally planned but have been adjusted based on consultation feedback from the Chamber of Shipping to ensure summer vessel traffic survey data is ready and shared with stakeholders prior to commencement of the HAZID workshop.

ER confirmed a proposed summer vessel traffic survey in July but commented that Isle of Man Steam Packet suggested June in order to capture additional ferry traffic scheduled in support of the Isle of Man TT races. **NS** confirmed MCA would be happier with a July survey.

SV requested clarification that the Agreement for Lease is based on 125km^2. **KW** confirmed the Scoping Report will be based on the full RLB and the boundary will be reduced but was unsure when this would happen.

Actions

Ref	Action	Whom	When	Progress	Status
1	Confirm number of platforms within the vicinity of the Project to be decommissioned	Morecambe OWF		In progress	
2	Provide any information on when the RLB will reduce	Morecambe OWF		In Progress	

Project Update meeting with Defence Infrastructure Organisation - Morecambe Offshore Wind Farm

Date: 09/03/2022

Time: 15:00 – 16:00
Location: Online meeting

Meeting called by:	NASH Maritime (NM)	**Type of meeting:**	Online meeting
Facilitator:	Ed Rogers (NM)	**Note taker:**	R Marlow (NM)
Attendees:	As below	**Apologies:**	

Organisation:

Defence Infrastructure Organisation (DIO)
Teena Oulaghan (TO) – Safeguarding Manager

Flotation Energy (FE)
- Kirstine Wood (KW) – Stakeholder Engagement Lead
- Archie Fowden (AF) – Offshore Consenter

NASH Maritime (NM)
- Ed Rogers (ER) - Shipping and Navigation - Project Director
- Rich Marlow (RM) - Shipping and Navigation - Project Manager

Agenda

1. Overview of the Morecambe Offshore Windfarm and Scoping Report
2. Identification of key impacts from an MoD perspective
3. Agree way forward for NRA assessment methodology
4. Understand how best to engage with MoD going forwards

Supporting presentation: FLO-MOR-PPT-20220309-MoD

Minutes

1. Overview of the Morecambe Offshore Windfarm and approach to Scoping

KW talked through slides 4-9 of the presentation providing an overview of the Morecambe Offshore Windfarm Project.

Due to the delayed Offshore Transmission Network Review (OTNR) Holistic Network Design (HND) study publication; the Project does not have a confirmed grid connection point or connection date. It is unlikely a grid connection will be offered until at least July 2022. For this reason, whilst the Project originally planned to release a scoping report for the windfarm only site in February 2022 – the release of the Scoping report has been delayed.

TO asked if the Project has submitted a pre-application (Ministry of Defence Safeguarding form). **KW** confirmed that no pre-application had been submitted and that the Project was secured as part of the Crown Estate R4 leasing process.

TO advised FE to submit the required parameters in an email to request pre-application assessment. This will answer questions around the impact of a development from an MoD/DIO perspective; and confirmed that this service is free.

2. Key issues

RM ran through the initial shipping and navigation scope and schedule, confirming that the winter vessel traffic survey had been completed. **RM** noted that the survey did experience weather downtime due to the February storms, although 14 days in total had been collected for AIS, radar and visual means.

RM confirmed that an additional early scope of work had been identified, including early stakeholder engagement, which had commenced. This consultation includes ferry operators, Chamber of Shipping, Maritime & Coastguard Agency and Trinity House (which have been completed), with RNLI, RYA, Ports and Health & Safety Executive scheduled.

Following the ferries consultation, NASH received passage plans for key routes passing near to or through the Project. **RM** confirmed that NASH are currently using these alongside 1 year of AIS data from 2019 to help identify issues that will need to be addressed.

ER presented Slide 13 displaying Firing Danger Areas and asked if **DIO** had any comments. **TO** said that the best way to gather this information is by completing a pre-application to determine the impact of the Project to MoD activities.

ER asked how the pre-application process works. **TO** confirmed that **FE** need to provide 6-digit coordinates in British National Grid format of the vertices of the Project area. Other information required will be maximum blade tip height, hub height of turbines, rotor diameter, number of turbines and generating capacity. If this can be provided, the Project can be assessed from a technical point of view. **TO** suggested that the area would likely have been assessed at R4 stage but undertaking again will help support the Scoping Report.

TO estimated that the assessment would take one week to complete. **TO** highlighted that if there were concerns regarding impacts of the project on MoD activities, this doesn't mean MoD would object, as mitigation control options would be identified.

TO requested that **DIO** are kept up to date with changes on the Project, confirming that once turbine layouts are determined, the Project can be reassessed against the layout footprint.

TO, again, advised FE to submit the required parameters in an email in order to instruct the assessment. This has been recorded as **Action 1**. The MoD pre-application (including coordinates and supporting parameters) are provided in **Appendix 1**.

3. Next steps

RM ran through the latest scope and schedule for the NRA, summer survey and consultation. **RM** confirmed that a commercial and safety shipping assessment has also been proposed.

Actions

Ref	Action	Whom	When	Progress	Status
1	Submit pre-application document to DIO	Morecambe OWF		In progress	

Appendix 1

Ministry of Defence Safeguarding

NOTICE TO WIND FARM DEVELOPERS
Please submit a completed application form for all new or revised onshore and offshore wind farm plans. Its purpose is to standardise the information provided and to expedite the assessment of your proposed wind farm development. Assessment is made against the safeguarding requirement of MOD assets and operations, including MOD radars, through evaluation of the possible effects on air traffic systems, defence systems and low flying needs.

WHAT TO DO WITH THIS FORM
Please provide as much detail as possible by **filling in the shaded areas.** If the specific turbine and/or exact positions have yet to be established then fill in the likely turbine size (hub height, rotor diameter) and boundary points as a minimum. On completion send copies to following address.

CONFIDENTIALITY

Unless directed otherwise, the Ministry of Defence will treat all pre-application information in confidence and the information will only be used or disclosed in accordance with the wishes of the confider.

Safeguarding

Defence Infrastructure Organisation

Kingston Road

Sutton Coldfield

B75 7RL

Or to the following email address:

DIO-Safeguarding-Wind@mod.uk

It is important that a copy of this form is retained for inclusion with subsequent planning applications at the same site. It should also be included with any subsequent planning application.

DISCLAIMER
On the basis of the information included in this form the MOD will carry out an assessment of the potential technical impact of the proposed development on defence interests. Whilst this consultation will identify the MOD assets and operations, if any, affected by the wind farm proposal, it will not necessarily be able to give definitive information regarding the operational impact of the development. This is because the operational impact of the development, in many instances, will depend on a number of variable constraints. These include the number of built and consented turbines, and the number of proposed turbine developments in the planning system in the vicinity of the proposal. As MOD cannot predict what this will be at any point in the future, in many instances, MOD will not be able to comment on whether a development will have an acceptable or unacceptable operational impact at the pre-application stage.

Wind Farm Name
Morecambe Offshore Windfarm

Developers reference	
Related/previous applications (at or near this site): Provide reference names or numbers	

Developer Information

Company name:	
Address:	
Contact:	
Telephone:	
Facsimile:	
e-mail:	

Relevant Wind Turbine Details

Wind farm generation capacity (MW)	**480**	**Number of turbines**	40

Number of blades	3	
Rotor diameter	300	Meters
Wind turbine hub height	180	Metres
Tower design (* delete as required)	* Tubular	

Comments

Are there any details or uncertainties that it may be helpful to add?

The parameters listed above are maximum designs parameters. The as built windfarm would not have the maximum number of turbines (40) with the maximum rotor diameter and hub height dimensions as using larger turbines would allow us to reduce the number of turbines required. These values have been taken from the Rochdale Envelope for the Project.

Turbine Locations	
Please provide as much information as you can. The position of every machine if available, the site boundary if not. **Copy this page as necessary** to account for all turbines or boundary points	
Wind farm **Name & Address:**	**At present the turbine locations are unknown. Turbine locations will be determined through a combination of further site investigation and detailed design. The coordinates for the corner points of the Red Line Boundary awarded to the Project by The Crown Estate within which the turbines will be located has been provided in addition to this proforma.**

Turbine no.						
Grid Reference			100 km square letter(s) identifier			
Easting (10 m)			Northing (10 m)			
	Degrees		Minutes		Seconds	
Latitude						
Longitude						
Turbine no.						
Grid Reference			100 km square letter(s) identifier			
Easting (10 m)			Northing (10 m)			
	Degrees		Minutes		Seconds	
Latitude						
Longitude						
Turbine no.						
Grid Reference			100 km square letter(s) identifier			
Easting (10 m)			Northing (10 m)			
	Degrees		Minutes		Seconds	
Latitude						
Longitude						

Turbine no.													
Grid Reference							100 km square letter(s) identifier						
Easting (10 m)							Northing (10 m)						
	Degrees						Minutes			Seconds			
Latitude													
Longitude													
Turbine no.													
Grid Reference							100 km square letter(s) identifier						
Easting (10 m)							Northing (10 m)						
	Degrees						Minutes			Seconds			
Latitude													
Longitude													
Turbine no.													
Grid Reference							100 km square letter(s) identifier						
Easting (10 m)							Northing (10 m)						
	Degrees						Minutes			Seconds			
Latitude													
Longitude													
Turbine no.													
Grid Reference							100 km square letter(s) identifier						
Easting (10 m)							Northing (10 m)						
	Degrees						Minutes			Seconds			
Latitude													
Longitude													
Turbine no.													
Grid Reference							100 km square letter(s) identifier						
Easting (10 m)							Northing (10 m)						
	Degrees						Minutes			Seconds			
Latitude													
Longitude													

Coordinates of RLB:

Point	Northing	Easting	Latitude	Longitude	DDLat	DDLon
1	441341.28	288186.8	53° 51' 21.71852246" N	003° 42' 00.58034870" W	53.856033	-3.700161
2	438055.84	296610.46	53° 49' 41.72632415" N	003° 34' 15.69328250" W	53.828257	-3.571026
3	438055.84	301505.91	53° 49' 45.14946401" N	003° 29' 48.00165239" W	53.829208	-3.496667
4	429761	301505.86	53° 45' 16.81574599" N	003° 29' 38.45887521" W	53.754671	-3.494016
5	429419.68	294420.27	53° 45' 00.78000304" N	003° 36' 04.80000074" W	53.750217	-3.601333
6	435176.41	285513.72	53° 48' 00.21624123" N	003° 44' 18.56553397" W	53.80006	-3.73849
7	435408.65	285614.68	53° 48' 07.80825920" N	003° 44' 13.35969447" W	53.802169	-3.737044

Parameters:

Max Hub Height (above HAT): 180m

Max Rotor diameter: 300m

Max Number of turbines: 40

Project Update meeting with Ports - Morecambe Offshore Wind Farm

Date: 10/03/2022

Time: 16:00 – 17:00
Location: Online meeting

Meeting called by:	NASH Maritime (NM)	**Type of meeting:**	Online meeting
Facilitator:	Ed Rogers (NM)	**Note taker:**	R Marlow (NM)
Attendees:	As below	**Apologies:**	

Organisation:

Peel Ports (PP)
- William Barker (WB) – Senior Manager, Marine Operations

Associated British Ports (ABP)
- Andy Reay (AR) – Group Head of Commercial (Offshore Wind)

Isle of Man Harbours and Coastguard (IoM)
- Emma Rowan (ERo) – Representative from Department of Infrastructure

Flotation Energy (FE)
- Kirstine Wood (KW) – Stakeholder Engagement Lead
- Archie Fowden (AF) – Offshore Consenter
- Paul Boath (PB) – Lead Engineer

NASH Maritime (NM)
- Ed Rogers (ER) - Shipping and Navigation - Project Director
- Rich Marlow (RM) - Shipping and Navigation - Project Manager

Agenda

1. Overview of the Morecambe Offshore Windfarm and Scoping Report
2. Identification of key impacts from a Ports perspective
3. Agree way forward for NRA assessment methodology
4. Understand how best to engage with Ports going forwards

Supporting presentation: FLO-MOR-PPT-20220310-Ports

Minutes

1. Overview of the Morecambe Offshore Windfarm and approach to Scoping

KW talked through slides 4-9 of the presentation providing an overview of the Morecambe Offshore Windfarm Project.

Due to the delayed Offshore Transmission Network Review (OTNR) Holistic Network Design (HND); the Project does not have a confirmed grid connection point or connection date. It is unlikely a grid connection will be offered until at least July 2022. For this reason, the Project originally planned to release a scoping report for the windfarm only site in February 2022. However release of the report has now been delayed.

2. Scope & Schedule

ER ran through the initial shipping and navigation scope and schedule, confirming that the winter vessel traffic survey had been completed. **ER** noted that the survey did experience weather downtime due to the February storms, although 14 days in total had been collected for AIS, radar and visual means.

ER confirmed that an additional early scope of work had been identified, including early stakeholder engagement, which had commenced. This consultation includes ferry operators, Chamber of Shipping, MoD, Maritime & Coastguard Agency and Trinity House (which have been completed), with RNLI, RYA and Health & Safety Executive scheduled.

Following the ferries consultation, NASH received passage plans for key routes passing near to or through the Project. **ER** confirmed that NASH are currently using these alongside 1 year of AIS data from 2019 to help identify issues that will need to be addressed.

3. Key Issues

ER asked the Ports what they considered to be the key issues in the area. **WB** stated that the Project needs to consider the impacts of Morgan/Mona windfarms and also the Isle of Man windfarm. **ER** confirmed that NASH will assess the cumulative impacts of all projects, suggesting the biggest challenge will be to Stena Line in terms of impact to services. **ERo** confirmed that IoM can provide the Project with the shapefile of the Isle of Man wind farm. This has been recorded as **Action 1**.

ERo asked whether bad weather routes from the Isle of Man Steam Packet had been plotted. **ER** noted that vessel track analysis had been undertaken in GIS and adverse weather routes were evident to the west of the Project.

ER ran through slides 13-20 providing an overview of vessel traffic by vessel type and by ferry operators Stena Line, Steam Packet and Sea Truck. **ER** commented that the Project area is complex and made more complex by Morgan and Mona. The area is dense in terms of vessel traffic activity with various vessel routing schemes and existing infrastructure present in and around the surrounding area.

ER confirmed that one Stena Line route between Liverpool and Belfast passes through the Project, and another passes the west. **ER** noted that NASH is establishing reasons for the trajectory of these two routes, which could be weather related. Two high speed Steam Packet routes between Liverpool and Douglas pass the west of the Project. Vessel traffic analysis illustrates that tracks intersect through the Project on one of the routes. Sea Truck routes pass north and south of the Project. However, **ER** acknowledged that the key issue to be assessed is the cumulative effects of the Project with Morgan/Mona and the implications for future passage planning.

ER provided an overview of other vessel types. Two commercial routes pass through the Project in different directions, including a reasonable number of cargo vessels, including two regular runners. **ER** commented on the low levels of fishing activity but emphasised that the winter vessel traffic survey picked up scallop dredgers to the south of the Project. **ER** confirmed the survey did not pick up any recreational traffic, indicating the area is not used for recreation but rather transiting through the site.

Tug and service craft are present in the area supporting oil and gas platform activities. **ER** noted that future activity is likely to be localised related to the scheduled decommissioning of the platforms. **WB** noted the potential for vessel traffic activity related to potential carbon storage projects, confirming that **PP** are consulting with ENI on this. **PB** confirmed that the Project are aware of this and are also reviewing how long oil and gas operators will be operating in the area. **ER** reaffirmed that the Project will consider these activities to ensure the cumulative future baseline is considered.

PB confirmed that the Project will also have vessels going out to the windfarm. **WB** questioned which port they would be departing from. **PB** responded that this was unknown at present but this was a point of investigation during 2022. The Project is speaking to ports to understand how the operation will work.

ERo commented on the potential impacts to radar or airports and stated that she could act as a point of contact and facilitate any discussion required as they operate under the same organisation. **ERo** further commented on impacts, stating the key for IoM is the impact to freight, cargo and passenger services.

WB noted that with north-westerly winds, vessels board and land pilots off Douglas to shelter from conditions. **ERo** agreed, stating the Project must ensure access to this sheltering area is maintained and HM Coastguard and helicopter operations are not impacted. **ER** confirmed that post-DCO application, and emergency response plan will be developed.

4. <u>Next steps</u>

ER ran through the latest scope and schedule for the NRA, summer survey and consultation. **ER** confirmed that a commercial and safety shipping assessment has also been proposed.

ER asked if the ports were happy to be consulted as a group of ports during future consultations. **AR** and **WB** confirmed this. **ERo** also confirmed, adding if a specific harbour representative is required for specific issues, then that can be arranged.

WB suggested it may be worth contacting Glasson Dock at Port of Lancaster for consultation to determine views on the Project and key impacts. The main operator in the port is Glasson Grain Ltd, using a WS Mezeron vessel.

Actions

Ref	Action	Whom	When	Progress	Status
1	Contact IoM to request Isle of Man windfarm shapefile	NASH Maritime		In progress	

Project Update meeting with Royal Yachting Association - Morecambe Offshore Wind Farm

Date: 12/05/2022

Time: 13:00 – 13:20
Location: Online meeting

Meeting called by:	NASH Maritime (NM)	**Type of meeting:**	Online meeting
Facilitator:	Ed Rogers (NM)	**Note taker:**	Rachel Watson (FE)
Attendees:	As below	**Apologies:**	Rich Marlow, Kirstine Wood, Archie Fowden

Organisation:

Royal Yachting Association (RYA)
- Richard Hill (RH) – Planning and Environment Officer

Flotation Energy (FE)
- Rachel Watson (RW) – Consents Lead, Morecambe Offshore Windfarm

NASH Maritime (NM)
- Ed Rogers (ER) - Shipping and Navigation - Project Director

Agenda

1. Overview of the Morecambe Offshore Windfarm and Scoping Report
2. Agree specification of Navigation Risk Assessment (NRA)
3. Identify any recreational concerns

Supporting presentation: FLO-MOR-PPT-20220412-RYA

Minutes

1. Overview of the Morecambe Offshore Windfarm and approach to Scoping

FE and **NM** talked through the presentation providing an overview of the Morecambe Offshore Windfarm Project.

Due to the delayed Offshore Transmission Network Review (OTNR) Holistic Network Design (HND); the Project does not have a confirmed grid connection point or connection date. It is unlikely a grid connection will be offered until at least July 2022. For this reason, the Project originally planned to release a scoping report for the windfarm only site in February 2022. However release of the report has now been delayed.

2. Scope & Schedule

ER ran through the initial shipping and navigation scope and schedule, confirming that the winter vessel traffic survey had been completed.

ER confirmed that an additional early scope of work had been identified, including early stakeholder engagement, which commenced Feb-22. This consultation included ferry operators, Chamber of Shipping, MoD, Maritime & Coastguard Agency and Trinity House.

3. Key Issues

ER asked **RH** what he considered to be the key issues in the area in relation to recreation craft.

RH noted the timing of the summer survey, and that **RYA** considers mid-July to mid-August as optimum period as organised recreational events (e.g. racing and cruising activities/rallies) tend to decline after this. **RH** noted that the planned survey for Morecambe, was within the RYA optimum period, but is towards the end of this period, so delays to the survey should be avoided where possible. In order to mitigate this, **RH** noted that the project could benchmark survey data with pre-COVID AIS data to ascertain recreational craft seasonality (this could be undertaken on MMO AIS data). **ER** agreed with this approach and noted that the project had processed Pre-COVID full fidelity AIS data from 2019 which will also be used to inform recreational use including seasonality in the area.

ER stated that other stakeholders had identified cumulative impacts on navigation as the main initial concern. **RH** agreed and highlighted the need to consider Morgan/Mona/Morecambe together, and in particular impacts on recreational craft, ferry routes and increase in space conflict with between maritime users. **ER** acknowledged this and confirmed the Project is establishing a working relationship with the Morgan/Mona projects to allow a Cumulative Impact Assessment on regional scale. **RH** stated the need to ensure that cumulative impacts are covered in the project NRAs.

ER ran through the data presentation plots. **RH** noted that the recreational use data maps based on RYA Coastal Atlas shows uses different symbology (colours) to the **RYA** symbology/colours and that the **RYA** are about to update data agreements and are contemplating putting in the requirements that the key symbology used is the same as **RYA. ER** explained this due to the propriety nature of the supplied files from RYA, which require a ESRI GIS license to identify the symbology and data ranges for different levels of recreational usage. **ER** suggested that if the RYA data agreement is updated, then it could include a details of RYA data classification levels. For transparency, RYA recreational craft classification is now also included in the presentation as a separate slide.

RH confirmed **RYA** is a non-statutory consultee for PEIR and may not attend consultation events unless the Project think they are required. **RH** confirmed that **RYA** will review the Scoping report to inform attendance requirement.

RH advised to add recreational sailing clubs as potential consultees in the Scoping report. **RH** recommended overlaying **RYA** clubs and facilities data layer from the RYA coastal atlas to help identify clubs and offered to assist if needed. Suggested clubs in the following locations include:

- Whitehaven routes
- Morecambe Bay
- Liverpool
- Clubs associated with recreational crossing to IOM and North Wales also highlighted. **RH** detailed these are usually small craft not equipped with AIS. **ER** informed that an indication on these vessel types transiting the area will be determined from the summer survey.

RH suggest low use AIS area in the GIS density plot does not necessarily mean low use recreational area. Although the Project area is not listed as high use, there is a general boating area immediately to the NE of the Project which does come out to within about 10km of the site.

RH highlighted that south-eastern point of the Project is a moderately used area for recreational craft and it would be interesting to further understand recreational use in the area. **ER** noted this and agreed it would be investigated in the NRA.

4. Next steps

ER summarised latest scope and schedule for the NRA, summer survey and consultation. **ER** confirmed that a commercial and safety shipping assessment has also been proposed.

Actions

Ref	Action	Whom	When	Progress	Status

MINUTES OF MEETING

Security Classification:
CONFIDENTIAL

Partners in UK offshore wind

MOM Number: Morgan_Mona_OWF_MNEF_20211110_Meeting_Minutes_R02-00 **REV. No.:** R02-00

MOM Subject: Morgan & Mona OWF, Irish Sea: Maritime Navigation Engagement Forum (MNEF)

MINUTES OF MEETING

MEETING DATE: 10-Nov-2021

MEETING LOCATION: Microsoft Teams

RECORDED BY: Claire Conning

ISSUED BY: Jamie Holmes

PERSONS PRESENT:

See: Member and Attendee List: 'Morgan_Mona_OWF_MNEF_20211110_Members_Attendees_R02-00.pdf'

DISTRIBUTION:

See: Member and Attendee List: 'Morgan_Mona_OWF_MNEF_20211110_Members_Attendees_R02-00.pdf'

ATTACHMENTS:

1. Member and Attendee List: 'Morgan_Mona_OWF_MNEF_20211110_Members_Attendees_R02-00.pdf'
2. Slide Pack: 'Morgan_Mona_OWF_MNEF_Slide_Pack_20211110_R01-00'
3. MNEF Terms of Reference: 'Morgan__Mona_Maritime_Navigation_Engagement_Forum_ToR_Rev02.pdf'

MEETING AGENDA:

- Introductions
- About the Projects:
  - The Team
  - The Constraints
  - The Development Process
    - Indicative timeline and programmes for shipping & navigation
    - Consent process
    - Projects development/design to date
- Community and Maritime Engagement
- About the MNEF
  - Purpose and ToR
  - Administration and logistics
  - Indicative timeline and progression of the agenda
- Roadmap
  - Project datasets and data collection
  - Work to inform projects development
- Summary

<table>
<tr><th>ITEM NO:</th><th>DISCUSSION ITEM:</th><th>Respon sible party</th><th>Date</th></tr>
<tr><td>1.</td><td>Disclaimer (slide 2 of attached slide pack), Introductions and Protocols (slide 3)

ID: Gave overview of disclaimer.

JH: Led introductions for all attendees and gave overview of MNEF meeting protocols.

ID and JH: Requested all members/attendees to confirm sharing of email address within forum and on MNEF business. JH will send email to all and ask that all respond</td><td>All</td><td>Dec-2021</td></tr>
<tr><td>2.</td><td>Objective and Agenda (slides 4 & 5)

JH: Outlined the objective of this initial Maritime Navigation Engagement Forum (MNEF) meeting is to introduce the Projects and the MNEF.</td><td></td><td></td></tr>
<tr><td>3.</td><td>Projects Overview (slides 6 & 7)
RH: Introduced the projects and delivery teams (slide 6) with key points as follows:
• bp and its partner EnBW are preferred bidders on the two 60-year leases in UK Offshore Wind Round 4 for Morgan and Mona in East Irish Sea.
• ESIA Delivery Team:
– RPS | ESIA lead
– NASH Maritime (NASH) | Shipping & Navigation
JH: Introduced NASH explaining personnel have wide ranging background in assessments for maritime and offshore energy projects and (on request from KT) confirmed this includes Master Mariners and Harbourmasters with practical navigation and operation backgrounds. Further information on some of the NASH Maritime personnel is available at www.nashmaritime.com and (as requested in confirmation by KT) includes personnel with seagoing experience and shipping and navigation assessment experience.
KT: Asked NASH Maritime to confirm that they are employed by the developers and their cost/fees is paid by them (developer). NASH Maritime confirmed that they have been contracted by RPS, the lead ESIA consultants, who in turn have been contracted by the developers to prepare the ESIA for the projects. RPS/NASH fees are paid for by the developer.
AE: Noted a number of issues were raised by the ferry user groups for the Celtic Array project and recommended that relevant information from that project and the stakeholders are applicable to this project and should be considered.
ID: Provided overview of key constraints being considered in the development of the projects (slide 7) and that, from a shipping perspective, these need to be drawn together to meet the needs of users and requirements on safety:
– Maritime safety
– Navigation
– Commercial fisheries
– Aviation and radar
– Engineering
– Ecological
– Commercial
SS: Queried the location of projects in relation to navigation features and specifically the distance from the Conwy Fields installations?
JH: Explained there are more detailed plots, with charts, later in the Slide Pack showing the projects in context with navigation features. [Post meeting note: the Conwy platform is 1nm to the east of the Mona bidding area boundary].</td><td></td><td></td></tr>
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	AE: Queried how the Morgan and Mona areas were originally selected and whether ferry routes were taken into consideration during this initial decision? **ID:** Initial areas for Round 4 were determined by The Crown Estate and based on a number of factors, although navigation routes was not one of them and it is the responsibility of project developers to consider this. Maritime safety is also a key issue. **AE:** Stated that the commercial impact of the projects on ferry services is important and that navigational safety and commercial viability should be equally high priorities. **ID:** Reassured **AE** that this point is fully understood. The primary focus of the forum is navigational safety; however, navigational safety and commercial viability are not divorced from each other. There will be further individual and group sessions regarding commercial viability with agreements made on bilateral arrangements.		
4.	**Project Timeline (slides 8, 9 and 10)** **AB:** Introduced the indicative projects timeline **(slide 8)** and for Mona **(slide 9)** and Morgan **(slide 10)**. **JH:** Noted that vessel traffic surveys are scheduled Nov/Dec 2021, and summer 2022 for a winter and summer assessment respectively. **JH:** Stated that it is the intention to include as much data in the PEIR as possible, to minimise uncertainty in the assessment. **KT:** Queried whether the marine vessel traffic survey will take into account COVID-19 impact on passenger services **JH:** Confirmed that NASH have proposed to consider impacts on ferry services from COVID-19 through supplementing the marine vessel traffic survey with a range of longer term AIS datasets pre (and post) COVID-19. NASH raised this point with the MCA (when meeting them in Oct-2021 to specify the marine vessel traffic survey requirements).		
5.	**Project Design and Refinement (slide 11)** **ID:** Introduced the Scoping boundaries for both projects (the boundary on which Scoping will be undertaken) and the key features (Generation Assets and Transmission Assets). Noted that: - Mona Scoping boundary has been reduced in the north from the original bidding area with a 3nm gap between both project boundaries. - The project team is currently in the early stages of reviewing baseline navigation routes in the vicinity of the project areas. - The number and layout of wind turbines and other infrastructure is being progressed. - The project team will liaise with stakeholders with regards to the maritime aspects of the designs and its constraints. **AE:** Queried the basis of how the size and position of the Scoping boundaries were decided and in particular the space between both projects. **ID:** Explained a combination of factors were considered, based around the key constraints outlined in **slide 7**. There is also an ongoing review of cumulative considerations, including the relationship of the other Round 4 Project and other offshore developments.		
6.	**Community and maritime engagement (slides 13 & 14)** **ID:** Explained that stakeholder engagement is taken very seriously and outlined what stakeholders can expect from the project team **(slide 13)** and the principles for stakeholder engagement:		

	• Open - transparent principles. • Constructive and collaborative - listening to stakeholders and engaging with respect. • Solutions focused - working together to find mutually acceptable solutions despite differing interests. • The sharing of documents at each stage and the opportunity for working groups focussed on specific issues. **ID:** Summarised stakeholder engagement timeline **(slide 14)** and emphasised that there will be open lines of communication between the project team and stakeholders.		
7.	**Purpose of MNEF and ToR (slides 16 & 17)** **JH:** Noted that the MNEF ToR has been issued to all in the initial contact with organisations (and will be re-circulated with these minutes). The purpose of the MNEF is as a platform to exchange information, knowledge and experience that will enable marine developers, and relevant shipping & navigation (S&N) stakeholders to co-exist in the marine environment. Specific focus on: • Risk to safety of marine operations and navigation • Impact on marine operations and navigation The MNEF aims to ensure that the views and needs of relevant S&N stakeholders and marine developers are discussed and considered. MNEF occurs approx. quarterly (over 2 years) with whole forum events. Issue Specific Stakeholder Workshops (ISSW) will take place on a case-by-case basis and will include relevant user groups/users when there are concerns regarding specific project matters. Additionally, alongside the MNEF, the Navigation Risk Assessment (NRA) will involve consultation with key users and HAZID workshops.		
8.	**Membership (slide 18)** See attached Attendee list (as run through during introductions) with key user groups and organisations identified.		
9.	**Administration and Logistics (slide 19 & 20)** **JH:** Outlined administration and logistics **(slide 19)**. NASH will facilitate MNEF meetings and act as secretariat – it is important that all stakeholders bring their issues to the forums and any relevant supporting information. ISSW will directly pick up matters with specific user groups. **JH** encouraged the group to send comments via the project email address. **JH:** Summarised that the indicative timeline and agenda evolution will be maintained on a periodic basis **(slide 20)** and that NASH will report back to stakeholders on this.		
10.	**MNEF summary (slide 21)** **JH:** Opened the floor to questions. **KT:** Referred to wording within The Electricity Act 1989 – Section 36B – 'Duties in relation to navigation'. **JH** noted this and commented that a range of Acts, guidance and policy documents will be considered by the developers [post meeting note: We would note that this provision only applies to decisions on offshore energy projects made under the Electricity Act 1989 and not to Nationally Significant Infrastructure Projects (NSIPs) which are determined under the Planning Act 2008; the relevant policy provisions for NSIP projects in relation to shipping and navigation are set out in National Policy Statement (NPS) EN-3 Section 2.33]. *KT reply to post minute note: Both Electricity 1989 and Planning*		

	2008 Acts are considered in relation to renewable energy installations and where the Secretary of State consider the consents submitted. **KT:** Noted that MGN543 was replaced by MGN654 in 2021. **NS** and **JH** confirmed this and that the project will be assessed in accordance with MGN654. **JH** confirmed that NASH have undertaken a number of assessments against the updated guidance. **KT:** Asked if the developers were able to disclose the value of the project: **RH:** Explained this this isn't currently possible. The developers are in the early stages of determining the value of the project and therefore do not have exact numbers yet. Furthermore, working with The Crown Estate means commercial information cannot be divulged. **AE:** Asked whether the project is bound to providing a certain amount of GW? **RH**: Confirmed that 1.5GW (per project) is the expectation from The Crown Estate but there is future opportunity to adjust this. The developer will be working alongside government bodies and stakeholders to determine what array design works best. Future changes in technology are also considered including what the largest turbine size will be available at the time of installation. **AE:** Queried whether larger turbines mean having less turbines to reach the goal output, resulting in a smaller wind farm area? **RH:** Explained that all possible designs need to be modelled before this can be decided. There are a number of other factors that affect the number and positioning of turbines required, such as seafloor/subseafloor conditions which play a significant role in where turbines can be placed. **AE:** Queried whether floating turbines in deeper waters been considered as an alternative. **RH:** Explained that bp and EnBW can only bid on areas identified by The Crown Estate in Round 4 and the option of floating wind turbines in deeper waters was not offered within the bidding round. Additionally, floating technology is comparatively young in renewables compared to fixed bottom technology, and has not been developed at this scale to date.		
11.	**Shipping and Navigation Roadmap (slides 23 and 24)** **AB** and **JH:** Explained that a Shipping & Navigation Roadmap will be developed to document discussions and agreement between Applicant and key stakeholders in relation to the information that will be prepared to support the S&N assessment of the ESIA. **AB:** Explained the shipping and navigation roadmap document sits alongside the MNEF meetings and records all agreements and disagreements. It is a live document that will be maintained and circulated before being submitted with the ESIA. **JH:** Explained that, although the work is at very early stages, it would be helpful to outline the project datasets and planned work at this stage at a high level.		
12.	**Data Sources, collection and analysis (slide 25 & 26)** **JH:** Outlined identified data sources **(slide 25)** with respect to key shipping and navigation receptors. Through use of longer duration AIS datasets [see also minutes Item 4] the project will take into consideration COVID and other historic influencing factors on trends such as change in shipping due to Brexit. **JH:** NASH would welcome comments on likely future baseline and also invited the forum to highlight any other datasets. Group discussion held on data sources and determining the existing/future baseline.		

KT: Requested the 2020 data be omitted from analysis as ferry traffic during 2020 was significantly impacted by COVID-19.

- **JH:** Noted that the project was mindful of the representativeness of 2020 data (and some 2021 data) and will take this comment onboard noting these datasets will still provide the project with useful information on the traffic baseline (and variances) for a range of other users.

- **NS:** Noted that this had been discussed during early meetings with the MCA and that, with the PEIR due in 2023 [post meeting note: Morgan PEIR due Feb-2023 and Mona due Nov-2022] and ESIA the following year, the MCA consider there is also opportunity to supplement with data from 2021 and 2022 for benchmarking purposes.

SC: Queried about gathering data on future activity that isn't included in historic or recent data.

- **JH** explained NASH will be examining the existing baseline activity and future baseline activity within the assessment (as per guidance). The future baseline draws upon a range of sources including published shipping and port industry projected trends and consulting with stakeholders (e.g. ferry operators) to establish future activity and changes. In that regard, the project welcomes any supporting information that stakeholders can provide to the project on future activity/ traffic trends in their respective sector for consideration.

AE: Noted that, post Brexit, routes to Northern Ireland now run at capacity with numbers set to further increase. It is projected that the number of routes to Ireland may reduce.

- **JH:** Thanked **AE** for the comment and stated that NASH are keen to engage with stakeholders on this kind of information. This specific scenario will be picked up in a ferry user group.

SS: Queried whether a seafloor survey has been conducted of the wind farm bidding area?

- **AB:** Explained a geophysical survey and shallow geotechnical survey were conducted this summer and further surveys are planned for 2022.

- **RH:** Explained that a bathymetry survey is currently being conducted and thanked the group for cooperating with the operations whilst this was taking place.

JH: Outlined vessel traffic survey data collection (**slide 26**) with a Nov/Dec 2021 survey commencing imminently and plans being made for a summer 2022 survey. **Slide 27** also presented to show planned shipping and navigation assessment activities and an example of data showing raw vessel track lines for 12 months of 2019 (note - for all vessels with AIS).

ID: Noted that the projects are still early on in the design phase and there is a lot of time for discussion and consultation. At all phases, there will be different groups working in parallel to frequently inform the design team on how to work through the key constraints, and this will all be regularly reported back to the forum.

Group discussion held on basis of assessment and impacts:

AE: Queried the size of the project areas in sqkm.

	ID: Morgan bidding area is currently 300 sqkm and Mona bidding area was 500 sqkm although this has been reduced slightly as discussed above. **KT:** Explained that ferries may have to deviate around the wind farms and queried whether adverse weather routes are being planned for/taken into consideration? **JH** confirmed that NASH will be considering adverse weather routes (as per guidance) and initially seeking to analyse these through analysis/identifying them within long-term AIS datasets for known routes/vessels and through consultation with specific user stakeholders. **JO:** Queried whether the impact of both projects will be considered together, or separately. **AB:** Explained a cumulative impact assessment of Morgan and Mona plus other surrounding Round 4/development sites, will be taking place. **AE:** Queried why there are two separate projects rather than one project. **RH:** Explained the areas have been leased as two separate areas hence they are two separate projects. However, they significantly benefit from being developed in one integrated programme because the cumulative effects can be identified and mitigated. **SS:** Queried whether, with all the parameters taken into consideration, will the proposed datasets give a sufficient idea of the scoping areas? **JH:** explained that the project considers these proposed datasets will collectively give a good basis to understand both the Scoping areas and the wider project area and underpin the assessments. **NS:** Confirmed, as the MCA representative, that this is in accordance with MCA guidelines. **SS:** Queried where the best regions within the bidding areas to put turbines are located? **RH:** Explained this is subject to assessment and there are currently metocean buoys being deployed and FLiDAR buoys will be deployed at the end of the year to measure wind data. **KT:** Noted the AIS plot (**slide 27**) shows clearly established navigation routes through Morgan and Mona. How does this reconcile with the 1989 Act? **JH:** More detailed AIS data analysis is currently taking place to determine the baseline vessels and routes, define the nature of their operation and timetables, in order to develop a better understanding of how they will be impacted. **KT:** Queried whether vessel operators will be asked to divert around the scoping areas or if the wind farm designs will be changed? **JH:** Explained that once the baseline is understood, the options available to vessels/routes will be examined including how and where they might divert and the feasibility of doing this in a navigationally safe manner. This will be reviewed together with potential impact on scheduled operations for example (such as turnarounds). Stakeholders, such as ferry operators, will be consulted through this to understand the feasibility of change in scheduled routes.		

	• **NS:** Confirmed that this is in accordance with MCA guidance and that the consequential changes in risk of collision and contact, caused by rerouting vessels to other areas, will need to be fully considered in the NRA. **AE:** Noted that **slide 27** shows five major routes passing through the Morgan and Mona scoping areas which could be adversely affected. **AE** also noted that deviating is not a simple solution for most companies as it has knock-on effects for many factors, such as losing valuable time, having tight turn arounds that don't allow for delays, changes in crew timings/working to crew limitations etc**.** • **JH:** Thanked **AE** for this important point and that these sorts of commercial impacts are key to identify. These will be examined through the assessment and input from stakeholders. Information that stakeholders can provide in understanding these knock-on effects is helpful.		
13.	**Summary** **JH:** Opened the floor to questions and comments. **AE:** Queried that the sites appear large for comparatively few turbines in comparison to other surrounding wind farms. • **NS:** The scoping areas shown define areas of possible wind turbine placement and noted the whole area may not be developed. **AE:** Requested whether a percentage coverage of the area with wind turbines could be provided? • **RH:** Explained this is not possible at this stage in the project. • **AB:** Noted that when developers submit an application, they need to include a range of WTG options to cover current and future technology. Therefore, there will be a range of turbine options within the design envelope. • **ID:** Noted that there is no generic solution to designing a wind farm – trade offs have to be made between the various constraints when deciding where to place the turbines. **KT:** Wished it noted for the minutes that Isle of Man Steam Packet Company have operated for over 192 years and are a lifeline service integral to the commercial and social well-being of the 85,000 inhabitants of the island. **KT** noted they have no room for change if they are still to run at their current capacity. For example, the vessels used (as may also be the case for others) are unable to reach higher speeds to make up for the time lost when deviating around Morgan and/or Mona. **ID:** Responded that these concerns are understood by the project team and that they will heavily influence the decisions that are made when designing the OWF. **NS:** Stated that the issues voiced by **KT** are important to the Examining Authority and are given large weighting in decision making as per the National Policy Statement for Renewable Energy Infrastructure (Post meeting note: NPS EN-3) and in Marine Spatial Planning. **NS:** Commented to the group that the Scoping Reports (March 2022) will be the first opportunity for stakeholders to make formal comments on the proposals (outwith of discussions with the applicant).		

	RH: Thanked all for attendance and participation and asked that extensive feedback is provided by stakeholders at all points of the project and that individual meetings be requested if required. **JH:** Closed the meeting noting that any queries should be directed to the MNEF email address: morganmonamnef@nashmaritime.com.		

MINUTES OF MEETING

Security Classification:
CONFIDENTIAL

Partners in UK offshore wind

MOM Number:	Morgan_Mona_OWF_MNEF_20220506_Meeting_Minutes_	**REV. No.:**	R01-00
MOM Subject:	Morgan & Mona OWF, Irish Sea: Maritime Navigation Engagement Forum (MNEF)		

MINUTES OF MEETING

MEETING DATE:	06-May-2022
MEETING LOCATION:	Microsoft Teams
RECORDED BY:	Andrew Rawson (NASH Maritime)
ISSUED BY:	Jamie Holmes (NASH Maritime)

PERSONS PRESENT:

See: Member and Attendee List: 'Morgan_Mona_OWF_MNEF_20220605_Members_Attendees_R01-00.pdf'

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ATTACHMENTS:

1. Member and Attendee List: 'Morgan_Mona_OWF_MNEF_20220605_Members_Attendees_R01-00.pdf'
2. Slide Pack: 'Morgan_Mona_OWF_MNEF_Slide_Pack_20220506_R01-00'
3. MNEF Terms of Reference: 'Morgan__Mona_Maritime_Navigation_Engagement_Forum_ToR_Rev02.pdf'

MEETING AGENDA:

- Introductions
- Review of Key Themes from Previous Meeting
- About the Projects and Project Update:
    - The Team
    - The Programme
    - Scoping Review
- Project Datasets and Data Collection:
    - Desktop Data
    - Vessel Traffic Survey
- Assessment of Impact on Commercial Ferry Operators
- Navigation Risk Assessment
- Summary

ITEM NO:	DISCUSSION ITEM:	Responsible party	Date
1.	**Introductions (Slide 1-5)** **JJH** led the introductions and outlined the meeting protocols. The agenda and objectives of the meeting were reviewed. JJH confirmed meeting minutes will be issued together with the slide pack (unchanged from the slide pack issued prior to the meeting). **JJH** reminded all members/attendees to opt in for sharing of contact details. As not all members have opted in, group MNEF correspondence and meeting invites will continue without sharing details.	**All**	**May-22**
2.	**Review of Key Themes from Previous Meeting (Slide 6)** **JJH** summarised the key themes and feedback arising from the MNEF 1 (held on 10-Nov-2021): – Site selection process with The Crown Estate (TCE): **JJH** noted that TCE has put the emphasis on developers to progress the sites post-bid as is currently being undertaken. – Issues raised on previous projects: **JJH** noted that stakeholders had been involved in previous Offshore Wind Farm (OWF) projects in the area and the project has sought to access this information to take this into account. – Importance of considering both safety and commercial impacts. – Open, constructive and collaborative consultation approach, to which **ID** reiterated the project's commitment to this. – Addressing impact of COVID on data collection (noting datasets are being discussed later in this meeting). – Potential commercial and safety impacts on Irish Sea commercial ferry operators had been understood as key theme (particularly in relation to NPS EN-3) and **JJH** noted that work had progressed on this (including engagement. **AE** added that cumulative impact had also been raised including concern in relation to future OWF projects - referring specifically to recent announcements by Boris Johnson on potential floating offshore wind farms in the Irish Sea that could impact ferry routes. **GV** explained that any further OWF plans beyond Round 4 would be subject to a new Strategic Environmental Assessment (which would consider cumulative impact) and a new tendering round. **AE** raised concern that future OWF leasing rounds may not take account of future ferry services noting that they procure and build ferries with a 30 year design life and are therefore concerned about long term impacts. **AE** added that other OWF's are proposed on the other side of the Irish Sea (such as Clogherhead). **JJH** summarised key activities carried out by the project since the last MNEF including meetings with MCA, Chamber of Shipping (CoS) and ferry companies (individually and combined), spending time with ferry masters, engaging with RYA, and engaging with CoS on other commercial users.		
3.	**About the Projects and Project Updates (Slide 7-10)** **JJH** noted that the project description in Slide 8 is unchanged from MNEF 1, but has been included for reference. **AB** provided an overview and update of the Scoping activities as part of the EIA activities. The Mona Scoping Report was submitted to The Planning Inspectorate and Natural Resources Wales (NRW) on 05-May-2022, and is available on The Planning Inspectorate's website. **AB** explained that The Planning Inspectorate		

	and NRW are responsible for consulting on the Scoping Report and will be preparing a Scoping Opinion. **AB** noted that consultation feedback can also be provided through this MNEF and will be addressed in the Preliminary Environmental Information Report (PEIR) and EIA. *Meeting Postscript: note that for consultation on the Scoping Report, stakeholders should respond directly to The Planning Inspectorate and NRW for responses to be included in the respective Scoping Opinions*. **AB** noted that the Scoping Report is structured into four parts. **AB** explained that the timescales for submission of the Morgan Scoping Report are to be confirmed pending the outcome of discussions with National Grid on the ongoing Offshore Transmission Network Review (OTNR) process. **RM** asked when the Scoping Report will be made available and if there will be any coordination between The Planning Inspectorate and NRW, i.e. do stakeholders need to respond to both parties. **AB** explained that the Scoping Report is available on The Planning Inspectorate's website [**ID** posted a link in the Teams chat: https://infrastructure.planninginspectorate.gov.uk/projects/wales/mona-offshore-wind-farm/?ipcsection=docs]. The Planning Inspectorate has 42 days to prepare a Scoping Opinion, and NRW has 90 days. **AB** noted that The Planning Inspectorate will be consulting on the project as a whole whereas it is anticipated that NRW's consultation will focus on the offshore export cable route only (which overlaps with both Welsh offshore and inshore waters). The project will ask The Planning Inspectorate to confirm to what extent there will be coordination with NRW and confirm back to the MNEF. *Meeting Postscript: The Planning Inspectorate have indicated that consultees should respond to both consultations as they are separate processes and are not coordinated.* Slide 9: **AB** confirmed that the Mona programme is unchanged from that presented at MNEF 1, with PEIR due to be consulted on in Nov-2022 and the application due to be submitted in Oct-2023. The Morgan programme is to be confirmed (as mentioned above) pending the outcome of the OTNR process.		
4.	**Project Datasets (Slides 12-15)** **AR** provided an overview of the key project datasets already collected and planned to be available to support the Navigation Risk Assessment (NRA). **AR** added that the project team continues to welcome any additional data stakeholders consider relevant to the assessment. **RM** noted that incident data for 2010-2020 was insufficient to characterise infrequent incidents. **AR** confirmed that an FOI request was already underway to extend the Marine Accident Investigation Branch (MAIB) data back to the 1992 start date. **RM** offered to facilitate this access if required which was welcomed. **AR** summarised the status of the vessel traffic surveys, with the winter survey completed in Nov/Dec-2021 and the summer planned for Jul 2022. **AE** questioned (with reference to the plot on slide 14) why the survey was located in the north of the Mona area. **AR** explained that the aim was to base the survey vessel approximately at the mid-point of the Mona site, and highlighted that AIS/radar coverage from the vessel extends to the south of the site. **AR** summarised the collected data over the 28 days of radar/AIS tracking. No recreational craft were recorded during the surveys but fishing activity was recorded by radar, particularly to the west of Morgan. **KT** asked for confirmation of the survey period. **AR** explained the survey took place between 21-Nov and 19-Dec-2021. **KT** raised concern that the IoM to Liverpool route is not shown in the plot on slide 15. **AR** explained that the plot shows data captured during the vessel traffic survey period only and the assessment will be based on a combination of datasets including the full 2019 AIS dataset (i.e. not just the vessel traffic survey datasets). **AE** considered that the 'passenger' category would be better described as 'ferries' as this includes freight routes. **AR** noted		

	that this and the NRA will present a much more detailed breakdown by vessel categories (for example the aggregated plot also includes cruise ships). **KT** noted that the Mona and Morgan projects are being submitted separately and to a different timescale. **JJH** explained that despite this a lot of the work is being progressed in parallel. **AB** explained that they are two separate projects and so there will be two separate applications. **KT** asked why the projects are on a different timeline. **AB** explained that this is mainly due to the survey programmes for the marine mammal and bird data collection; two years' data is required to inform the EIA and the Mona survey programme is ahead of the Morgan programme. **AE** was concerned that they would need to comment on the impact of one project without having information on the other project. **GV** explained that the project had intended to submit Scoping Reports for both projects in the same timeframe but this was subject to discussions with National Grid and the OTNR process. **GV** explained that the project is hoping to submit the Scoping Report for Morgan in the next few months but the timescale is to be confirmed. **GV** took an action to review what information can be provided on both projects at future engagements to allow stakeholders to better consider the potential for cumulative effects. **RM** queried how The Planning Inspectorate will determine the projects if they are submitted separately. **GV** explained there is an established process for considering potential cumulative impacts of projects through a tiering system. The same process applied to the Round 3 projects. **KT** raised concern that the separate timelines are tactical. **ID** explained that the two projects were bid independently of each other and there are different energy targets for Morgan and Mona. **ID** emphasised that was not tactical; there are two licence areas subject to separate applications. **GV** added that the projects are sited in different locations, are likely to connect to the grid in different locations and are likely to have different issues. Furthermore, **GV** stated that The Crown Estate Round 4 bidding requirements limited individual project bids to a maximum of 1.5GW. **GV** commented that this situation is no different from many other developers who have a pipeline of projects. **AE** queried what percentage of the sites would need to be filled with wind turbines to meet the generating capacity. **GV** explained that the project needs to go through the EIA process and better understand all stakeholders concerns before the engineering design can be finalised for the application and therefore they could not comment on a percentage at this early stage. **AE** asked where the percentage would fall between 1% and 100%. **ID** explained that the navigation simulations planned for August 2022 would help with understanding the developable area from a safety of navigation perspective. **ID** could not confirm the percentage of the site which would be developed at this stage but considered it would be a higher percentage rather than low percentage.	**GV**	**Sep-22**
5.	**Assessment of impact on commercial ferry operators (Slides 17-19)** **JJH** summarised the impacts highlighted at the previous MNEF including impacts on normal and adverse weather routing, and safety. **JJH** explained that NASH Maritime has since collected additional baseline data (including the winter vessel traffic survey data), engaged with ferry operators and CoS collectively in Feb-2022 and subsequently held individual meetings with ferry operators in Apr-2022 including the project team participating in a ferry transit. **AR** set out the approach to the assessment of impact on commercial ferry operators. This includes a commercial shipping assessment (Task 1) involving review of AIS data to understand routing decisions; a safety assessment (Task 2) involving assessment of corridors, collision risk modelling, and navigation simulations; and engagement with ferry operators (Task 3) to understand current operations and constraints. **AR** explained that this work will feed into the NRA.		

	AR summarised the safety assessment further with reference to Tasks 2A (desktop review), 2B (collision risk modelling) and 2C (navigation simulation) and noted that this work is ongoing. **JJH** highlighted that the project is keen for ferry operators to participate in the navigation simulations. **KT** raised that Isle of Man Steam Packet Company (IoMSPC) are a national shipping line owned by the IoM Government, and there is also a need to assess the impact on the livelihoods of people from IoM. **KT** stated that the IoM depends on these shipping lines and that their vessels are designed for the existing routes. **JJH** noted that this point had been raised at a previous meeting and has been noted by the project. **RM** asked when the results of this work (including the collision risk modelling) will be made available. **JJH** explained that the results would be made available in the following ways: • In the NRA which will be consulted on at the PEIR stage. • In information to be shared with the ferry operators to inform the scope of the navigation simulations planned for late summer. • In material to be shared in advance of the hazard workshops. • At the next MNEF planned for September 2022 to provide an opportunity to feedback on the NRA and the navigation simulations. **KT** asked if NASH received feedback from the ferry masters during the ferry trip. **AR** explained he was one of the NASH personnel on the trip aboard the Ben-my-Chree (Douglas to Heysham on 05-Apr-2022) and explained that the purpose of the trip was to understand navigational decision making (e.g. existing concerns, factors to take into account for routing e.g. passing O&G platforms and other factors) rather than asking questions on potential impacts of the project. **AR** noted that many of these navigation decisions are at the discretion of the master. NASH would continue to welcome feedback from the ferry masters on the projects through the NRA consultation process.		
6.	**Navigation Risk Assessment (Slide 21)** **AR** provided an overview of NRA process, which will identify key hazards for assessment against MCA and IMO guidelines. The assessment will be based on data, and comments from stakeholders through the hazard workshop. The assessment will consider the project alone and cumulatively with other projects. **AE** asked how the project had decided how big the gap between Morgan and Mona should be. **ID** explained that this gap is not set and is being worked on, based on factors including geology, wind turbine spacing, and safe and viable navigation. **AE** asked if the gap is therefore indicative; **ID** confirmed this and explained that the project is working through the design process to decide what area will be developed – this will include the opportunity for ferry operators to participate in navigation simulations. **AE** asked if any work has been carried out on the consequence of a ship collision with a WTG, noting there was a vessel not under command in the Irish Sea recently. **AR** explained that there have been few incidents involving collisions, but referred to a known recent incident in Dutch waters where a tanker drifted during a storm and collided with a transition piece. **AR** explained that there have been simulated studies and NASH will make reference to these in the consequences assessment. **JJH** added that the Scoping Report identifies contact (between a vessel and structure) as a potential hazard which will be assessed within the NRA. **AR** added that NASH would like input from as many stakeholders as possible as part of the hazard workshop; NASH will be circulating invitation letters to MNEF members, and there will be an option to attend either in person or via Microsoft Teams.		

	JJH explained that the navigation simulations with ferry operators are planned for August 2022 (in response to question from **KT**) and NASH will liaise with the ferry companies on timelines and location; **JJH** emphasised the importance of ferry masters attending.	**CH**	**27-May**
7.	**Summary and AOB (Slide 22)** **JJH** summarised planned dates for the next meetings: • MNEF 3 (circa. Sep-2022) following simulations and hazard workshop. • MNEF 4 (circa. Nov/Dec 2022) following submission of PEIR for consultation. **JJH** asked if there were any other queries or comments from attendees. **WB** suggested an assessment is carried out on the availability of tugs in the vicinity of the project, with reference to vessels not under command. **JJH** confirmed this point has been noted. **RM** offered to assist with identifying commercial vessel owners to attend the hazard workshops. **JJH** thanked **RM** for his assistance. **RM** emphasised the value that in-person hazard workshops have in facilitating discussion and selecting a suitable location**. JJH** confirmed this and that there will be an option for attendance in person or via Microsoft Teams.	**JJH**	**May-22**
ACTIONS			
ITEM NO:	**DISCUSSION ITEM**:	**Responsible party**	**Date**
1	All to opt in for contact details sharing.	All	May-22
4	GV to review what information can be provided on both projects at future engagements to allow stakeholders to better consider the potential for cumulative effects..	GV	Sep-22
6	CH to liaise with ferry operators on simulator timelines and locations.	CH	27-May-22
7	JJH to liaise with RM on relevant commercial operators for hazard workshop	JJH	May-22

MINUTES OF MEETING

Security Classification:
CONFIDENTIAL

Partners in UK offshore wind

MOM Number:	MoMoMo_MNEF_20221010_Minutes_R01-00	**REV. No.:**	R01-00
MOM Subject:	Morgan, Mona and Morecambe Maritime Navigation Engagement Forum (MNEF)		

MINUTES OF MEETING

MEETING DATE:	10-Oct-2022
MEETING LOCATION:	Liverpool Holiday Inn / Microsoft Teams
RECORDED BY:	CLC / JJH (NASH Maritime)
ISSUED BY:	JJH (NASH Maritime)

PERSONS PRESENT:

Organisation	Attendee	Role	Initial
RPS	Miriam Knollys	Principal Environmental Consultant – EIA coordinator Morgan and Mona	MK
Royal Haskoning DHV	Rebecca Worbey	Senior Environmental Consultant (Marine) - EIA coordinator Morecambe	RW
Flotation Energy	Kristine Wood	Communications Manager - Morecambe	KW
Bp and EnBW	Gero Vella Ian Duffy (online) Lucy Harper John Davies Miriam Parish (online)	Offshore Consents – Morgan and Mona Head of communications and advocacy – UK offshore Wind Consenting Lead – Morgan and Mona Master Offshore Consents –Morgan and Mona	GV ID LH JD MP
Cruising Association	Nigel Robinson	Representative	NR
IoM Department of Infrastructure	Emma Rowan	Isle of Man Government	ER
Harbour Energy	Alex Morton	Marine and Aviation Global Technical Authority	AM
IoM Steam Packet Company	Robert Hunter Capt Jonathan Palmer Capt Chris Kelly Capt Kane Taha	Marine Manager Master Master Operations Manager	RH JP CK KT
Maritime and Coastguard Agency	Nick Salter Vaughan Jackson	Offshore Renewables Lead, Marine Licensing and Consenting	NS VJ
Peel Ports	Neill Sumner	Deputy Harbour Master / Marine Operations Manager	NSU
Royal Yachting Association	Phil Horton	Environment and Sustainability Manager	PH
Seatruck Ferries	Matt Henderson	Fleet Training Superintendent	MH
Spirit Energy	Denis Utisch		DU

Stena Line	Michael Proctor	Safety & Security Superintendent, Deputy CSO, DP Ports (PMSC)	MP
Tom Watson	Tom Watson		TW
UK Chamber of Shipping	Robert Merrylees	Policy Manager (Safety & Nautical) & Analyst	RM
Kirkcudbright	Douggie White (online)		DW
Trinity House	Capt Trevor Harris (online)	Navigation Manager	TH
NASH Maritime	Jamie Holmes Ed Rogers Claire Conning Sam Anderson Brown	Project Director (Morgan and Mona) Project Director (Morecambe) Maritime Consultant Principal Maritime Consultant	JJH EJR CLC SAB
In addition circa 5 MNEF invitees attended on MS Teams as 'unknown users'			

DISTRIBUTION:

See Persons Present List.

ATTACHMENTS:

1. 21-NASH-0146_MNEF_20221010_R00-01.pdf

MEETING AGENDA:

- Introductions – NASH Maritime
  - To project teams
  - To stakeholders
  - Review key themes from meeting (05-May-2022)
- Project Updates
  - Morgan and Mona Project Updates
    - i. Project Update – bp/EnBW
    - ii. EIA Lead Update – RPS
    - iii. Shipping and Navigation – NASH Maritime
  - Morecambe Project Update – Flotation Energy/Cobra
- Morgan Mona Morecambe Cumulative Assessment (responding to stakeholder feedback)
  - Morgan Morecambe Transmission Assets
  - Background
  - Grid Connections arrangements
  - Consenting strategy
  - Indicative timelines

ITEM NO:	DISCUSSION ITEM:	Responsible party	Date
1.	**Introductions (Slide 1-4)** **JJH** welcomed everyone to the meeting and outlined the meeting protocols. **JJH** explained that this MNEF No. 3 was a shorter format update than usual with an extended MNEF proposed for Nov/Dec-2022. **JJH** requested that questions be taken at the end and confirmed meeting minutes will be issued together with the slide pack following the meeting. **JJH reminded all members/attendees to opt in for sharing of contact details. As not all members have opted in, group MNEF correspondence and meeting invites will continue without sharing details.** **JJH** gave an overview of the objectives and agenda as per the accompanying slide pack (slide 4) noting in particular that this meeting served as an opportunity to introduce the Morecambe OWF project, how the Morgan, Mona and Morecambe projects are being assessed cumulatively and also the Morgan/Morecambe joint transmission assets project. It is intended that the MNEF will, in future, be co-hosted by the Morgan, Mona and Morecambe projects.		
2.	**Background to projects (slides 6&7)** **JJH** provided a brief background of the Morgan, Mona and Morecambe Offshore Wind Farm (OWF) projects, noting that this information has been shared previously. An informative video on the 6 stages of the development consent order (DCO) regime for Nationally Significant Infrastructure Projects (NSIPs) was shared to explain the 6-stage process for NSIP applications (which includes OWFs). The video is available **here** and more information can be found at the National Infrastructure Planning website **here**.		
3.	**Review of key themes from previous meeting (slide 8) and project updates (slide 10)** The previous meeting (MNEF 2) was held on 06-May-2022 and final minutes were issued on 20-May-2022. The key themes arising at MNEF 2 were: 1. Ongoing discussion regarding the cumulative concerns for the 3 proposed East Irish Sea OWF projects 2. Concerns regarding potential future projects beyond The Crown Estate Round 4 leasing round 3. Discussion around stakeholders responding to individual projects on differing individual timescales 4. Impact to commercial ferry operators 5. Importance of considering both safety and commercial impacts on navigation 6. Open, constructive and collaborative consultation approach **JJH** explained that the three projects have started working collaboratively since the last MNEF in order to address items 1 and 3. **GV** summarised the Morgan and Mona Project updates as follows: • The projects are currently investigating the human, physical and biological environments. This includes data collection, analysis and modelling e.g. aerial surveys for birds and marine mammals, physical processes modelling, shipping & navigation simulations and Navigation Risk Assessment. • The current activity aims are to understand the environment in and around Mona and Morgan to better understand how the proposals might impact the existing environment. • The Preliminary Environmental Information Reports (PEIRs) for Morgan and Mona are planned for submission in late Q1 2023.		

	• The applications for Morgan and Mona are planned to be submitted in Q1 2024.		

4.	**Overview of EIA Process and Scoping (slides 11&12)**
	MK summarised the Environmental Impact Assessment (EIA) process (building on the DCO material as shared on slide 7) as follows:
	• The EIA forms the bulk of the pre-application process and is undertaken across all topics where a potential impact has been identified. These topics are set out as individual chapters. Feedback from the scoping report is used to inform the PEIR. The PEIR findings are then presented in the Environmental Statement (ES) which presents the findings of the EIA and is submitted with the DCO application.
	JJH outlined the Scoping Report submission updates by each project:
	• Mona generation and transmission assets:
	  o Submitted: 05-May-22
	  o Scoping Opinion: 15-Jun-2022
	• Morgan generation assets:
	  o Submitted: 15-Jun-2022
	  o Scoping Opinion: 22-Jul-2022
	• Morecambe generation assets *[postscript added here for clarity noting subsequently presented on slide 18]*:
	  o Submitted: 23-Jun-2022
	  o Scoping Opinion: 02-Aug-2022
	• Morgan & Morecambe transmission assets:
	  o Submission due: Nov-2022 tbc		

5.	**Shipping and Navigation Update – Morgan & Mona (slides 13&14)**
	JJH provided an update to the shipping and navigation activities undertaken since the last MNEF as follows:
	• The Vessel Traffic Surveys completed (summer & winter).
	• Ongoing assessment of impact on commercial ferry operators including:
	  o Typical and non-typical (inc. adverse) weather routing
	  o Consideration of safety and commercial impact
	  o Desk based, risk modelling and bridge navigation simulations
	• The Morgan/Mona projects are working collaboratively with Morecambe on the cumulative assessment (noting MNEF 1 & 2 feedback).
	• Key submissions are being prepared for PEIR submission in Q1 2023 namely:
	  o Navigation Risk Assessment (NRA)
	  o Shipping and Navigation chapter
	JJH provided an overview of bridge navigation simulations that took place at HR Wallingford.
	This work was undertaken, with stakeholder participation, to test the viability and safety of ferry transits through areas between the Mona, Morgan and Morecambe. Projects.
	Simulations were attended by ferry masters and officers from IoMSPC, Stena Line and Seatruck, with simulation scenarios agreed in advance. Representative runs were undertaken by the team for P&O.
	Current status (at 30-Sep-2022) is that draft reports are with operators for comment.		

6.	**Morecambe introduction and update (slides 16-19)** **KW** explained that the Morecambe project is at a similar stage to Morgan and Mona and intends to have a similar timeline as per slide 18 – notably: • PEIR Submission in Q1 2023.		

	• ES submission and DCO application in Q1 2024. **EJR** explained that for the Morecambe project, NASH Maritime will be conducting the NRA and RHDHV will be writing the PEIR Shipping and Navigation Chapter. **EJR** summarised the shipping and navigation update for the Morecambe project as follows: • Early stakeholder engagement was undertaken in (Feb-22 to April-22) • Development of Passage Plans using information sourced from ferry operators. • Vessel traffic analysis has been undertaken using AIS data. • The vessel traffic surveys are complete (summer & winter). • Preparation of key submissions for PEIR in Q1 2023.		
7.	**MoMoMo Cumulative Assessment Overview (slide 21)** **JJH** introduced the basis of the Morgan, Mona and Morecambe (MoMoMo) cumulative assessment being undertaken collaboratively by the three projects (slide 21) noting that this took into account the cumulative concerns previously communicated by stakeholders and also sought to ensure a coordinated, consistent and efficient approach.		
8.	**Morgan and Morecambe Transmission assets (slides 23-27)** **KW** noted, with respect to the Morgan and Morecambe Transmission asset that both project teams agree with and support Holistic Network Design Review (HNDR) report conclusions. Therefore, in order to improve the coordination of offshore wind generation connections and transmission networks, Morgan and Morecambe will have a single, coordinated grid connection location at Penwortham, Lancashire (Mona will be connected separately along the north coast of Wales) and hence the combined DCO application for the Morgan and Morecambe Transmission assets (separate to the Generation Assets). Slide 26 provides clarity over which aspects of the project are considered offshore/onshore and generation/transmission assets. It was also noted that the indicative DCO timelines for the Morgan and Morecambe transmission and generation assets are aligned.		
9.	**Summary, questions and comments** **JJH** outlined the confirmed details of the next MNEF are anticipated as follows: • Nov/Dec-2022 • Inclusion of Morecambe Generation Assets • Inclusion of Morgan and Morecambe Transmission Assets **KT** asked where the substations will be located. **GV** explained that Morecambe and Morgan will have individual substations within the generation asset boundary. There is potential for Morgan to have a single offshore booster station platform locations within the transmission corridor and this may be close to the Morecambe generation asset boundary although planning for this is ongoing. **ID** stated that there is an ongoing fishery consultation running in parallel with the other planned project activities. **NS** suggested that there is collaboration and coordination regarding the substation location within array areas and their alignment with the wind turbines. The MCA preference is that platforms are aligned with the turbines. **NS** asked whether Awel Y Mor has been considered in the assessments. **GV** noted that the Awel Y Mor project is much further along in the process than MoMoMo. **JJH** confirmed that all the shipping and navigation assessments are based on Awel Y Mor being in place. **AM** asked when construction is expected to start. **GV** stated that for Morgan and Mona, construction would likely start in 2026 with operation by 2028. Generally, construction starts 2-3 years post consent (with a 4yr construction program as a worst-case scenario). KW confirmed that this timescale is similar for Morecambe. **EJR** stated that the IoM Wind Farm (application previously proposed by DONG Energy [now Orsted] in 2014) is progressing and therefore should be considered		

	alongside the MoMoMo developments. Additionally, there is an IoM hydrocarbon project to be considered that may also impact the MoMoMo projects, specifically Morgan. **GV** noted this and explained that a meeting has been scheduled between Orsted and bp/EnBW in late Oct-2022.		
ACTIONS			
ITEM NO:	**DISCUSSION ITEM**:	**Responsible party**	**Date**

MOM Number:	MoMoMo_MNEF_20230118_ Minutes_R01-00	**REV. No.:**	R01-00
MOM Subject:	Morgan, Mona and Morecambe Maritime Navigation Engagement Forum (MNEF)		

MINUTES OF MEETING

MEETING DATE:	18-Jan-2023
MEETING LOCATION:	Microsoft Teams
RECORDED BY:	CLC (NASH Maritime)
ISSUED BY:	NASH Maritime

PERSONS PRESENT:

Organisation	Attendee	Role	Initial
Cruising Association	Rick Ballard Nigel Robinson	Representative Representative	RB NR
RWE	Paul Carter	Consent Manager	PC
RPS	Miriam Knollys	Principal Environmental Consultant – EIA coordinator Morgan and Mona	MK
Royal Haskoning DHV	Sarah Read	Principle Marine Consultant	SR
SWFPA	Raymond Hall		RH
Bp and EnBW	Gero Vella Lucy Harper Ian Duffy John Davies Wenger Angelika Katherine Descamps	Offshore Consents – Morgan and Mona Consenting Lead – Mona Head of communications and advocacy – UK offshore Wind Master Offshore Consents – Morgan and Mona EnBW Development Manager	GV ID LH JD WA KD
Cairn Risk	Jonanthan Moorse Sam Bird	Morecambe principal designer	JM SB
Cruising Association	Nigel Robinson	Representative	NR
Flotation Energy	Khaleda Chowdhury Paul Boath	Communications Manager – Morecambe Engineering Manager	KC PB
IoM Department of Infrastructure	Emma Rowan	Isle of Man Government	ER
IS&EFPO	John Lynch	Chairman	JL
Northern Ireland Fish Producers' Organisation (NIFPO)	Jimmy Kelly		JK
Harbour Energy	Lindsey Lindgren		LL

	Mike Burnett		MB
IoM Steam Packet Company	Robert Hunter Capt Kane Taha	Marine Manager Operations Manager	RHu KT
Marine Management Organisation (MMO)	Katrina Wignall		KW
MOD	Teena Oulaghan		TO
Maritime and Coastguard Agency (MCA)	Nick Salter Vaughan Jackson Vinu John	Offshore Renewables Lead, Marine Licensing and Consenting	NS VJ VNJ
Orsted	Hannah Towner-Roethe	Environment Manager	HTR
Port of Mostyn	Ellis Humphreys	Harbour Master	HM
Peel Ports	Neill Sumner	Deputy Harbour Master / Marine Operations Manager	NSU
Royal Yachting Association	Stuart Carruthers		SC
Seatruck Ferries	Matt Henderson Steve Cole Steve Olbison	Fleet Training Superintendent	MH
Spirit Energy	Denis Utisch Susan Gair		DU SG
Stena Line	Michael Proctor	Safety & Security Superintendent, Deputy CSO, DP Ports (PMSC)	MP
Tom Watson	Tom Watson	Fisheries Advisor	TW
UK Chamber of Shipping	Robert Merrylees	Policy Manager (Safety & Nautical) & Analyst	RM
NASH Maritime	Jamie Holmes Ed Rogers Claire Conning Andrew Rawson Nigel Bassett	Project Director (Morgan and Mona) Project Director (Morecambe) Maritime Consultant Principal Maritime Consultant Expert Mariner	JJH EJR CLC AR NM

DISTRIBUTION:

See Persons Present List.

ATTACHMENTS:

1. MoMoMo_MNEF_20230118_Slide_Pack_R01-00.pdf

MEETING AGENDA:

- Project Introductions & Summary Updates
  - Morgan + Mona + Morecambe + combined transmission
  - Key Shipping & Navigation themes
  - Work in period [HAZID, PEIR deliverables (cumulative and individual NRA), post PEIR preparation]
- DCO Process (PEIR, Statutory consultation)
- Project revisions / commitments
- Planned Activities
  - Mitigation measures assessments

  - Stakeholder engagement (breakout detail for ferry operators)
  - ES preparation for submissions
  - Timescales
- AOB

ITEM NO:	DISCUSSION ITEM:	Responsible party	Date
1	**Introductions and Session Objectives & Agenda (Slides 1-5)**		
1.1	**JJH** welcomed everyone to the meeting of MNEF No. 4 and outlined the meeting protocols. **JJH** provided an overview of the session objectives: 1. Provide an update on Morgan (Generation Assets), Mona and Morecambe projects (generation and transmission assets) 2. Introduce proposed changes to projects (project commitments) 3. Planned activities through to Application **JJH** provided overview of the meeting agenda (slide 5).		
2	**Project Summary Updates**		
2.1	**Recap of Projects Background (slide 7)** **JJH** briefly recapped each proposed offshore wind farm (OWF) project and summarised the 4 applications across the projects: • Morecambe Offshore Windfarm Generation Assets ("Morecambe Generation Assets") • Morgan Offshore Wind Project Generation Assets ("Morgan Generation Assets") • Mona Offshore Wind Project ("Mona") • Morgan and Morecambe Transmission Assets		
2.2	**Schedule (slide 8)** **JJH** summarised the schedule for the 4 applications as outlined on slide 8 for key milestones of Scoping, PEIR, DCO/ES submission, Examination and Decision. **JJH** highlighted that the key milestone dates have now been aligned across all the generation applications (Morgan and Morecambe Transmission Assets is circa 6 months later) following feedback from previous MNEF Meetings and stakeholder comments with regard to the timing of the Preliminary Environmental Information Report (PEIR) documents and benefiting the cumulative assessment of all 3 generation assets. **LH** clarified that the timeline has not been fully finalised. The projects are aiming for the dates presented on slide 8 but document submission may not be exactly aligned due to other ongoing projects.		
2.3	**Review of key themes of previous meeting (MNEF No. 3) (slide 9)** **JJH** reviewed the key themes of the previous MNEF (no. 3) meeting held on 10-Oct-2022 (minutes issued on 29-Nov-22) as per slide 9. Ref bullet pt 1-3: Discussion was held regarding the collaborative approach and schedule alignment between the 3 projects since MNEF No. 2 and the cumulative considerations in the East Irish Sea – specifically the proposed Isle of Man OWF (being proposed by Orsted) which was raised by the IOM Government as relevant to shipping & navigation at MNEF No. 3. **GV** commented that based on feedback from attendees and the IoM Government at the last MNEF, the projects have now invited Orsted (developer) to attend the MNEF (and were attending the call today) and plan on engaging with them throughout the remaining application process. **GV** confirmed IoM OWF has been included in the cumulative assessment as a Tier 3 project.		
2.4	**Review of Scoping Opinions (slide 10)** **JJH** confirmed that scoping opinions have now been received for all 4 applications (Slide 10 outlines a review of the statutory consultee scoping opinions).		

	AR gave an overview of the key themes by the 4 responding parties (MCA, Trinity House, IOM Gov Department of Infrastructure and Planning Inspectorate). Noting the comments on potential impacts and assessment requirements were consistent with those highlighted early on in the projects and already being considered **AR** highlighted that there is consistency between the projects of key points such as navigational safety and impact on shipping routes. **AR** assured that all Scoping Opinion points and impacts will be addressed for each project.		
2.5	**Work in period | Shipping & Navigation (slides 11)** **JJH** provided an overview of the shipping and navigation work undertaken in period. **Bridge Navigation Simulation** **JJH** explained that the Bridge Navigation Simulation report was finalised on 23-Dec-2022 incorporating comments from participants. The bridge navigation simulation was undertaken with bridge teams from key commercial ferry operators participating - navigating their vessels in a simulated environment with the projects in place and looking at the feasibility of safe navigation within the key corridors. **JJH** further summarised the key findings, as detailed on slide 11, noting that in normal conditions, and without other vessels, corridors could be safely navigated although in adverse weather, or with significant traffic, some runs failed or were marginal when assessed against pre-agreed criteria. **KT** noted that the simulations had excluded night time conditions and that the Isle of Man Steam Packet Company's high-speed craft (*Manannan*) was not able to be correctly simulated in some conditions. **JJH** acknowledged these points confirming that this is detailed in the report and also incorporated in recommendations. **RB** asked whether recreational craft had been considered and specifically recreational craft under sail. **JJH** responded that the focus of the simulations was primarily the feasibility of interaction of commercial ferries with the projects and other large vessels, however several small vessels (fishing vessels and other small powered craft) were also included. As with all other vessels, recreational vessels have been considered within the Navigation Risk Assessment (NRA) with recreational representatives (RYA and Cruising Association) having participated within the HAZID workshops. **Individual and Cumulative Regional Navigation Risk Assessment, HAZID workshops and PEIR Chapters** **AR** explained that as part of the NRA process for the projects cumulatively and individually, a series of group hazard workshops were undertaken involving identifying hazards, risk scoring and discussions around hazard consequences. **AR** explained that an individual NRA and PEIR chapter was produced for each generation asset (Morgan Generation Assets, Mona Generation Assets and Morecambe Generation Assets), and was informed by the hazard workshop, stakeholder consultations and bridge navigation simulations. A cumulative regional NRA (CRNRA) was also produced, assessing the combined effect of all 3 generation areas and will be annexed for each individual NRA report. **EJR** noted that the process followed to conduct the individual NRAs and the CRNRA is aligned with MCA and industry guidance.		
2.6	**Work in period | Shipping & Navigation (slides 12)** **AR** outlined the risk assessment methodology and individual/cumulative NRA results in more detail (slide 12). Four hazard workshops were conducted in Liverpool with the attendance of a range of stakeholders representing different interests. The first day addressed the CRNRA and the following days addressed each project NRA individually. In total, 56 cumulative hazards were grouped into		

	navigation corridors between project array areas and were assessed to identify how the presence of the three projects together will impact navigational safety. **AR** summarised five hazards which were scored as 'High Risk' and deemed unacceptable for the following areas: • Corridor between Mona and Morgan Array Areas • Corridor between Morgan Array Area and Walney Offshore Wind Farm • Approaches to the TSS south of Mona Array Area. **AR** explained that as a result of the workshop, one of the key 'High Risk' hazards identified was the collision between a ferry and another large vessel (e.g. ferry/cargo/tanker), or a small craft such as fishing vessel. **AR** noted that 42 hazards were scored as 'Medium Risk' and deemed tolerable if As Low As Reasonably Possible (ALARP). Additional risk controls were identified that could be implemented to reduce risk to tolerable levels, particularly boundary revisions. **AR** concluded that the key finding of the hazard workshop was that the projects from a cumulative perspective have unacceptably high-risk scores. **RM** explained that despite there being 56 hazards in total, only around 10 hazards were addressed for each project in the hazard workshop. **RM** asked whether the amended scores for the hazards addressed, were later applied to all remaining hazards not addressed in the workshop. **AR** responded that learnings taken from the hazard workshop (e.g. discussions regarding consequences of a ferry collision with a fishing vessel having a higher consequence to people than previously scored), were applied to all other hazards of a similar nature, ensuring that stakeholder input was taken into account across all 56 hazard scores. **RM** queried whether the draft and updated scores will be shared with stakeholders. **AR** explained that the NRA reports will contain hazard logs detailing the initial draft hazard scores, the hazards that were re-scored by stakeholders in the workshop and the updated final hazard scores. **KT** requested that the NRAs containing the adjusted hazard scores are shared with stakeholders for comment. **GV** responded that project timescales for PEIR submission in Mar-2023 cannot accommodate sharing the NRAs and receiving stakeholder comments before the submission date. Therefore although the NRA documents could be shared before PEIR submission it wouldn't be possible to receive and address any stakeholder comments for the PEIR. **GV** assured **KT** that the submission of the PEIR is followed by a formal consultation period in which all stakeholders will have the opportunity to officially respond to all NRAs in the Shipping and Navigation sections of the PEIRs. **KC** agreed with this response on behalf of the Morecambe project. **KT** requested that the NRA is shared with stakeholders in advance of PEIR submission. POST MEETING NOTE. Morgan and Mona projects will look to setup a meeting during the PEIR consultation period. Morecambe Offshore Windfarm project will also offer the same. The CRNRA for Mona Offshore Wind Project, Morgan Offshore Wind Project, and Morecambe Offshore Windfarm Project is under review and has yet to be finalised. Therefore, we are not in a position to share this with stakeholders at this moment in time. If over the coming weeks we are in a position to do so, the teams will consider sharing the CRNRA with stakeholders in advance of the PEIR submission. Please note that we will not be able to accommodate any comments on the CRNRA before the PEIR submission date. We would like to assure stakeholders there will be sufficient time to submit any comments on the PEIR, which will include the NRA, during the consultation period.	**GV / KC** **GV / KC**	

	HTR queried whether the gap between Morgan Generation Assets and IoM OWF has been considered a high risk. **GV** responded that the IoM OWF was not assessed within the hazard workshop and NRA leading to this matter being raised by the IoM Government and Mona and Morgan Generating Assets teams meeting with Orsted. Subsequent to this, the IoM OWF has been included in the cumulative effects assessment as a Tier 3 project. **HTR** queried whether the IoM OWF should be considered a Tier 2 project given submission of a Scoping Report. **GV** explained that the IoM OWF Scoping Report is not published within in public domain hence the Tier 3 status. **ER** confirmed that the IoM Government has not made the IoM OWF Scoping Report available in the public domain. **KW** asked if the Marine Management Organisation (MMO) will be consulted in the PEIR process and **GV** confirmed this is the case. **RM** requested clarification that the NRA's submitted for the PEIR will not include the IoM OWF and requested that it be clearly stated. **GV** confirmed the IoM OWF was not able to be included in the PEIR NRA's and that this will be made clear in the reports submitted at PEIR also noting the IoM OWF wasn't included in supporting studies such as the hazard workshop or bridge navigation simulations.	**GV**	
3	**DCO Process**		
3.1	**Overview of EIA Process (slide 14)** **MK** summarised the PEIR stage of the EIA process (slide 14). The NRAs have been prepared and the accompanying PEIR chapters have been drafted and both are in the process of being finalised. The PEIR stage presents the initial information that has been gathered, and provides an opportunity for stakeholders to comment on the proposed project. These comments will then be considered during preparation of the final impact assessment for inclusion in the Environmental Statement which will be submitted with the application for consent.		
3.2	**PEIR Statutory Consultation (slide 15)** **MK** provided an overview of the statutory consultation process and key dates (slide 15). Statutory consultation provides an opportunity for stakeholders to review the project information submitted in the PEIR, and provide feedback/comments. The consultation includes all statutory bodies, local authorities, local community and any affected persons. PEIR consultations for Mona, Morgan Generation Assets and Morecambe Generation Assets will take place between in April and May 2023. Dates for the engagement events have yet to be confirmed, however are envisaged to take place 14-Apr to 05-May. **MK** and **NS** clarified that the NRAs were conducted using the existing wind farm array area boundaries (as per slide 7) but will address commitments which the projects are making to address issues and what changes will follow the PIER. **MK** concluded by emphasising that the PEIR will be submitted based on the current		

	wind farm array area boundaries without any adjustments to reflect the commitments made today, and this is what stakeholders will be commenting on.		
4	**Proposed revisions & Project(s) commitments post PEIR**		
4.1	**Proposed revisions & Project(s) commitments post PEIR (slide 17)** **JJH** explained that following consideration of the findings of the NRA and supporting studies, the projects have proposed changes to be implemented post PEIR. The commitments are made regarding changes to boundaries of the wind farm array areas and lines of orientation to turbines within these areas. **JJH** emphasised that the changes have only recently been made and so they will not have been considered or assessed within the PEIR (*as explained in points 3.1 and 3.2 above*). However, these commitments will be assessed for inclusion in the Environmental Statement submitted alongside the application for consent. **JJH** summarised the project commitments as: • All projects are committed to 2 lines of orientation within the wind farm array area. This benefits SAR and maintaining safe navigation within the windfarm area for those vessels electing to do so. • Boundary revisions – securing minimum widths and sea room commitments for four key corridor/areas as shown in Slide 17. **GV** stated that the project teams have taken onboard comments and feedback from consultations, the hazard workshop and bridge navigation simulations and have looked at what they can do to reduce the potential cumulative effect of the projects. The commitments for revisions (post PEIR) are stated in the text boxes on slide 17, with indicative wind farm array area boundaries given to demonstrate how the commitments would be achieved. The project teams are still in the process of examining other studies e.g. geotechnical surveys etc. Additionally, comments that come out of the PEIR submission may further inform wind farm array area boundary revisions. As a result, the wind farm array area boundaries shown are not finalised. However, the principles of increasing navigational sea room around the boundaries and commitments made in the text boxes on Slide 17 will be maintained through to Application for consent. **JJH** summarised that the objective of sharing the proposed revisions and project commitments today is to introduce them as early as possible to stakeholders. There will be opportunities to further discuss the commitments and share additional comments as the projects progress in assessing them. **LH** highlighted that the project commitments will be listed in the PEIR document, but due to their provisional status and their timing, they are not included in the assessment.		
4.2	**Commitment 1: Mona and Morgan Generation Assets Corridor (slide 18)** **AR** outlined the commitment to increase the Mona and Morgan Generation Assets corridor from 3nm to 6nm which will better accommodate the safe navigation of multiple vessels concurrently from a range of directions (large passenger vessels and small craft) and provide significant increase in sea room for adverse weather conditions.		
4.3	**Commitment 2: Morgan Generation Assets and Walney Corridor (slide 19)** **AR** described the commitment to widen the Morgan Generation Assets-Walney corridor and remove the north-western 'hump' from the Morgan Generation Assets boundary. Due to frequent ferry transits and the presence of fishing activity in the northern approaches (and other small craft), the initial boundary resulted in insufficient sea room for safe navigation, particularly in adverse weather conditions. **MP** welcomed the change as an improvement although noted the presence of Millom West gas platform within the corridor impacts navigation as it reduces the width of the corridor. **AR** responded that the structure will be decommissioned before the projects are in operation and clarified that it is an assumption that has been made for the assessment.		

	LH confirmed that the Millom Gas Field has submitted a decommissioning plan and if in the public domain, will share with stakeholders. POST MEETING NOTE: bp was not able to ascertain if there is a decommissioning plan in the public domain for the Millom Gas Field however previous feedback from Harbour Energy confirms that decommissioning is in progress for Millom West.	**LH**	Com plete
4.4	**Commitment 3: South of Mona (slide 20)** **AR** explained that the region to the south of Mona has a high confluence of vessel routes, particularly a high traffic density of large vessels approaching Liverpool. **AR** described the commitment to increase the separation between the Mona OWF boundary and a paralleling line extending from the Traffic Separation Scheme (TSS Liverpool Bay) from 1.5 – 2nm. **AR** noted that guidance advises that a boundary must remain 2nm from a TSS and, by paralleling an imaginary extension of the TSS, a precautionary approach is being taken in accordance with the guidance.		
4.5	**Commitment 4: Morecambe Generation Assets Western Boundary (slide 21)** **EJR** outlined that the western boundary of Morecambe Generation Assets is under review and could be further reduced from present. **EJR** noted that the revision of the western boundary addresses ALARP hazards from the CRNRA (not scored as a 'high risk').		
4.6	**JJH** invited stakeholders to provide any initial comment or queries on the project commitments noting that they are initial revisions, will be further assessed post PEIR submission and further opportunity for consultation will be available through this process and the planned assessments. **KT** stated he considered the timing of the change to be tactical and asked whether the revised boundaries will be fully re-assessed. **JJH** confirmed that the projects intend to fully test the efficacy of the commitments (including revised boundaries) post PEIR which will include updating all individual project NRAs and the CRNRA and the supporting studies as well as comprehensively re-consulting with stakeholders. **ER** queried whether the project commitments have taken into account the IoM OWF and/or the IoM gas field? **GV** responded that the project commitments are based off the NRA's and supporting studies completed to date (bridge navigation simulations, modelling etc…) and therefore do not take the IoM OWF into account. **ER** requested that it's made clear that the IoM OWF isn't included in the boundary revisions and **GV** confirmed the PEIR will be clear on the commitments being made and the underlying assumptions. **RH** asked whether wind turbines will be placed closer together due to a reduced project footprint which would affect navigation within the array areas e.g. fishing vessels. **JK** added that if spacing is reduced, vessels could be displaced into the corridors and increase traffic density. **GV** explained that if there are changes to turbine placement locations, this will be considered, commercial fisheries will be consulted, and it will be assessed in the updated NRAs. **RM** commented that the reduction in boundaries is welcomed although cannot comment further at this stage. The Chamber of Shipping is looking for assurance that further bridge navigation simulation will be conducted using the revised boundaries and any additional commitments, including the presence of the IoM OWF. **JJH** confirmed that in updating the NRAs, the supporting activities will be revisited (including bridge navigation simulation, hazard workshops and stakeholder consultation). In revisiting the bridge navigation simulations for the revised boundaries the recommendations from the initial sessions will be considered including, for example, night time runs. **GV** added that the addition of IoM OWF to the NRA would be necessary if its tier status changed from Tier 3.	**GV**	

	RM asked whether the reduced array areas, as a result of the revised boundaries, will result in a change in the generation capacity of the projects. **PB** explained that Morecambe is expected to produce 6.74MW/sqkm and the revised boundary may reduce the array area from 125-76sqkm. The boundary revision could take the array area down to The Crown Estate minimum requirement. Once more information is gathered (e.g. Geotechnical surveys), a decision on the boundary revision can be made. **GV** added that as the final boundary revision to Morgan Generation Assets and Mona have not been made, owing to the reasons given earlier (*see point 4.1)* Morgan Generation Assets and Mona it would not be meaningful to discuss whether the commitment made today affect generation capacity. **JJH** thanked all for these initial comments and concluded that these proposed revisions will be developed and assessed through to application.		
5	**Planned Activities**		
5.1	**Planned Activities (slide 23)** **AR** expanded on the planned activities that will be undertaken to assess the commitments post PEIR (together with provisional dates). These include: 1) Update understanding of baseline environment – previous vessel traffic analysis was conducted on 2019 AIS data. Updated assessments will conduct vessel traffic analysis using 2022 AIS data, and benchmark it against 2019 analysis. 2) Update passenger and commercial vessel passage plans as impacts on routeing will have changed. 3) Analysis of risk and journey times using recent datasets and revised boundaries. 4) Further consultation with all stakeholders who want to address any residual concerns with the wind farm array area boundary changes. 5) Updating bridge navigation simulation including the revised wind farm array area boundaries and incorporating recommendation from previous simulations. 6) Updated hazard workshops (project team are still considering whether to undertake as a large group or smaller groups by key users/vessel types). 7) Update NRA, CRNRA and ES chapters. **JJH** concluded that the progress/findings of the above will continue to be communicated through the MNEF meeting approximately quarterly. **HTR** requested that Orsted (IOM OWF) would like to set up regular engagement with regards to their involvement in the cumulative aspect of the projects. **LH** responded that they would like to engage with Orsted and will arrange post meeting. **NS** commented that the MCA welcome the changes and the supporting work – and considered the changes were necessary. MCA agree with the inclusion of updated AIS data and additional bridge navigation simulation which they wish to attend. **NS** noted that the PEIR not assessing the revised boundaries will potentially limit useful feedback but the MCA will be looking at the identified key 'high risk' hazards. **ER** enquired whether a socio-economic assessment is included as part of the EIA. **LH** explained that the socio-economic section will not be included in the shipping and navigation chapter but there will be a separate socio-economic chapter. **LH** suggested setting up a meeting with ER to run through the socio-economic components of the PEIR. **KT** requested being included in the above meeting. **RM** noted that including the ferry services to Ireland and Northern Ireland are considered lifeline services and should be included in this.	**LH/HTR** **LH**	
6	**Summary**		
	Summary (slide 24)		

6.1	**JJH** summarised that the next MNEF is scheduled around Apr-2023 (post PEIR submission) and enquired whether there was any other business or queries. **RH** requested that the revised wind farm array area boundary coordinates are provided to stakeholders (also requested by **MP** and **SC**). **JJH** responded that he would take this away to the project team and would seek to share co-ordinates in the same format as previously. [POST MEETING NOTE: The projects will issue once available] **KW** asked whether there has been any research conducted regarding the affect of the projects on commercial fishing and other receptors such as marine mammals and seabed communities. **GV** explained that the PEIR will include an impact assessment on all receptors for which potential effects were identified including marine mammals, commercial fisheries and fish and shellfish, separate to the shipping and navigation chapter. **GV** also noted that the projects were hosting similar forums to the MNEF for many receptor groups such as Expert Working Groups. **PB** added that a biological impact assessment (separate from the shipping and navigation chapter) will also be conducted for the Morecambe project. **TW** queried the locations of turbines within the array area within the NW of Morgan which **GV** agreed to pick up separately owing to that relating to commercial fisheries. **NS** asked when the project team will know the finalised dates for the updated bridge navigation simulations **JJH** explained that this is currently unconfirmed - the project teams will be working on the overall schedule over the next few weeks and would also shortly be liaising with commercial ferry companies as a sub group of the MNEF. The projects recognise the need to confirm these in good time for attendance and, on current schedule estimates and the preparatory work required, this will most likely occur in Apr/May 2023. **RM** queried whether the bridge navigation simulation will consider stakeholder comments following the submission of the PEIR? **JJH** responded that formal comments (Section 42) will likely not have been received prior to the simulations based on the above schedule although noted the ongoing dialogue with commercial ferry operators was seeking to mitigate this to a degree. **GV** noted RM's comment and will take this into account when considering project timings.	**GV** **GV** **GV**	

MINUTES OF MEETING

Security Classification: CONFIDENTIAL

Partners in UK offshore wind

MOM Number:	MoMoMo_MNEF_20230921_Minutes_R01-00	**REV. No.:**	R01-00
MOM Subject:	Morgan, Mona and Morecambe Maritime Navigation Engagement Forum (MNEF)		

MINUTES OF MEETING

MEETING DATE:	21-Sep-2023
MEETING LOCATION:	Microsoft Teams
RECORDED BY:	HLT (NASH Maritime)
ISSUED BY:	NASH Maritime

PERSONS PRESENT:

Organisation	Attendee	Role	Initial
Boskalis Westminster	William Grace	Resource Development Manager	WG
Bp and EnBW	Gero Vella Rosie Howatt Angelika Wenger Marta Orcajo Garcia Heather Kwiatkowski Stuart Barnes	Offshore Consents – Mona Offshore Consents – Morgan Generation Offshore Consents – Morgan and Mona EnBW EnBW Offshore Consents – Morgan Transmission Stakeholder Lead - EnBW	GV RHo AW MOG HK SBa
Cairn Risk	Sam Bird	Principal Technical Safety Consultant	SBi
Flotation Energy and Cobra	Rachel Watson Nancy James Tracey Siddle Ian Mackay Khaleda Chowdhury	Offshore Consents- Morecambe Offshore Consents – Morecambe Onshore/Offshore Consents - Morecambe Onshore Consents – Morecambe Stakeholder Lead – Morecambe	RW NJ TS IM KC
Harbour Energy	Lindsey Lindgren Alex Morton Cathy Marston	Business Lead Marine and Aviation Global Technical Lead Decommissioning Lead	LL AM CM
IoM Department of Infrastructure	Emma Rowan	Isle of Man Government	EMR
Irish South and East Fish Producers Organisation	John Lynch	Chairman	JL
Maritime and Coastguard Agency (MCA)	Nick Salter Vaughan Jackson Vinu John	Offshore Renewables Lead, Marine Licensing and Consenting Offshore Renewables Project Lead Navigation Policy Advisor	NS VJ VNJ
NASH Maritime	Ed Rogers Chris Hutchings Andrew Rawson Brocque Preece Nigel Bassett Helen Taylor	Project Director (Morecambe) Project Manager (Morgan and Mona) Principal Maritime Consultant Project Director (Morgan and Morecambe Transmission) Expert Mariner Maritime Consultant	ER CH AR BP NB HT

Orsted	Hannah Towner-Roethe	Environment Manager – IoM OWF	HTR
Port of Mostyn	Ellis Humphreys	Harbour Master	HM
Royal Haskoning DHV	Sarah Read	Principal Marine Consultant	SR
RPS	Miriam Knollys Alex Bowers	Principal Environmental Consultant – EIA coordinator - Morgan and Mona Project Director – Morgan Generation	MK AB
Saipem	Unknown		
Scottish Fisheries Federation	Andrew Innes	Fisheries Advisor	AI
Scottish White Fish Producers Association	Raymond Hall	Renewable Energy Policy Officer	RHa
Seatruck Ferries	Matt Henderson Steve Olbison	Fleet Training Superintendent Marine Manager	MH SO
Spirit Energy	Denis Ustich Susan Gair	Head of Logistics Operations Senior Commercial Advisor	DU SG
Stena Line	Michael Proctor	Safety & Security Superintendent, Deputy CSO, DP Ports (PMSC)	MP
United Utilities	Diane Ireland	Project Manager	DI

DISTRIBUTION:

See Persons Present List.

ATTACHMENTS:

1. 21-NASH-0146_MNEF_20230921_Final_R02-00.pdf

MEETING AGENDA:

1. Project introductions & summary updates
2. Summary of shipping & navigation:
   - PEIR (work and findings)
   - Project revisions
   - Work undertaken in period
3. DCO process (PEIR, statutory consultation)
4. Planned activities:
   - Hazard workshops
   - Update to CRNRA and individual NRAs
   - ES preparation for submissions
   - Timescales
5. AOB

ITEM NO:	DISCUSSION ITEM:	Responsible party	Date
1	**Introductions and Session Objectives & Agenda (Slides 1-5)**		
1.1	**ER** welcomed everyone to the meeting of MNEF No. 5 and outlined the meeting protocols. **ER** provided an overview of the session objectives:		

	1. Provide an update on Morgan, Mona and Morecambe projects (Generation and Transmission Assets) 2. Introduce revisions to projects following PEIR and feedback 3. Planned activities through to Application **ER** provided overview of the meeting agenda (slide 5).		
2	**Project Summary Updates**		
2.1	**Recap of Projects Background (slide 7)** **ER** briefly recapped each proposed offshore wind farm (OWF) project and summarised the 4 applications across the projects: • Morecambe Offshore Windfarm Generation Assets • Morgan Offshore Wind Project Generation Assets • Mona Offshore Wind Project • Morgan and Morecambe Transmission Assets		
2.2	**Schedule (slide 8)** **ER** summarised the schedule for the 4 applications as outlined on slide 8 for key milestones of Scoping, PEIR, DCO/ES submission, Examination and Decision.		
2.3	**Review of key themes of previous meeting (MNEF No. 4) (slide 9)** **ER** reviewed the key themes of the previous MNEF (no. 4) meeting held on 18-Jan-2023 (minutes issued on 02-Feb-2023) as per slide 9. This included the collaborative approach across the Morgan Generation, Morecambe Generation and Mona projects and alignment of the timescales for the 3 applications. The IoM OWF and how it is being considered within assessments was also raised and was discussed later within the MNEF 5 meeting. **SB** noted that Orsted have now provided information on the IoM OWF, and queried whether this information went beyond the lease boundary. **GV** explained that the further information provided within the last two weeks included pre-scoping indicative layouts for WTGs and OSPs, as well as proposed turbine dimensions. This information is considered adequate for undertaking a cumulative risk assessment.		
2.4	**Work in period | Shipping & Navigation (slides 11-12 and 18)** **ER** provided an overview of the assessments undertaken for PEIR, the PEIR findings, and other shipping and navigation work undertaken in the period. **CRNRA** **EMR** from the IoM Government asked whether there would be an opportunity to have sight of results prior to application submission. **GV** noted that this will be taken as an action to consider the programme. [*POST MEETING NOTE: At the two-day Morgan Mona Morecambe Cumulative Navigation Risk Assessment Hazard Workshops held on 28-29 Sept-2023 it was advised that the MNEF 6 would be used to present the findings from the cumulative regional navigation risk assessment and shipping and navigation environmental statement. This would be for information only.]*		
2.5	**Project revisions post-PEIR (slides 13-15)** **ER** gave an overview of the project revisions made post-PEIR which included: - Removal of the 'hump' at the northwest corner of the Morgan array - Increasing the separation between Morgan and Mona from 3.0 nm to 6.0 nm - Increasing the separation between Mona and the TSS Liverpool Bay from 1.5 nm to 2.0 nm - Increasing the separation between Mona southeastern boundary and the TSS Liverpool Bay from 1.7 nm to 4.5 nm - Increasing the separation between Morgan and Walney from 4.1 nm to 4.3-5.3 nm - Removal of the western portion of Morecambe - The presence of the booster station search areas was also noted. **Updated bridge navigation simulation on new boundaries** **ER** noted that updated navigation simulations have been carried out for the revised project boundaries and summarised the key findings. The revised boundaries have significantly improved navigation, although routes remain susceptible to adverse weather which necessitates longer deviations with the projects in place.		

2.6	**Consideration of the IoM OWF (slide 18)** **ER** presented information on how the IoM OWF is to be considered within future assessments, noting that the Scoping Report is expected to be released in Q4 2023. The IoM OWF is to be assessed as an additional scenario within the Hazard Workshop and CRNRA. **MP** reiterated that the IoM OWF is to be considered within next week's Hazard Workshop, and queried whether the wind farm will also be included in simulations cumulatively as has already been done for Mona, Morgan and Morecambe. **CH** explained that the IoM OWF is to be included within the cumulative assessment, which was not done within the PEIR. The IoM OWF was considered within the IoMSPC navigation simulations; however, this was not the case for the Stena Line simulations due to the information not being available at the time. **MP** noted that Stena had stated at the navigation simulations that the IoM OWF should be included as they knew this project was arising imminently. MP stated that the Projects should take an action, to include the IoM OWF in navigation simulations with other ferry operators.		
3	**DCO Process**		
3.1	**Overview of EIA Process (slide 14)** **MK** summarised the PEIR stage of the EIA process (slide 14). Statutory consultation on the Preliminary Environmental Information Report (PEIR) was held between 19th April – 4th June 2023. The PEIR stage presents the initial information that has been gathered and provided an opportunity for stakeholders to comment on the proposed project. The project is working through the comments received on the PEIR in the drafting of the Environmental Statement and Development Consent application. A Consultation Report is being prepared which sets out how responses have been considered in the development of the assessment. This report will be included as part of the Development Consent application.		
4	**Planned Activities**		
4.1	Key activities from now through to ES submission (slide 23) **ER** presented a summary of the next activities to take place - During September 2023, the Hazard Workshops will take place and the bridge navigation simulation reports will be finalised. - The NRAs, both cumulative and individual, will be updated from September to November 2023. - Top-up vessel traffic surveys and benchmarking assessment will be carried out between October and December 2023. - The Generation applications will be submitted circa Q1/Q2 2024.		
6	**Summary**		
6.1	**Provisional scheduling of next MNEF** **ER** advised that MNEF No. 6 is proposed to take place in Q1/Q2 2024, and that parties who wish to attend should opt-in via email or use/share of email addresses within MNEF of additional MNEF members with interest in the forum. MNEF No. 6 will be used to communicate the progress and findings of the planned activities (see Item No. 4.1). [*POST MEETING NOTE: At the two-day Morgan Mona Morecambe Cumulative Navigation Risk Assessment Hazard Workshops held on 28-29 Sept-2023 it was advised the MNEF 6 would also be used to present the findings from the cumulative navigation risk assessment and shipping and navigation environmental statement. This would be for information only.]*		
6.2	**AOB** **MP** asked if a copy of the slides can be sent to all present. **ER** advised that the slide pack and meeting minutes will both be circulated. **WG**, who represents operations at the aggregate extraction area (Area 457) within Liverpool Bay, asked whether there are any plans submitted or drawn for exclusion zones beyond the array boundaries. **ER** responded that there are no plans for	**ER**	

	exclusion zones and that none have been highlighted as a requirement during the risk assessment process. **WG** queried how close the turbines will be to the array boundaries. **ER** explained that turbines have potential to be placed up to the boundary line. **WG** expressed concern around navigation risk with vessels travelling or operating close to the turbines, for example if a loss of power were to occur causing a vessel to drift. He also noted the restricted manoeuvrability of dredgers during dredging activities. **ER** asked how far Area 457 lies from the project boundary. **WG** could not recall at this time. **MK** noted that the aggregate dredging area has been scoped into the Cumulative Effects Assessment (CEA). **WG** noted the issues caused at aggregate dredging areas by nearby Triton Knoll turbines, and highlighted the need to be clear on where the closest turbines are to be located. This has been noted as an action and the concerns will be considered/discussed. [POST MEETING NOTE: Area 457 lies approximately 5.9 nm east of Mona and 5.0 nm south of Morecambe].	**GV**	
6.3	**ER** thanked all attendees of the meeting for their time and input, noting once again that the slide pack and meeting minutes will be circulated following the meeting.	**ER**	

ACTIONS:

Item no.	Action	Responsible party
1	Consider the programme and whether the CRNRA can be made available for review by the IoM government prior to application submission. [*Addressed in POST MEETING NOTE in Sections 2.4 and 6.1*]	**complete**
2	Consider incorporation of the IoM OWF within navigation simulations undertaken which have not already considered it.	**Morgan Moan Morecambe Projects**
3	Discussion and consideration to be given to turbine placement in proximity to dredge area 457 to address concerns raised. [*Addressed in POST MEETING NOTE in Section 6.2*]	**complete**
4	Meeting minutes and slide pack to be circulated among those present at MNEF 5.	**NASH Maritime**

MINUTES OF MEETING

Security Classification: CONFIDENTIAL

Partners in UK offshore wind

MOM Number:	MoMoMo_MNEF_20240208_Minutes_R01-00	**REV. No.:**	R01-00
MOM Subject:	Morgan, Mona and Morecambe Maritime Navigation Engagement Forum (MNEF)		

MINUTES OF MEETING

MEETING DATE:	08-Feb-2024
MEETING LOCATION:	Microsoft Teams
RECORDED BY:	ADR (NASH Maritime)
ISSUED BY:	NASH Maritime

PERSONS PRESENT:

Organisation	Attendee	Role	Initial
ANIFPO	Brian Chambers	Chairman	BC
Bp and EnBW	Stuart Barnes Paul Carter Rosie Howatt Heather Kwiatkowski Gina Roper Angelika Wenger	Stakeholder Lead – EnBW Offshore Consents – Mona Offshore Consents – Morgan Generation Offshore Consents – Morgan Transmission Offshore Wind Commercial Development Lead Offshore Consents – Morgan and Mona EnBW	SBa PC RH HK GR AW
Cairn Risk	Sam Bird	Principal Technical Safety Consultant	SBi
Chamber of Shipping	Robert Merrylees	Policy Manager (Safety and Nautical)	RM
Flotation Energy and Cobra	Nancy James Ian Mackay Tracey Siddle Richard West	Offshore Consents - Morecambe Generation Offshore Consents - Morecambe Transmission Offshore Consents - Morecambe Generation Offshore Consents - Morecambe Generation	NJ IM TS RW
Harbour Energy	Marielle Wilkinson Cathy Marston	 Decommissioning Lead	MW CM
Irish South and East Fish Producers Organisation	John Lynch	Chairman	JL
Isle of Man Steam Packet	Robert Hunter	Marine Manager	RH
NASH Maritime	Richard Marlow Brocque Preece Andrew Rawson Edward Rogers	Project Manager (Morecambe) Project Manager (Morgan and Morecambe Transmission) Technical Lead (Morgan and Mona) Project Director (Morecambe)	RMa BP AR ER
Orsted	Hannah Towner-Roethe	Environment Manager – IoM OWF	HTR
Port of Mostyn	Unknown	Pilots	Unk

	Robert Jackson	Harbour Master	RJ
Royal Haskoning	Sarah Marjoram	EIA Shipping and Navigation Lead - Morecambe	SM
RPS	Alex Bowers	Morgan Generation EIA Project Director	AB
RYA	Phil Horton	Environment and Sustainability Manager	PH
Seatruck Group	Steve Cole Matt Henderson Steve Olbison	Marine Superintendent Fleet Training Superintendent Marine Manager	SC MH SO
Spirit Energy	Susan Gair	Senior Commerical Advisor	SG
Tom Watson	Tom Watson	Independent Fisheries Expert	TW
Trinity House	Joseph Anderson	Aids to Navigation Manager	JA
Warrenpoint Harbour	Michael Young	Harbour Master	MY

DISTRIBUTION:

See Persons Present List.

ATTACHMENTS:

1. 21-NASH-0146_MNEF_20240208_Final_R02-00.pdf

ITEM NO:	DISCUSSION ITEM:	Responsible party	Date
1	**Introductions and Session Objectives & Agenda (Slides 1-5)**		
1.1	**ER** welcomed everyone to the meeting of MNEF No. 6 and outlined the meeting protocols. **ER** led the introductions of the projects teams. **ER** provided an overview of the session agenda: 1. Project Introductions and Summary Updates 2. Summary of Shipping and Navigation a. Recap on project changes discussed at last MNEF b. Work undertaken since last MNEF c. Update to CRNRA 3. DCO Process 4. Planned Activities a. ES preparation for submissions b. Timescales 5. AOB		
2	**Project Summary Updates**		
2.1	**ER** recapped the four projects. **ER** reviewed the key themes from MNEF 5 (21-Sep-2023), including: • Revisions to Array Areas • Consideration of Mooir Vannin OWF **ER** recapped the activities undertaken since MNEF 5, principally: • Finalisation of navigation simulations. • Hazard workshop (28/29 September 2023). • Top-up vessel traffic surveys. • Updates to NRAs and preparation of Environmental Statement.		
2.2	**ER** recapped the project array areas boundary changes post-PEIR. **ER** announced that following further design review, the Morgan booster station within the Morgan and Morecambe Transmission Assets project was being removed. **RM** asked for clarity on what was being removed.		

	HK responded that the booster station was being removed, but also that the duplication of the offshore substation platforms in both the generation and transmission assets applications was being corrected. The Transmission Assets application will therefore only include the offshore and onshore export cable and onshore substations.		
2.3	**ER** updated attendees on the status of the Mooir Vannin Offshore Wind Farm. Noting that a Scoping Report was issued on 18 October 2023. However, due to the receipt of early information from Orsted, it had been considered within the CRNRA and hazard workshop.		
2.4	**ER** summarised the consultation activities, vessel traffic surveys and impacts assessed within the CRNRA.		
2.5	**ER** summarised the findings of the CRNRA, noting that high risk unacceptable hazards had been reduced to Medium Risk – Tolerable if ALARP following boundary changes made after the PEIR. **ER** noted that consensus was reached with stakeholders at the hazard workshop in Liverpool on 28/29 September 2023 on this.		
2.6	**RM** clarified that whilst he welcomed the project commitments, several of the hazards were towards the high end of Medium Risk and therefore further mitigation might need to be considered. **ER** responded that additional mitigation, other than boundary changes, had been proposed and implemented within the NRA, some of which was implemented within each individual project and some of which was cumulative between the developers. These were considered to reduce all risks to ALARP.		
2.7	**ER** introduced the Mooir Vannin Offshore Wind Farm (OWF) and the relative location of the Morgan Array Area and Walney Extension Offshore Wind Farm. **ER** summarised the conclusions of the Mooir Vannin OWF considered within the CRNRA addendum which noted that unacceptable risks to navigation could exist given the width of the passage between Mooir Vannin and Morgan Array Area. This may also increase adverse weather routeing requirements. **ER** noted that Mooir Vannin are also undertaking their own shipping and navigation assessment to understand and address these impacts.		
3	**DCO Process**		
3.1	**AB** summarised the application process, noting that Mona Offshore Wind Project, Morgan Generation Assets project and Morecambe Generation Assets project are at the final stages of pre-application. Following this there is a clear process for submission, acceptance, pre-examination, examination and recommendation/decision required under the formal DCO application process. These steps are laid out on the Planning Inspectorate's website and links are available within the slides. There are opportunities for stakeholders to register as interested parties to take part in this process for each respective project.		
3.2	**RM** questioned whether the applicants will be seeking statements of common ground. **PC** responded that yes they would, and this will be encouraged by the Examining Authority. **TS** agreed, noting that both the applicant and stakeholders benefit from engaging in this process. **TS** asked whether stakeholders would want to do this sooner rather than later? **RM** responded that he wished to see the NRA/ES chapter first.		
4	**Planned Activities**		
4.1	**ER** summarised the next steps through to examination, noting that the MNEF will be paused during this process, however there is a formal process for stakeholder engagement going forward throughout the DCO applications.		
4.2	**RM** questioned how commercial impacts to operators were being assessed. He asked that he could be signposted to whether these impacts would be considered and, if so, how the quantum of impact will be assessed. **AB** noted that the NRA was a technical report on safety of navigation, however the shipping and navigation ES chapter considers wider impacts. **PC/TS/RH** added that the impacts weave through other chapters, such as socio-economics, human health and commercial fisheries chapters and are signposted accordingly.		
5	**AOB**		

5.1	None		

ACTIONS:

Item no.	Action	Responsible party
1		
2		
3		
4		

Appendix C Stakeholder Hazard Workshop Process and Results

HAZARD WORKSHOP 1

HAZARD WORKSHOP PROCESS

The hazard workshop process was as follows:

- Invitation to workshop: Stakeholder organisations invited to attend hazard workshop;
- Pre-read material: Pre-read material issued to stakeholders containing detailed project information;
- Pre-hazard workshop seminar: Pre-hazard workshop webinar held to discuss pre-read material and familiarise stakeholders with NRA and hazard log methodology.
- Draft hazard log: Draft hazard log issued to stakeholders for score updates and comments.
- Hazard workshop; Stakeholder hazard workshop held in-person.

PRE-READ MATERIAL

Prior to the hazard workshop, all stakeholder organisations were provided with a pre-read pack that contained a detailed summary of the:

- existing marine environment and maritime activities in the Irish Sea (including detailed vessel traffic analysis);
- project description and assumptions;
- potential impacts of the project on the existing environment; and
- NRA requirements and methodology.

PRE-HAZARD WORKSHOP WEBINAR

On the 3rd October 2022, one week prior to the in-person hazard workshop, a webinar was undertaken, to discuss the pre-read material and familiarise stakeholders with the risk assessment methodology and draft hazard log spreadsheet that was to be used by stakeholder organisations in the hazard workshop.

DRAFT HAZARD LOG

On the 4th October 2022, following the webinar, each stakeholder organisation was issued a copy of the draft hazard log spreadsheet. They were invited to review and re-score each hazard as they see fit prior to the hazard workshop. Stakeholders were encouraged to add a description to the comments section of their adjusted hazard scores to clarify their reasoning and aid discussion in the hazard workshop.

HAZARD WORKSHOP

A hazard workshop was held on 12th October 2022 at the Holiday Inn Liverpool.

The agenda was as follows:

- 08:30 09:00 Coffee/Tea
- 09:00 09:15 Introductions
- 09:15 09:30 Aims and Objectives
- 09:30 09:45 Supporting Studies and Data
- 09:45 10:00 Workshop Methodology Recap
- 10:00 10:15 Key Navigation Themes / Discussion
- 10:15 11:15 Hazard Scoring Session
- 11:15 11:30 Coffee/Tea
- 11:30 12:45 Hazard Scoring Session
- 12:45 13:00 Summary
- 13:00 13:45 Lunch
- 13:45 14:30 Run Over Time
- 14:30 Finish

Table 46 details the organisations and representatives that attended the workshop.

Table 46: Hazard workshop attendees

Organisation	Role
Royal Haskoning DHV	Senior Environmental Consultant (Marine)
Flotation Energy	Communications Manager
IoM Department of Infrastructure	Isle of Man Government
IoM Steam Packet Company	Marine Manager Master Master Operations Manager
Maritime Coastguard Agency	Offshore Renewables Lead, Marine Licensing and Consenting
Seatruck Ferries	Fleet Training Superintendant
Spirit Energy	
Stena Line	Safety & Security Superintendent, Deputy CSO, DP Ports (PMSC)

Organisation	Role
Fisheries Liaison Officer	
UK Chamber of Shipping	Policy Manager (Safety & Nautical) & Analyst
NASH Maritime	Project Director Maritime Consultant Principle Maritime Consultant

At the workshop, the pre-read material was reviewed at a high level before stakeholders were invited to describe their key concerns regarding the projects. These are summarised as follows:

- Increased traffic density in the ‘corridor’ between the north of the windfarm site and West of Duddon Sand Wind Farm from rerouted vessels and increased number of WFSVs. Rerouted traffic will be displaced toward existing O&G infrastructure.
- Increased traffic density around southwest corner of the windfarm site - impacts multiple ferry routes, reduces sea room and increases risk of tanker and cargo collision and/or allision.
- The windfarm site minimises the adverse weather route options.
- Commercial impact of ferry route deviation around the windfarm site.
- Radar interference from the turbines (particularly at night and in poor visibility) – may obscure WFSVs exiting the windfarm site.
- Morecambe construction phase will overlap with the O&G decommission phase increase service vessel traffic in the region.
- O&G service vessels transiting through the wind farm need access routes.
- O&G decommissioning vessels are large (up to 300m) and difficult to manoeuvre with - challenging angles of approach (possibly through the wind farm).
- If the cod quota is increased), there will be an increased amount of beam trawler traffic and fishing activity in the Morecambe project area.

From these key navigational concerns, the NRA team identified five hazards to focus the hazard workshop discussions around. For each hazard, stakeholders were provided an opportunity to discuss the hazard in small groups and update their scorings in their copy of the draft risk assessment spreadsheet. These scores were then updated (live) within the summary spreadsheet (presented to the room) which contained the draft NRA teams scores alongside all attending stakeholder organisation scores. A discussion was then held across the wider room about the variation in scoring for each hazard and where differences lay. Once each hazard discussion had come to a close, the summary spreadsheet was ‘locked’ to capture the concluding scores of the discussion. Stakeholders were encouraged to fill out the comments section of each hazard post workshop to provide a higher level of description regarding their scores.

At the end of the day, a summary was held to discuss the key impacts identified and some potential mitigation options.

RESULTS

The baseline hazard scores and comments for the six hazards discussed in the workshop are as follows:

Hazard ID:	1
Hazard Title:	Collision: Ferry & Passenger ICW. Cargo & Tanker or other Ferry & Passenger
Area:	Array Area + 10nm

Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Realistic Worst Credible Scenario
Reduced Searoom Between OWFs; Human Error/Poor Seamanship; Failure to Comply with COLREGs; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; ERCOP; Layout Plan and Lines of Orientation.	Multiple major injuries; Moderate damage to vessels; Minor pollution (Tier 1); Widespread adverse publicity; Short term interruption to ferry services.	Multiple fatalities; Constructive Loss; Serious pollution incident (Tier 2); International adverse publicity. Ferry out of service.

Organisation	Baseline Risk Rank	Realistic Most Likely Scores					Realistic Worst Credible Scores					Baseline Risk Score	Baseline Risk Rating	Notes
		People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency			
NASH Draft Scores	1	2	2	1	3	3	5	5	4	5	2	8.6	Medium Risk - Tolerable (if ALARP)	
Department of Infrastructure (IOM)	1	3	4	3	4	3	5	5	4	5	3	12.9	High Risk - Unacceptable	
Isle of Man Steam Packet Company Limited	1	3	4	3	4	3	5	5	4	5	3	12.9	High Risk - Unacceptable	high speed craft, full speed, aluminium hull, frequency worst case should be 2.5 as different risk in north channel compared to southwest passage
Maritime and Coastguard Agency	2	3	3	2	3	3	5	5	4	5	2	9.2	Medium Risk - Tolerable (if ALARP)	
Seatruck Ferries	1	3	3	3	4	3	5	5	4	5	3	12.8	High Risk - Unacceptable	share concerns with Stena and IoMSP. the matrix doesn't have a board enough scope to consider level between established levels (would have scored 2.5 for worst credible frequency)
Spirit Energy	4	3	3	2	3	3	5	5	4	5	3	11.6	Medium Risk - Tolerable (if ALARP)	
Stena Line	1	3	4	3	4	3	5	5	4	5	3	12.9	High Risk - Unacceptable	Scenario considered is an interaction with a North bound conventional ferry ex Liverpool (3 times daily) encountering a vessel ex IoM bound for Liverpool. This encounter takes place West of Morecambe.
Tom Watson	1	3	3	2	3	3	5	5	4	5	2	9.2	Medium Risk - Tolerable (if ALARP)	
UK Chamber of Shipping	2	3	3	2	3	3	5	5	4	5	3	11.6	Medium Risk - Tolerable (if ALARP)	Higher risk in SW corner. Frequency greater with ferry/pax involvement due to no of crossings
Final Scores	1	3	3	2	3	3	5	5	4	5	2	9.2	Medium Risk - Tolerable (if ALARP)	Increase RML people, property and environment by 1 category.

Hazard ID:	2
Hazard Title:	Collision: Cargo & Tanker ICW. other Cargo & Tanker
Area:	Array Area + 10nm

Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Realistic Worst Credible Scenario
Reduced Searoom Between OWFs; Human Error/Poor Seamanship; Failure to Comply with COLREGs; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; ERCOP; Layout Plan and Lines of Orientation.	Multiple minor injuries; Moderate damage to vessels; Minor pollution (Tier 1); Widespread adverse publicity; Vessel requires drydock.	Single fatality; Constructive Loss; Major pollution incident (Tier 3); National adverse publicity.

Organisation	Baseline Risk Rank	Realistic Most Likely Scores					Realistic Worst Credible Scores					Baseline Risk Score	Baseline Risk Rating	Notes
		People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency			
NASH Draft Scores	4	2	2	1	2	3	4	5	5	4	2	7.6	Medium Risk - Tolerable (if ALARP)	
Maritime and Coastguard Agency	5	2	3	2	3	3	4	5	5	4	2	8.9	Medium Risk - Tolerable (if ALARP)	
UK Chamber of Shipping	4	2	3	1	3	3	4	5	5	4	2	8.7	Medium Risk - Tolerable (if ALARP)	Higher risk in SW corner
Final Scores	1	2	3	2	3	3	4	5	5	4	2	8.9	Medium Risk - Tolerable (if ALARP)	Increased RML property, environment, and business by 1 category.

Hazard ID:	3	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Realistic Worst Credible Scenario
Hazard Title:	Collision: Ferry & Passenger or Cargo & Tanker ICW. Small Craft	Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; Failure to Comply with COLREGs; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; ERCOP; Incident Investigation and Reporting; Layout Plan and Lines of Orientation; Marine Operating Guidelines; Vessel Standards; Training; Compliance of Project Vessels; Vessel Traffic Monitoring.	Multiple major injuries; Moderate damage to small craft; Minor pollution (Tier 1); Widespread adverse publicity;	Multiple fatalities; Loss of small craft; Moderate pollution incident (Tier 2); National adverse publicity.
Area:	Array Area + 10nm				

Organisation	Baseline Risk Rank	Realistic Most Likely Scores					Realistic Worst Credible Scores					Baseline Risk Score	Baseline Risk Rating	Notes
		People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency			
NASH Draft Scores	6	2	3	1	2	3	4	3	3	4	2	7.5	Medium Risk - Tolerable (if ALARP)	
Department of Infrastructure (IOM)	1	3	3	2	4	4	5	4	3	4	3	13.8	High Risk - Unacceptable	Following consideration by IOMSPC and reflecting the use of the fast craft vessel. This also takes into account the fast craft travelling along the southern sector of the array area (+10nm).
Isle of Man Steam Packet Company Limited	1	3	3	2	4	4	5	4	3	4	3	13.8	High Risk - Unacceptable	fast craft, full speed, aluminium hull, small craft construction material vary between stell and GRP
Maritime and Coastguard Agency	1	3	3	2	3	4	4	3	3	4	3	11.4	Medium Risk - Tolerable (if ALARP)	
Seatruck Ferries	2	3	3	2	3	4	5	4	3	4	3	12.5	High Risk - Unacceptable	
Spirit Energy	6	3	3	2	3	3	4	3	3	4	3	9.9	Medium Risk - Tolerable (if ALARP)	
Stena Line	1	3	3	2	4	4	5	4	3	4	3	13.8	High Risk - Unacceptable	Possibility of non-detection of service vessels, leisure craft or FV's by radar due to cumulative interference by radar or backscatter from turbine lights.

Tom Watson	1	3	3	2	3	4	4	3	3	4	3	11.4	Medium Risk - Tolerable (if ALARP)	
UK Chamber of Shipping	2	3	3	2	3	4	4	4	3	4	3	11.6	Medium Risk - Tolerable (if ALARP)	
Final Scores	**1**	**3**	**3**	**2**	**3**	**4**	**5**	**4**	**3**	**4**	**2**	**10.3**	**Medium Risk - Tolerable (if ALARP)**	Increased RML people by 1 category and frequency by 1 category. Increased RWC people and property by 1 category.

Hazard ID:	7
Hazard Title:	Allision: Ferry & Passenger
Area:	Array Area + 10nm

Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Realistic Worst Credible Scenario
Presence of WTGs; Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; AtoNs Failure; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; Safety Zones; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Aids to Navigation; Air Draught Clearance; Layout Plan and Lines of Orientation; Vessel Traffic Monitoring.	Multiple major injuries; Moderate damage to vessel; Minor pollution (Tier 1); Widespread adverse publicity; Repairs to WTGs; Short term interruption to ferry services.	Multiple fatalities; Serious damage/Constructive Loss; Moderate pollution incident (Tier 2); International adverse publicity; Loss of WTGs; Ferry out of service.

Organisation	Baseline Risk Rank	Realistic Most Likely Scores					Realistic Worst Credible Scores					Baseline Risk Score	Baseline Risk Rating	Notes
		People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency			
NASH Draft Scores	2	2	2	1	3	3	5	4	3	5	2	8.4	Medium Risk - Tolerable (if ALARP)	
Department of Infrastructure (IOM)	3	3	4	3	4	3	5	4	3	5	3	12.6	High Risk - Unacceptable	Following discussions and consideration by IOMSPC taking into account the impact of the scenario on the fast craft vessel.
Isle of Man Steam Packet Company Limited	3	3	4	3	4	3	5	4	3	5	3	12.6	High Risk - Unacceptable	fast craft, full speed, aluminium hull, extensive damage to vessel and turbine structure
Maritime and Coastguard Agency	4	3	3	2	3	3	5	4	3	5	2	8.9	Medium Risk - Tolerable (if ALARP)	
Seatruck Ferries	3	3	4	3	3	3	5	4	3	5	3	12.4	High Risk - Unacceptable	
Spirit Energy	1	5	5	3	5	2	5	5	4	5	3	12.1	Medium Risk - Tolerable (if ALARP)	Allision with the O&G installation
Stena Line	3	3	4	3	4	3	5	4	3	5	3	12.6	High Risk - Unacceptable	It is assumed that any contact with a turbine will result in major structural damage to the turbine and lesser damage to the vessel.
Tom Watson	4	3	3	2	3	3	5	4	3	5	2	8.9	Medium Risk - Tolerable (if ALARP)	
UK Chamber of Shipping	1	3	3	1	4	3	5	4	3	4	3	11.8	Medium Risk - Tolerable (if ALARP)	Frequency a 2.5 for worst credible
Final Scores	1	3	3	2	3	3	5	4	3	5	2	8.9	Medium Risk - Tolerable (if ALARP)	Increased RML people, property and environment by 1 category.

Hazard ID:	**8**
Hazard Title:	Allision with OWF: Cargo & Tankers
Area:	Array Area + 10nm

Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Realistic Worst Credible Scenario
Presence of WTGs; Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; AtoNs Failure; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; Safety Zones; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Aids to Navigation; Air Draught Clearance; Layout Plan and Lines of Orientation; Vessel Traffic Monitoring.	Multiple minor injuries; Moderate damage to vessel; No pollution; Widespread adverse publicity; Repairs to WTGs;	Single fatality; Serious damage, drydock required; Serious pollution incident (Tier 2); International adverse publicity; Loss of WTGs.

Organisation	Baseline Risk Rank	Realistic Most Likely Scores					Realistic Worst Credible Scores					Baseline Risk Score	Baseline Risk Rating	Notes
		People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency			
NASH Draft Scores	2	2	2	1	2	4	4	4	4	5	2	8.4	Medium Risk - Tolerable (if ALARP)	
Maritime and Coastguard Agency	2	2	3	2	3	4	4	4	4	5	2	10.1	Medium Risk - Tolerable (if ALARP)	
UK Chamber of Shipping	5	2	3	1	3	3	4	4	4	5	2	8.6	Medium Risk - Tolerable (if ALARP)	
Final Scores	1	2	3	1	3	3	4	4	4	5	2	8.6	Medium Risk - Tolerable (if ALARP)	Increased RML property and business by 1 category. Decreased RML frequency by 1 category.

Hazard ID:	**23**
Hazard Title:	Allision with O&G: Cargo & Tankers
Area:	Array Area + 10nm

Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Realistic Worst Credible Scenario
Presence of WTGs; Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; AtoNs Failure; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; Safety Zones; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Aids to Navigation; Air Draught Clearance; Layout Plan and Lines of Orientation; Vessel Traffic Monitoring.	Multiple major injuries; Moderate damage to vessel; Moderate pollution incident (Tier 2); Widespread adverse publicity; Repairs to WTGs;	Multiple fatalities; Major Damage, drydock required; Serious pollution incident (Tier 2); International adverse publicity; Loss of WTGs.

Organisation	Baseline Risk Rank	Realistic Most Likely Scores					Realistic Worst Credible Scores					Baseline Risk Score	Baseline Risk Rating	Notes
		People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency			
NASH Draft Scores	2	2	2	1	2	4	4	4	4	5	2	8.4	Medium Risk - Tolerable (if ALARP)	
Spirit Energy	1	5	5	3	5	2	5	5	4	5	3	12.1	Medium Risk - Tolerable (if ALARP)	Allision with the O&G installation
Final Scores	1	3	3	3	3	3	5	5	4	5	2	9.4	Medium Risk - Tolerable (if ALARP)	Increased RML people, property and environment by 1 category.

During the hazard workshop, consensus was not reached on a number of hazards, with a range of scores between the NRA team and stakeholders. Therefore, the findings of the workshop were considered with the analysis and wider assessment undertaken by the NRA team to derive the final risk assessment described in the NRA.

HAZARD WORKSHOP 2

HAZARD WORKSHOP TIMINGS

The hazard workshop preparation consisted of the following:

1) **09 August 2023**: Save the date email issued to the wider stakeholder group which provided the dates for the hazard workshop, format and location
2) **29 August 2023**: Issue of letter to all stakeholders introducing the Projects, the commitments made post-PEIR and provided further details of the hazard workshop venue and format
3) **18 September 2023**: Issue of Project update newsletters outlining boundary changes made to the public
4) **21 and 22 September 2023**: Issue of pre-read packs to all stakeholders which contained:
5) Slide pack containing a summary of the Projects, boundary changes, analysis, methodology and reasoning behind the hazard scoring
6) Draft hazard logs developed by the Project Team
7) **29 September 2023**: Hazard Workshop.

HAZARD WORKSHOP

A hazard workshop was held in person on 29 September 2023 at the Mercure Atlantic Tower Hotel in Liverpool.

The agenda was as follows:

- 09:00 Recap of CRNRA and Recap of Method
- 09:15 Morgan/Mona Scoring Session
- 12:00 Morgan/Mona Washup
- 12:15 Lunch
- 13:30 Morecambe Scoring Session
- 16:30 Morecambe Washup

ATTENDEES

Table 47 details the organisations and representatives that attended the workshop.

Table 47: Hazard workshop attendees.

Organisation	Category	Role
NASH Maritime	Project Team	Shipping and Navigation Consultants (Mona/Morgan/Morecambe)
HR Wallingford		Consultant Master Mariner Supporting NASH Maritime
Brookes Bell		Consultant Master Mariner Supporting NASH Maritime
bp/EnBW		Developer of Mona and Morgan
Flotation Energy		Developer of Morecambe
Royal Haskoning		EIA Lead for Morecambe
Anglo-North Irish Fish Producers Organization (ANIFPO)	Stakeholder	Impact on Fishing
ENI		Impact on Oil and Gas Operations
Harbour Energy		Impact on Oil and Gas Operations
IoM Government		Impact on Ferry Services and IoM Developments
MCA		Impact on Navigation Safety
Orsted		Impact on Existing and Planned offshore windfarms
Peel Ports		Impact on Navigation Safety and Port Operations
Scottish Whitefish Producers Association (SWFPA)		Impact on Fishing
Seatruck Group		Impact on Navigation Safety and Ferry Services
Spirit Energy		Impact on Oil and Gas Operations
Steam Packet		Impact on Navigation Safety and Ferry Services
Stenaline		Impact on Navigation Safety and Ferry Services
Fisheries Liaison Officer		Impact on Fishing
UK Chamber of Shipping		Impact on Navigation Safety and Commercial Operators

HAZARD WORKSHOP PROCESS

At the workshop:

- The Project team introduced the material and methodology
- Each hazard was reviewed in turn, with each attendee invited to discuss amongst their tables and score their personalised hazard log. Stakeholders were encouraged to fill out the comments section of each hazard post workshop to provide a higher level of description regarding their scores
- Each hazard score was then reviewed as a group with differences in scoring discussed, before a consensus was sought
- Once each hazard discussion had come to a close, the summary spreadsheet was ‘locked’ to capture the concluding scores of the discussion

- Risk controls were reviewed and appropriate additional risk controls discussed
- Update of hazard risk scores based on the findings of the hazard workshop for inclusion in the NRA.

RESULTS

During the hazard workshop it was agreed that the hazards discussed for the cumulative scenario were similar but lesser for the Project individually. It was agreed that the two highest scoring hazards (Hazard ID 3 and 23) should be discussed, and the other hazards should be amended based on the feedback from the CRNRA workshop on 28 September 2023 (see Appendix 14.2 Cumulative Regional Navigational Risk Assessment (Document Reference 5.2.14.2). The baseline hazard scores and comments for the hazards discussed in the Project NRA hazard workshop are provided in the following tables.

During the hazard workshop, consensus was not reached on the discussed hazards, with a range of scores between the NRA team and stakeholders. However, consensus was reached with the stakeholders that no further additional risk controls were required for the Project. This means that, where risks are scored as Medium, they are considered to be ALARP and therefore Tolerable. The findings of the workshop were considered with the analysis and wider assessment undertaken by the NRA team to derive the final risk assessment described in this NRA (see **Section 9** and Appendix **D**).

Hazard ID:	3
Hazard Title:	Collision: Ferry & Passenger or Cargo & Tanker ICW. Small Craft
Area:	Windfarm Site + 10nm

Organisation	Realistic Most Likely Scores					Realistic Worst Credible Scores					Baseline Risk Score	Baseline Risk Rating	Notes
	People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency			
Draft Scores	3	3	2	3	3	5	4	3	4	2	**8.8**	Medium Risk - Tolerable (if ALARP)	
ANIFPO	3	3	2	3	3	5	4	3	4	2	**8.8**	Medium Risk - Tolerable (if ALARP)	
CoS	3	3	2	3	3	5	4	3	4	2	**8.8**	Medium Risk - Tolerable (if ALARP)	
ENI	3	3	2	3	3	5	4	3	4	2	**8.8**	Medium Risk - Tolerable (if ALARP)	
Harbour Energy	3	4	2	3	2	5	5	3	4	2	**8.1**	Medium Risk - Tolerable (if ALARP)	
IoM Gov	3	3	2	3	3	5	4	3	4	2	**8.8**	Medium Risk - Tolerable (if ALARP)	
IoMSPC	3	3	2	3	3	5	4	3	4	2	**8.8**	Medium Risk - Tolerable (if ALARP)	
MCA	3	3	2	3	3	5	4	3	4	2	**8.8**	Medium Risk - Tolerable (if ALARP)	
Seatruck	3	4	2	3	3	5	4	3	4	2	**9.8**	Medium Risk - Tolerable (if ALARP)	
Spirit Energy	3	4	2	3	2	5	5	3	4	2	**8.1**	Medium Risk - Tolerable (if ALARP)	
Stenaline	3	3	2	3	3	5	4	3	4	2	**8.8**	Medium Risk - Tolerable (if ALARP)	
SWPAL	3	3	2	3	3	5	4	3	4	2	**8.8**	Medium Risk - Tolerable (if ALARP)	
Fisheries Liaison Officer	3	3	2	3	3	5	4	3	4	2	**8.8**	Medium Risk - Tolerable (if ALARP)	
WCSP	3	3	2	3	3	5	4	3	4	2	**8.8**	Medium Risk - Tolerable (if ALARP)	

Hazard ID:	23
Hazard Title:	Allision with O&G Infrastructure: Cargo & Tankers
Area:	Windfarm Site + 10nm

Organisation	Realistic Most Likely Scores					Realistic Worst Credible Scores					Baseline Risk Score	Baseline Risk Rating	Notes
	People	Property	Environment	Business	Frequency	People	Property	Environment	Business	Frequency			
Draft Scores	3	3	3	3	3	5	5	4	5	2	**9.4**	Medium Risk - Tolerable (if ALARP)	
ANIFPO	3	3	3	3	3	5	5	4	5	2	**9.4**	Medium Risk - Tolerable (if ALARP)	
CoS	3	3	3	3	3	5	5	4	5	2	**9.4**	Medium Risk - Tolerable (if ALARP)	
ENI	3	3	3	3	3	5	5	4	5	2	**9.4**	Medium Risk - Tolerable (if ALARP)	
Harbour Energy	5	5	3	5	2	5	5	4	5	2	**9.6**	Medium Risk - Tolerable (if ALARP)	
IoM Gov	3	3	3	3	3	5	5	4	5	2	**9.4**	Medium Risk - Tolerable (if ALARP)	
IoMSPC	3	3	3	3	3	5	5	4	5	2	**9.4**	Medium Risk - Tolerable (if ALARP)	
MCA	3	3	3	3	3	5	5	4	5	2	**9.4**	Medium Risk - Tolerable (if ALARP)	
Seatruck	3	3	3	3	3	5	5	4	5	2	**9.4**	Medium Risk - Tolerable (if ALARP)	
Spirit Energy	5	5	3	5	2	5	5	4	5	2	**9.6**	Medium Risk - Tolerable (if ALARP)	
Stenaline	3	3	3	3	3	5	5	4	5	2	**9.4**	Medium Risk - Tolerable (if ALARP)	
SWPAL	3	3	3	3	3	5	5	4	5	2	**9.4**	**Medium Risk - Tolerable (if ALARP)**	
Fisheries Liaison Officer	3	3	3	3	3	5	5	4	5	2	**9.4**	**Medium Risk - Tolerable (if ALARP)**	
WCSP	3	3	3	3	3	5	5	4	5	2	**9.4**	**Medium Risk - Tolerable (if ALARP)**	

Appendix D Hazard Log Tables

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores – People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores – People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
1	7	C/O/D	Windfarm Site + 10nm	Collision: Ferry & Passenger ICW. Cargo & Tanker or other Ferry & Passenger	Reduced Searoom Between OWFs; Human Error/Poor Seamanship; Failure to Comply with COLREGs; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; ERCOP; Layout Plan and Lines of Orientation.	Multiple major injuries; Moderate damage to vessels; Minor pollution (Tier 1); Widespread adverse publicity; Short term interruption to ferry services.	3	3	2	4	2	Multiple fatalities; Constructive Loss; Serious pollution incident (Tier 2); International adverse publicity. Ferry out of service.	5	5	4	5	2	8.4	Medium Risk - Tolerable (if ALARP)
2	4	C/O/D	Windfarm Site + 10nm	Collision: Cargo & Tanker ICW. other Cargo & Tanker	Reduced Searoom Between OWFs; Human Error/Poor Seamanship; Failure to Comply with COLREGs; Fatigue; Radar Interference	Notice to Mariners; Site Marking and Charting; ERCOP; Layout Plan and Lines of Orientation.	Multiple minor injuries; Moderate damage to vessels; Minor pollution (Tier 1); Widespread adverse publicity; Vessel	2	3	2	3	3	Single fatality; Constructive Loss; Major pollution incident (Tier 3); National adverse publicity.	4	5	5	4	2	8.9	Medium Risk - Tolerable (if ALARP)

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores: People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores: People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
					from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;		requires drydock.													
3	1	C/O/D	Windfarm Site + 10nm	Collision: Ferry & Passenger or Cargo & Tanker ICW. Small Craft	Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; Failure to Comply with COLREGs; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; ERCOP; Incident Investigation and Reporting; Layout Plan and Lines of Orientation; Marine Operating Guidelines; Vessel Standards; Training; Compliance of Project Vessels; Vessel Traffic Monitoring.	Multiple major injuries; Moderate damage to small craft; Minor pollution (Tier 1); Widespread adverse publicity;	3	3	2	4	3	Multiple fatalities; Loss of small craft; Moderate pollution incident (Tier 2); National adverse publicity.	5	4	3	4	2	9.8	Medium Risk - Tolerable (if ALARP)

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores – People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores – People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
4	11	C/O/D	Windfarm Site + 10nm	Collision: Small Craft ICW. Small Craft	Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Layout Plan and Lines of Orientation; Marine Operating Guidelines; Vessel Standards; Training; Compliance of Project Vessels; Vessel Traffic Monitoring.	Multiple minor injuries; Moderate damage to small craft; No pollution; Minor adverse publicity.	2	3	1	2	3	Multiple serious injuries/single fatality; Moderate damage; Moderate pollution incident (Tier 2); National adverse publicity.	4	4	3	4	2	7.6	**Medium Risk - Tolerable (if ALARP)**
5	3	C/D	Windfarm Site + 10nm	Collision: Large Project ICW. Ferry & Passenger or Cargo & Tanker	Reduced Searoom Between OWFs; Human Error/Poor Seamanship; Failure to Comply with COLREGs; Fatigue; Radar Interference	Notice to Mariners; Site Marking and Charting; ERCOP; Layout Plan and Lines of Orientation.	Multiple major injuries; Moderate damage to vessels; Minor pollution (Tier 1); Widespread adverse publicity; Vessel	3	3	2	3	3	Multiple fatalities; Constructive Loss; Serious pollution incident (Tier 2); International adverse publicity.	5	5	4	5	2	9.2	**Medium Risk - Tolerable (if ALARP)**

								Baseline											Baseline Risk Score	
								Realistic Most Likely Scores						Realistic Worst Credible Scores						
ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
					from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;		requires drydock.													
6	13	C/D	Windfarm Site + 10nm	Collision: Large Project ICW. Small Craft	Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; Failure to Comply with COLREGs; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; ERCOP; Incident Investigation and Reporting; Layout Plan and Lines of Orientation; Marine Operating Guidelines; Vessel Standards; Training; Compliance of Project Vessels; Vessel Traffic Monitoring; Guard Boat.	Multiple major injuries; Moderate damage to small craft; Minor pollution (Tier 1); Widespread adverse publicity;	3	3	2	3	2	Multiple fatalities; Loss of small craft; Moderate pollution incident (Tier 2); National adverse publicity.	5	4	3	4	2	7.4	**Medium Risk - Tolerable (if ALARP)**

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores – People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores – People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
7	8	C/O/D	Windfarm Site + 10nm	Allision: Ferry & Passenger	Presence of WTGs; Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; AtoNs Failure; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; Safety Zones; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Aids to Navigation; Air Draught Clearance; Layout Plan and Lines of Orientation; Vessel Traffic Monitoring.	Multiple major injuries; Moderate damage to vessel; Minor pollution (Tier 1); Widespread adverse publicity; Repairs to WTGs; Short term interruption to ferry services.	3	3	2	4	2	Multiple fatalities; Serious damage/Constructive Loss; Moderate pollution incident (Tier 2); International adverse publicity; Loss of WTGs; Ferry out of service.	5	4	3	5	2	8.1	Medium Risk - Tolerable (if ALARP)

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores: People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores: People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
8	6	C/O/D	Windfarm Site + 10nm	Allision: Cargo & Tankers	Presence of WTGs; Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; AtoNs Failure; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; Safety Zones; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Aids to Navigation; Air Draught Clearance; Layout Plan and Lines of Orientation; Vessel Traffic Monitoring.	Multiple minor injuries; Moderate damage to vessel; No pollution; Widespread adverse publicity; Repairs to WTGs;	2	3	1	3	3	Single fatality; Serious damage, drydock required; Serious pollution incident (Tier 2); International adverse publicity; Loss of WTGs.	4	5	4	5	2	8.7	Medium Risk - Tolerable (if ALARP)

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores – People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores – People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
9	9	C/O/D	Windfarm Site + 10nm	Allision: Tug & Service	Presence of WTGs; Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; AtoNs Failure; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; Safety Zones; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Aids to Navigation; Air Draught Clearance; Layout Plan and Lines of Orientation; Marine Operating Guidelines; Vessel Standards; Training; Compliance of Project Vessels.	Multiple minor injuries; Moderate damage to small craft; No pollution; Widespread adverse publicity; Repairs to WTGs.	2	3	1	3	3	Single fatality; Loss of small craft; Moderate pollution incident (Tier 2); National adverse publicity; Repairs to WTGs.	4	4	3	4	2	7.8	Medium Risk - Tolerable (if ALARP)

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores – People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores – People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
10	15	C/O/D	Windfarm Site + 10nm	Allision: Fishing	Presence of WTGs; Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; AtoNs Failure; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; Safety Zones; Fishing Liaison Plan; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Aids to Navigation; Air Draught Clearance; Layout Plan and Lines of Orientation.	Multiple minor injuries; Minor damage to small craft; No pollution; Minor adverse publicity.	2	2	1	2	3	Single fatality; Loss of small craft; Minor pollution incident (Tier 2); National adverse publicity; Repairs to WTGs.	4	4	2	4	2	6.6	Medium Risk - Tolerable (if ALARP)

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores: People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores: People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
11	22	C/O/D	Windfarm Site + 10nm	Allision: Recreational	Presence of WTGs; Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; AtoNs Failure; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; Safety Zones; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Aids to Navigation; Air Draught Clearance; Layout Plan and Lines of Orientation.	Multiple minor injuries; Minor damage to small craft; No pollution; Minor adverse publicity.	2	2	1	2	2	Multiple serious injuries/single fatality; Loss of small craft; Minor pollution incident (Tier 2); National adverse publicity; Repairs to WTGs.	4	4	2	4	1	3.8	Negligible Risk - Broadly Acceptable

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores – People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores – People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
12	17	C/D	Windfarm Site + 10nm	Allision: Large Project	Presence of WTGs; Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; AtoNs Failure; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; Safety Zones; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Aids to Navigation; Air Draught Clearance; Layout Plan and Lines of Orientation; Vessel Traffic Monitoring.	Multiple minor injuries; Moderate damage to vessel; No pollution; Widespread adverse publicity; Repairs to WTGs;	2	3	1	3	2	Single fatality; Serious damage, drydock required; Moderate pollution incident (Tier 2); International adverse publicity; Loss of WTGs.	4	4	3	5	1	4.9	Low Risk - Broadly Acceptable

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline											Baseline Risk Score	
								Realistic Most Likely Scores					Realistic Worst Credible Scenario	Realistic Worst Credible Scores						
								People	Property	Environment	Business	Frequency		People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
13	18	C/O/D	Windfarm Site + 10nm	Allision: Small Project	Presence of WTGs; Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; AtoNs Failure; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; Site Marking and Charting; Safety Zones; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Aids to Navigation; Air Draught Clearance; Layout Plan and Lines of Orientation; Marine Operating Guidelines; Vessel Standards; Training; Compliance of Project Vessels.	Multiple minor injuries; Minor damage to small craft; No pollution; Minor adverse publicity; Repairs to WTGs.	2	2	1	2	3	Single fatality; Loss of small craft; Moderate pollution incident (Tier 2); National adverse publicity; Repairs to WTGs.	4	4	3	4	1	4.8	Low Risk - Broadly Acceptable
14	16	C/O/D	Windfarm Site	Snagging: Fishing	Insufficient Lookout; Inadequate Passage Planning; Human Error/Fatigue; Poor Visibility in Area;	Notice to Mariners; Site Marking and Charting; Safety Zones; Incident Investigation and Reporting;	Multiple minor injuries; Minor damage; No pollution; Minor adverse publicity.	2	2	1	2	3	Multiple serious injuries/single fatality; Serious damage/Loss of small craft; Minor pollution; Repairs to cable/armour.	4	4	2	3	2	6.4	Medium Risk - Tolerable (if ALARP)

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores: People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores: People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
					Charts not up to date.															
15	23	C/O/D	Windfarm Site	Snagging: Recreational	Insufficient Lookout; Inadequate Passage Planning; Human Error/Fatigue; Poor Visibility in Area; Charts not up to date.	Notice to Mariners; Site Marking and Charting; Safety Zones; Incident Investigation and Reporting;	Minor injuries; Minor damage; No pollution; Minor adverse publicity.	1	2	1	2	2	Multiple serious injuries/single fatality; Moderate damage; Minor pollution (Tier 1); Repairs to cable/armour.	4	3	2	3	1	3.5	Negligible Risk - Broadly Acceptable
16	21	C/O/D	Windfarm Site	Snagging: Ferry & Passenger & Cargo & Tanker	Insufficient Lookout; Inadequate Passage Planning; Human Error/Fatigue; Poor Visibility in Area; Charts not up to date.	Notice to Mariners; Site Marking and Charting; Safety Zones; Incident Investigation and Reporting;	Minor injuries; No property damage; No pollution; Widespread adverse publicity; Survey of cable.	1	1	1	3	2	Multiple serious injuries/single fatality; Serious damage; Minor pollution; Cable out of service until repaired.	4	4	2	3	1	4.1	Negligible Risk - Broadly Acceptable

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores: People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores: People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
17	20	C/O/D	Windfarm Site	Snagging: Large Project, Small Project and Tug & Services.	Insufficient Lookout; Inadequate Passage Planning; Human Error/Fatigue; Poor Visibility in Area; Charts not up to date.	Notice to Mariners; Site Marking and Charting; Safety Zones; Incident Investigation and Reporting;	Multiple minor injuries; Minor damage; No pollution; Minor adverse publicity; Survey of cable.	2	2	1	2	3	Multiple serious injuries/single fatality; Serious damage; Minor pollution (Tier 1); Cable out of service until repaired.	4	4	2	3	1	4.6	Low Risk - Broadly Acceptable
18	5	C/O/D	O&M Route	Collision: Small Project ICW. Ferry & Passenger, Cargo & Tanker	Increased Project Vessel Movements; Human Error/Poor Seamanship; Failure to Comply with COLREGs; Fatigue; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; ERCOP; Incident Investigation and Reporting; Marine Operating Guidelines; Vessel Standards; Training; Compliance of Project Vessels; Vessel Traffic Monitoring.	Multiple major injuries; Moderate damage to small craft; Minor pollution (Tier 1); Widespread adverse publicity; Short term interruption to ferry services.	3	3	2	3	3	Multiple fatalities; Loss of small craft; Moderate pollution incident (Tier 2); National adverse publicity. Long term interruption to ferry services.	5	4	3	4	2	8.8	Medium Risk - Tolerable (if ALARP)

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores: People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores: People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
19	14	C/O/D	O&M Route	Collision: Small Project ICW. (Other) Small Craft	Increased Project Vessel Movements; Human Error/Poor Seamanship; Fatigue; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Marine Operating Guidelines; Vessel Standards; Training; Compliance of Project Vessels; Vessel Traffic Monitoring.	Multiple minor injuries; Minor damage to small craft; No pollution; Minor adverse publicity.	2	2	1	2	3	Single fatality; Moderate damage; Moderate pollution incident (Tier 2); National adverse publicity.	4	4	3	4	2	6.7	**Medium Risk - Tolerable (if ALARP)**
20	18	C/O/D	O&M Route	Allision / Grounding: Small Project	Increased Project Vessel Movements; Human Error/Poor Seamanship; Fatigue; Mechanical Failure; Adverse Weather; Avoidance of Small Craft; Reduced Visibility;	Notice to Mariners; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Marine Operating Guidelines; Vessel Standards; Training; Compliance of Project Vessels.	Multiple minor injuries; Minor damage to small craft; No pollution; Minor adverse publicity.	2	2	1	2	3	Single fatality; Loss of small craft; Moderate pollution incident (Tier 2); National adverse publicity; Repairs to WTGs.	4	4	3	4	1	4.8	**Low Risk - Broadly Acceptable**

ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	Baseline: Realistic Most Likely Scores: People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	Realistic Worst Credible Scores: People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
21	9	C/O/D	Windfarm Site + 10nm & O&M Route	Vessel Emergency - Ferry & Passenger, Cargo & Tanker and Large Project	Human Error/Poor Seamanship; Fatigue; Mechanical Failure; Adverse Weather;	ERCOP; Periodic Exercises; Incident Investigation and Reporting;	Multiple minor injuries; Minor damage to vessel; No pollution; Minor adverse publicity.	2	2	1	2	3	Multiple fatalities; Major damage; Major pollution incident (Tier 3); International adverse publicity.	5	5	5	5	2	7.8	Medium Risk - Tolerable (if ALARP)
22	12	C/O/D	Windfarm Site + 10nm & O&M Route	Vessel Emergency - Small Craft	Human Error/Poor Seamanship; Fatigue; Mechanical Failure; Adverse Weather;	ERCOP; Periodic Exercises; Incident Investigation and Reporting;	Multiple minor injuries; Minor damage to small craft; No pollution; Minor adverse publicity.	2	2	1	2	3	Multiple fatalities; Serious damage; Serious pollution incident (Tier 2); National adverse publicity.	5	4	4	4	2	7.4	Medium Risk - Tolerable (if ALARP)
23	1	C/O/D	Windfarm Site + 10nm	Allision with O&G Infrastructure: Cargo & Tankers	Presence of WTGs; Reduced Searoom Between OWFs; Increased Project Vessel Movements; Human Error/Poor Seamanship; AtoNs Failure; Fatigue; Radar Interference from WTGs; Mechanical Failure; Adverse	Notice to Mariners; Site Marking and Charting; Safety Zones; ERCOP; Periodic Exercises; Incident Investigation and Reporting; Aids to Navigation; Air Draught Clearance; Layout Plan and Lines of Orientation;	Multiple major injuries; Moderate damage to vessel; Moderate pollution incident (Tier 2); Widespread adverse publicity; Repairs to WTGs;	5	5	3	5	2	Multiple fatalities; Major Damage, drydock required; Serious pollution incident (Tier 2); International adverse publicity; Loss of WTGs.	5	5	5	5	2	9.8	Medium Risk - Tolerable (if ALARP)

							Baseline												Baseline Risk Score	
								Realistic Most Likely Scores						Realistic Worst Credible Scores						
ID	Baseline Haz. Rank	Project Phase	Area	Hazard Title	Possible causes	Embedded Mitigation	Realistic Most Likely Scenario	People	Property	Environment	Business	Frequency	Realistic Worst Credible Scenario	People	Property	Environment	Business	Frequency	Baseline Risk Score	Baseline Risk Rating
					Weather; Avoidance of Small Craft; Reduced Visibility;	Vessel Traffic Monitoring.														

Appendix E Vessel Traffic Surveys

NASH MARITIME

MORECAMBE OWF

Vessel Traffic Survey Report

Offshore Wind Limited

Document No: 21-NASH-0193 | 01-00

07-Sep-22

PROJECT INFORMATION

PROJECT TITLE	Morecambe OWF
REPORT TITLE	Vessel Traffic Survey Report
CLIENT	Offshore Wind Limited
CLIENT ADDRESS	One, St Peter's Square, Manchester, United Kingdom, M2 3DE

DOCUMENT CONTROL

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FIGURES

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APPENDICES

ABBREVIATIONS

Abbreviation	Detail
AIS	Automatic Identification System
EIA	Environmental Impact Assessment
ES	Environmental Statement
GPS	Global Positioning System
LNG	Liquified Natural Gas
MCA	Maritime and Coastguard Agency
NRA	Navigation Risk Assessment
OREI	Offshore Renewable Energy Installation
OWF	Offshore Wind Farm
UTC	Universal Time Coordinated
VHF	Very High Frequency

1. INTRODUCTION

1.1 OVERVIEW AND DOCUMENT OBJECTIVE

NASH Maritime Ltd (NASH Maritime) have been contracted by Offshore Wind Ltd to undertake a Shipping and Navigation study for the proposed Morecambe Offshore Windfarm (OWF). The objective of this document is to provide a factual record of the primary marine vessel traffic datasets collected by NASH Maritime using Automatic Information System (AIS), marine Radar and visual observations to support the Shipping & Navigation study.

Full details on the assessment and data requirements, together with the data collection methodology (and including the project execution plan and survey methodology for the vessel based 'marine vessel traffic survey' undertaken of the OWF site in Winter and Summer 2022) is contained within the document titled 'Morecambe and White Cross OWF Marine Vessel Traffic Survey Methodology and Project Execution Plan' (Ref: 21-NASH-0201_Survey_Methodology_R01-00).

Additional project shipping and navigation datasets will be collected to assist in the characterisation of vessel traffic in the project area and will be integrated with the data presented in this document during the Shipping and Navigation study.

It should be noted that this document does not extend to interpretive analysis of the data collected which will be undertaken during the Shipping and Navigation study (including a Navigation Risk Assessment) being undertaken as a component of the Environmental Impact Assessment (EIA) and included within the planned submission of an Environmental Statement (ES).

1.2 GUIDANCE

Marine vessel traffic data for the proposed Morecambe OWF has been collected in accordance with requirements of Marine Guidance Note 654 titled 'Safety of Navigation: Offshore Renewable Energy Installations (OREIs) - Guidance on UK Navigational Practice, Safety and Emergency Response'.

4.6 NRA – Traffic Survey

a. An up to date, traffic survey of the proposed development area concerned should be undertaken within 12 months prior to submission of the EIA Report. This should include all the vessel and craft types found in the area and total at least 28 days duration but also take account of seasonal variations and peak times in traffic patterns and fishing operations. AIS data alone will not constitute an appropriate traffic survey; radar, manual observations, other data sources (e.g. for fishing and recreation) and stakeholder consultation will ensure those vessels that are not required to carry and operate AIS are included, and it provides an appropriate representation of the base line marine traffic.

NASH Maritime consulted with the Maritime and Coastguard Agency (MCA) in Jan-2022, to ensure the appropriateness of the proposed datasets and that where data was due to be collected, it could be correctly specified and surveyed in an adequate time, prior to commencement of the Shipping and Navigation study. Accordingly, a 28-day duration marine vessel traffic survey was undertaken of the Morecambe OWF site from a deployed vessel.

2. MARINE VESSEL TRAFFIC SURVEY METHODOLOGY

2.1 SURVEY AREA AND DATA EXTENTS

The study area and survey areas have been defined within the Scoping Report and data was therefore collected for the OWF site with a 10nm buffer as shown in **Figure 1**.

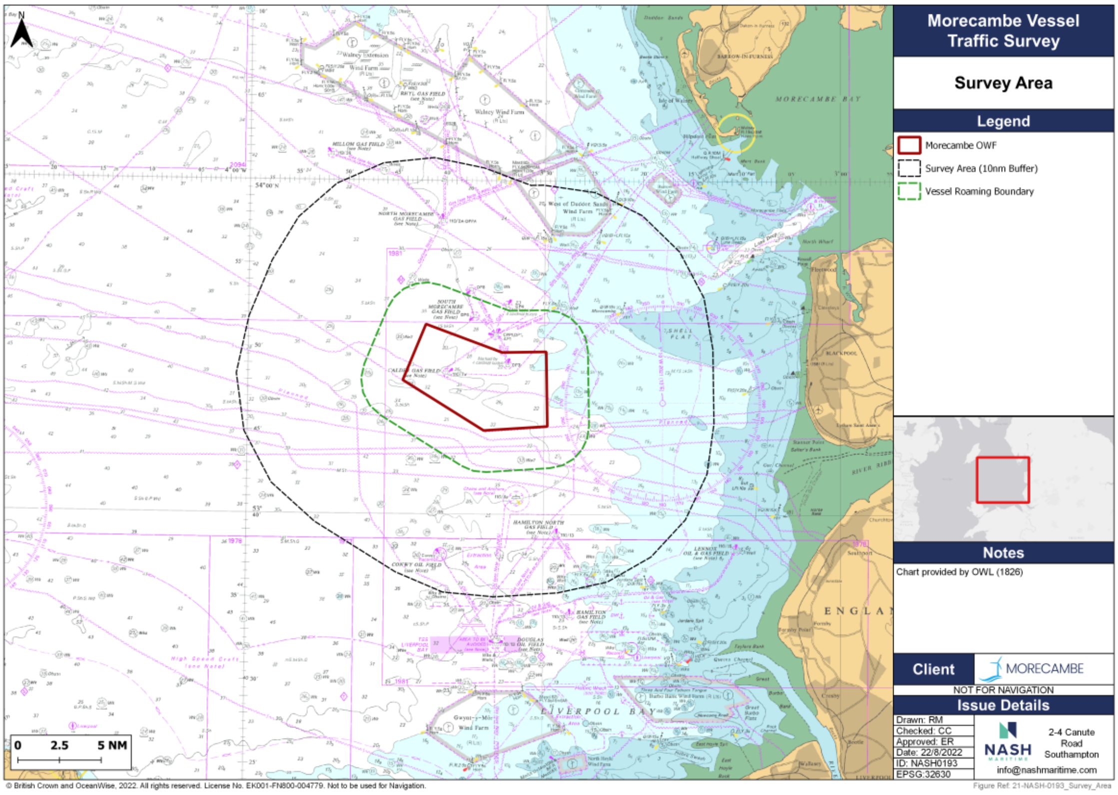

Figure 1: Survey area and vessel roaming boundary.

2.2 SURVEY VESSELS

The vessel based marine vessel traffic survey was undertaken using the Karelle survey vessel for the winter survey (see **Figure 2** and **Table 1**) and the Morning Star for the summer survey (see **Figure 3** and **Table 2**).

Table 1: Karelle specifications

Feature	Value
Name	Karelle
Callsign	n/a
Date built	1996
Hull	Steel
Length	27.85m
Breadth	8.7m
Depth	4.8m
Tonnage	338GT
Main Engine	Man Alpha 588KW
Auxiliary Engine	Cummings 155BHP/Mitsubishi D622TC 214KW
Speed	12kts cruising 14kts max
Fuel Oil Capacity	50,000 litres
Freshwater Capacity	19,000 litres

Figure 2: Karelle survey vessel (winter).

Table 2: Morning Star specifications

Feature	Value
Name	Morning Star
Callsign	MYXY7
Date built	1999
Hull	Steel
Length	23.0m
Breadth	7.0m
Depth	3.8m
Tonnage	146GT
Main Engine	Caterpillar C32 500KW
Auxiliary Engine	Daewoo 230KW
Speed	10kts cruising, 12kts max
Fuel Oil Capacity	24,000 litres
Freshwater Capacity	15,000 litres

Figure 3: Morning Star survey vessel (summer).

2.3 SURVEY EQUIPMENT

Survey equipment was installed on the survey vessels and was tested and maintained by NASH Maritime engineers throughout the survey period to integrate with the vessel's onboard systems. **Table 3** to **Table 5** provide an outline of general equipment on the vessels and the specific survey equipment used for vessel based AIS, radar and visual surveys.

Table 3: Survey Equipment

Item	No.	Purpose/Description
Survey Laptop inc logger software	2	1x laptop to record AIS and radar data outputs from vessel equipment – configured with chart and survey area layers for surveyor visual reference and context (to verify range/function etc..) and to record radar data outputs from vessel equipment 1x spare laptop for back-up Include battery for local power back-up to provide minimum of 1hr emergency power
Power adaptor	2	Power for laptops (inc surge protection)
R232 Cable	2	For data connection from AIS and radar equipment to laptop (may vary)
USB Memory Stick	2	Hourly back up of survey data files and images (per laptop and in duplicate)
Digital Camera	1	Photographic evidence of visual and radar targets when possible

Table 4: Karelle Vessel Equipment

Item	No.	Purpose/Description
ARPA Radar	2	JRC ARPA AIS Chart overlay Furuno ARPA AIS Chart overlay Koden ARPA AIS Chart overlay
AIS Receiver	1	Furuno
Satellite Broadband	1	Vessel fit Used for daily data transfer
Mobile Phone Coverage 3G and 4G	1	Backup for the satellite broadband

Table 5: Morning Star Vessel Equipment

Item	No.	Purpose/Description
ARPA Radar	2	Furuno ARPA AIS Chart overlay Koden ARPA AIS Chart overlay
AIS Receiver	1	Com NAV Voyager
Satellite Broadband	1	Vessel fit Used for daily data transfer
Mobile Phone Coverage 3G and 4G	1	Backup for the satellite broadband

2.4 SURVEY PERIODS

In accordance with MGN654, the data was collected over 28 days in total. In order to ensure the overall survey incorporated seasonal variations in traffic patterns and consider peak and off-peak periods, the survey was split into two survey campaign periods - each of 14 days over a summer and winter season.

The winter survey data was collected between 09-Feb-22 (09:50 UTC) and 26-Feb-22 (00:30 UTC) and the summer survey between 30-Jul-22 (06:00 UTC) and (13-Aug-22 23:40 UTC). These date windows were discussed with the MCA during a teleconference in Jan-2022 and it was agreed that they would constitute a seasonally representative sample.

Daily logs were collated from the vessel and provided in **Appendix A: Daily Logs**.

2.4.1 Vessel Downtime

During the surveys, the following downtime was incurred:

- Winter survey:
    - Karelle departed site at 00:10 UTC on 18-Feb-22 to seek shelter from Storm Eunice in lee of Isle of Man. Vessel arrived back on site 06:29 UTC on 19-Feb-22.
    - Karelle departed site at 06:53 UTC on 20-Feb-22 to seek shelter from Storm Franklin in lee of Isle of Man. Vessel arrived back on site 15:00 UTC on 21-Feb-22.
- Summer survey:
    - Morning Star departed site at 10:00 UTC on 08-Aug-22 for Whitehaven to allow faulty navigation equipment to be replaced. Vessel arrived back on site 03:40 UTC on 09-Aug-22.

The data presented in **Section 3** has been filtered to excluded downtime periods for both the winter and summer surveys.

2.5 SURVEY VESSEL LOCATION

The location of the survey vessel was monitored using onboard GPS, and a survey vessel track is presented in **Figure 4**.

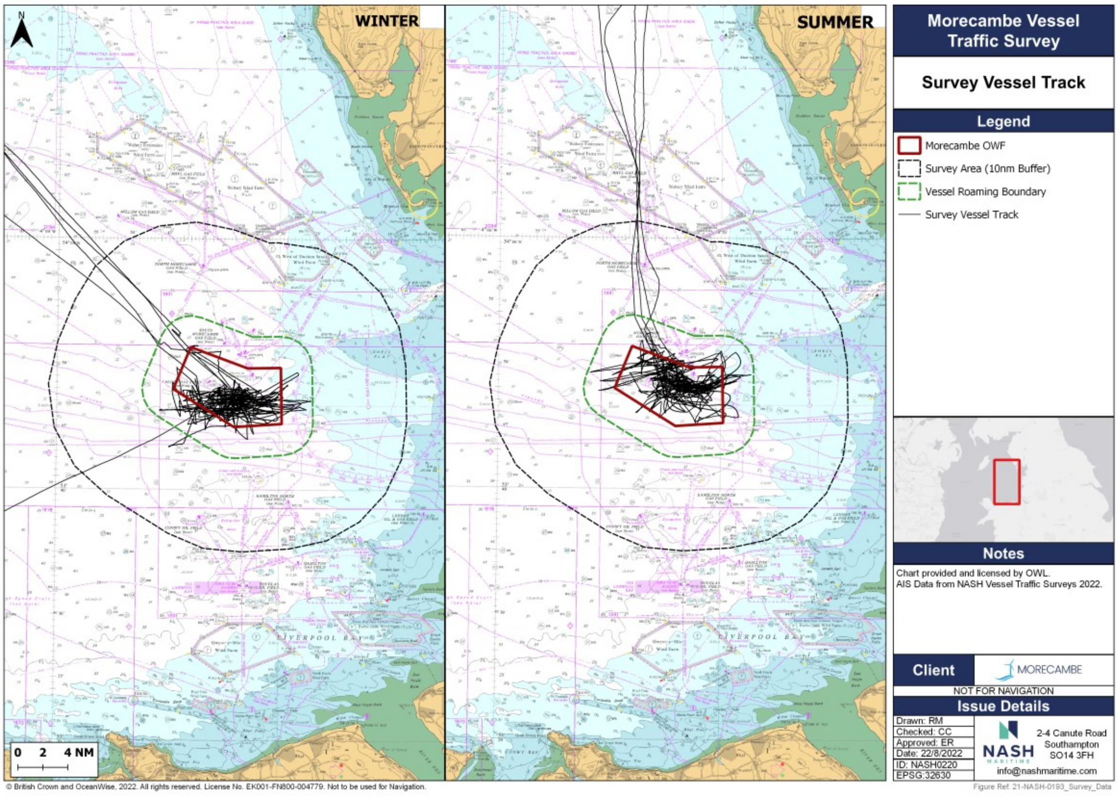

Figure 4: Winter and summer survey vessel tracks.

2.6 WEATHER LOG

Weather was recorded by the survey vessel at 6 hourly intervals during each survey campaign (see **Appendix B** for the survey weather log).

During the winter period, the maximum wind experienced (excluding downtime) was 45 kts from the west which contributed to a swell of 4.5m and a Very Rough sea state.

For the summer period, the maximum wind experienced (excluding downtime) was 25 kts from the south west which contributed to a swell of 2.5m and a Moderate/Rough sea state.

2.7 DATA COMPETENCY

Quality assurance checks on the survey vessel equipment and data collection was undertaken on a continuous basis throughout the surveys to ensure competency of equipment, area coverage and data collection fidelity. Initial data outputs following preliminary post processing of data are presented in **Section 3** and the data will be further post processed, interpreted and integrated with additional project datasets during the Shipping & Navigation study.

It should be noted that some vessel tracks, as shown in this section, appear shortened or isolated. Reasons for this may include the below factors and, where notable for individual tracks, narrative is provided to accompany the plots.

- Coinciding with commencement or completion of survey (including survey vessel weather downtime events).

- Tracking vessels by radar initially and subsequently aligning with an AIS transmission (at which point radar tracking was ceased) or vice versa.
- Target vessel factors including:
  - Radar signature of the target vessel (shape and size of the vessel – for example a smaller vessel represents a smaller detectable radar signature).
  - Stability of the target vessel (shape and size of the vessel and motion in different sea states).
  - AIS transmission and detection range from target vessel can vary in strength and consistency due to factors including:
    - Whether equipment is on and transmitting (some small non mandatory vessels manually elect to transmit [and receive] infrequently for operational reasons)
    - Power and setting configuration of transmission equipment over VHF
    - Location/height of aerial
    - Partial/intermittent shielding of AIS transmission aerial by vessel structures (common on smaller vessels)
    - Interference with other ship borne systems/communication equipment
    - State of repair of equipment and ancillary cables / fittings
  - Distance and range between target vessel and survey vessel
- Met-ocean effects including:
  - Atmospheric pressure (ducting of AIS signals improves in higher pressure conditions)
  - Sea state and combination of swell waves and wind generated waves
  - Precipitation and poor visibility (e.g. fog) will reduce radar and VHF range due to attenuation of signal and also influence ability of watch keeper making visual contact to identify vessel

3. SURVEY RESULTS

This section presents a series of vessel traffic plots, for the OWF site plus 10nm buffer, from the winter and summer survey campaigns.

3.1 VESSEL TYPE

Figure 5 provides a count of identified vessels during the survey period by vessel type. The most frequently identified vessel type during both the winter and summer periods was passenger. This is largely due to the proximity of multiple ferry routes in operation within the region, primarily between Heysham or Liverpool and Ireland or the Isle of Man. The increase in passenger numbers during the summer survey can be attributed to the seasonal service between Douglas and Liverpool and general increase in passenger services during peak season.

There was a significant difference between the winter and summer surveys for both fishing and tug and service vessels. The difference in fishing vessels related to weather conditions experienced during the different periods and seasonality of the fishing industry. Tug and service activity related to increased dredging activities south of the study area and activities associated with wind farm servicing at West of Duddon Sands.

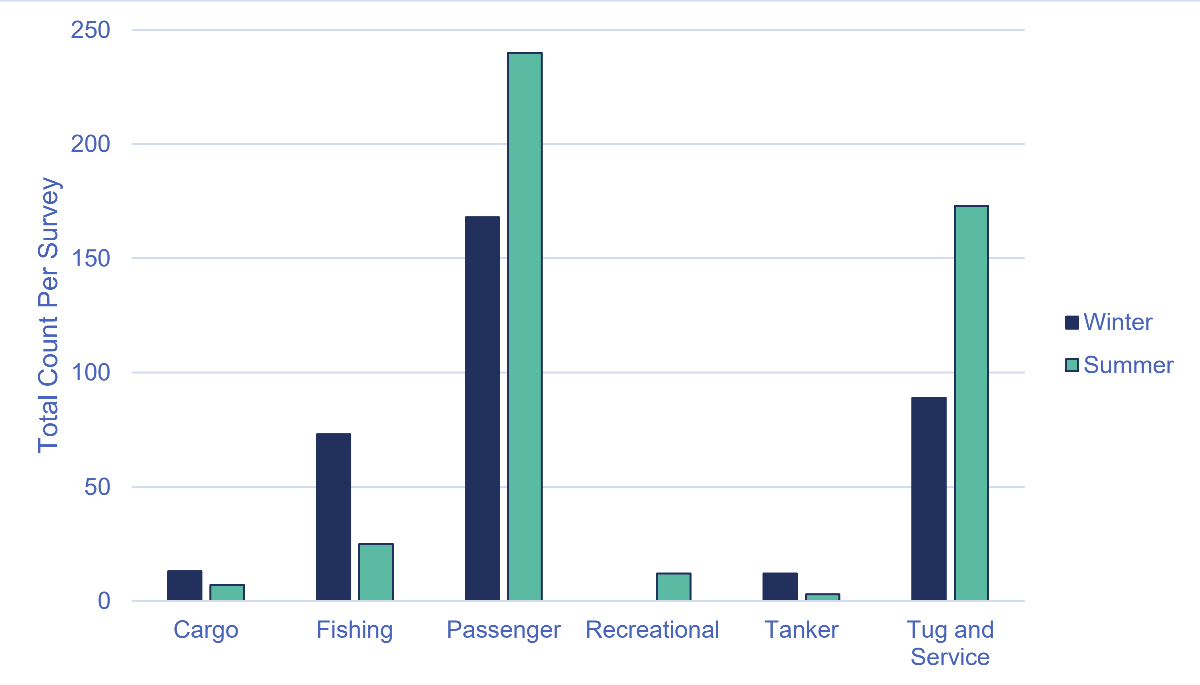

Figure 5: Vessel types for survey period.

3.1.1 Cargo

There were 13 cargo vessel tracks identified within 10nm of the OWF site during the winter and seven tracks for the summer survey as shown in **Figure 6**. Of these, five tracks crossed the OWF site in the winter period and two in the summer period. Most of these tracks are progressing in a southeast – northwest orientation which indicates they are on passage between Liverpool and Ireland/Europe.

For the winter survey, the largest vessel was the APL Gwangyang which is a 349m container ship which is likely transiting to/from the Liverpool container terminal. This vessel was identified four times during the winter survey, appearing to loiter in and out of the southwest region of the study area potentially due to availability of berths.

For the summer survey, the largest vessel was the Beaumare which is an 89m general cargo vessel on passage to Barrow-in-Furness. This vessel was identified twice during the summer survey.

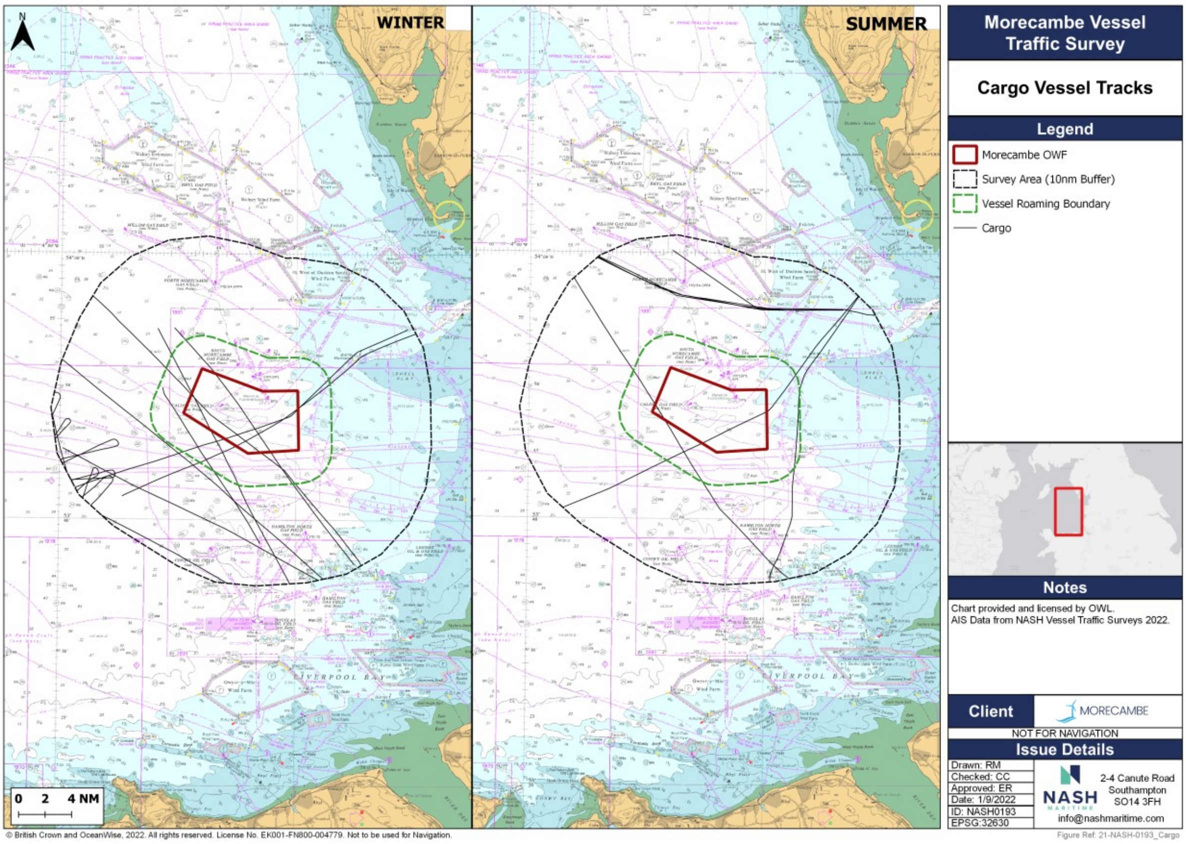

Figure 6: Cargo Vessel Tracks.

3.1.2 Tanker

There were 12 tanker tracks identified passing through the survey area for the winter survey period and three tracks for the summer period shown in **Figure 7**. All tracks are in an orientation in/out of Liverpool. In total, six of the tanker tracks crossed the OWF site in the winter period and two tracks crossed during the summer survey. Each of these tracks intersected the southwest extent of the OWF site.

The largest tanker identified during the winter survey period was the 128m Murray Star which transited the area twice in the period. The largest tanker identified during the summer period was the 77m Keewhit which is an oil products tanker which is regularly involved in vessel bunkering operations. This vessel was identified on three occasions during the summer survey, and six times during the winter survey.

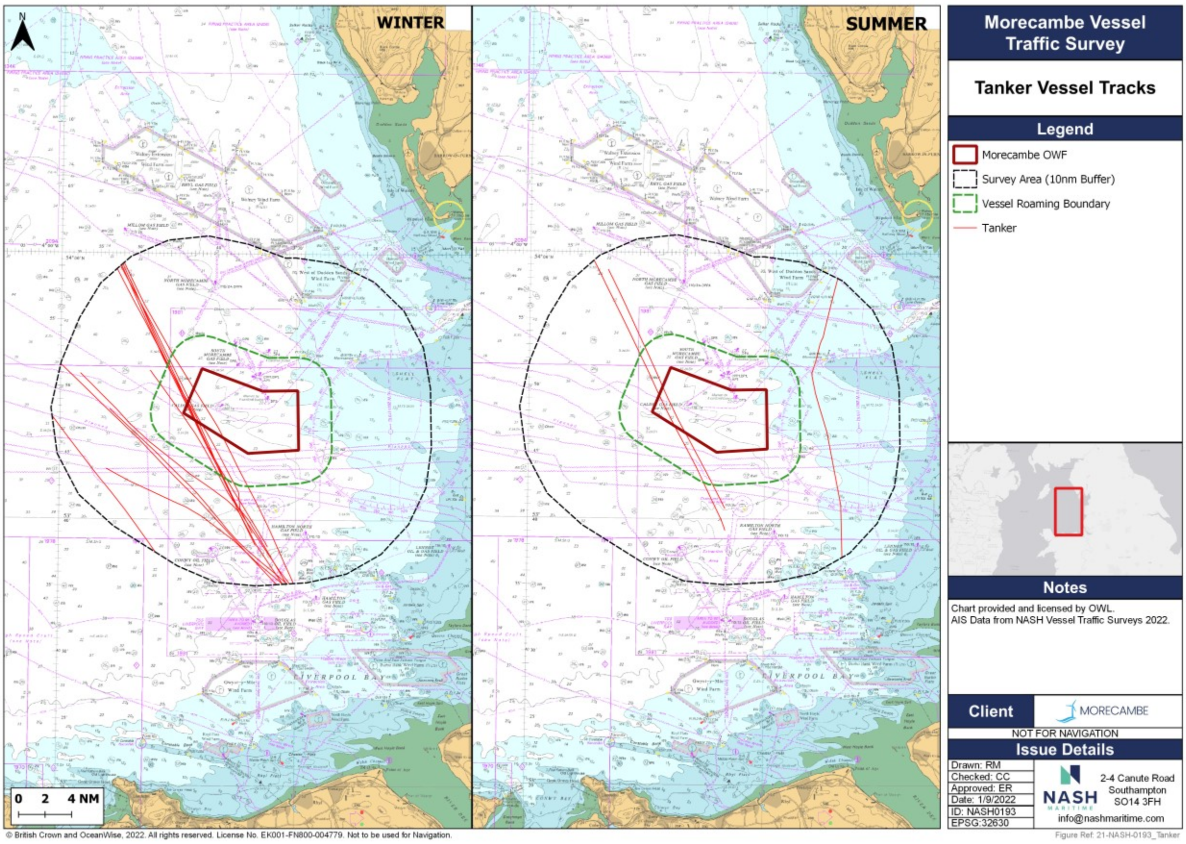

Figure 7: Tanker Vessel Tracks.

3.1.3 Passenger

There were 168 passenger vessels identified during the winter survey and 240 passenger vessels identified during the summer survey. Of these, five tracks crossed the OWF site in the winter period and ten in the summer period. In total, 12 these tracks are vessels operated by Stena Line on passage between Liverpool and Belfast. The other three tracks are the Manannan operated by Isle of Man Steam Packet Company on passage between Liverpool and Douglas.

The largest passenger vessels identified during the winter survey period were the 215m Stena Line vessels Stena Edda, Stena Estrid and Stena Embla. The Stena Embla and Stena Edda were also the largest passenger vessels identified during the summer period.

A cruise vessel was identified during the summer survey on two occasions to the north of the OWF site on passage to Barrow-in-Furness. The cruise vessel was the Corinthian which is 89m in length.

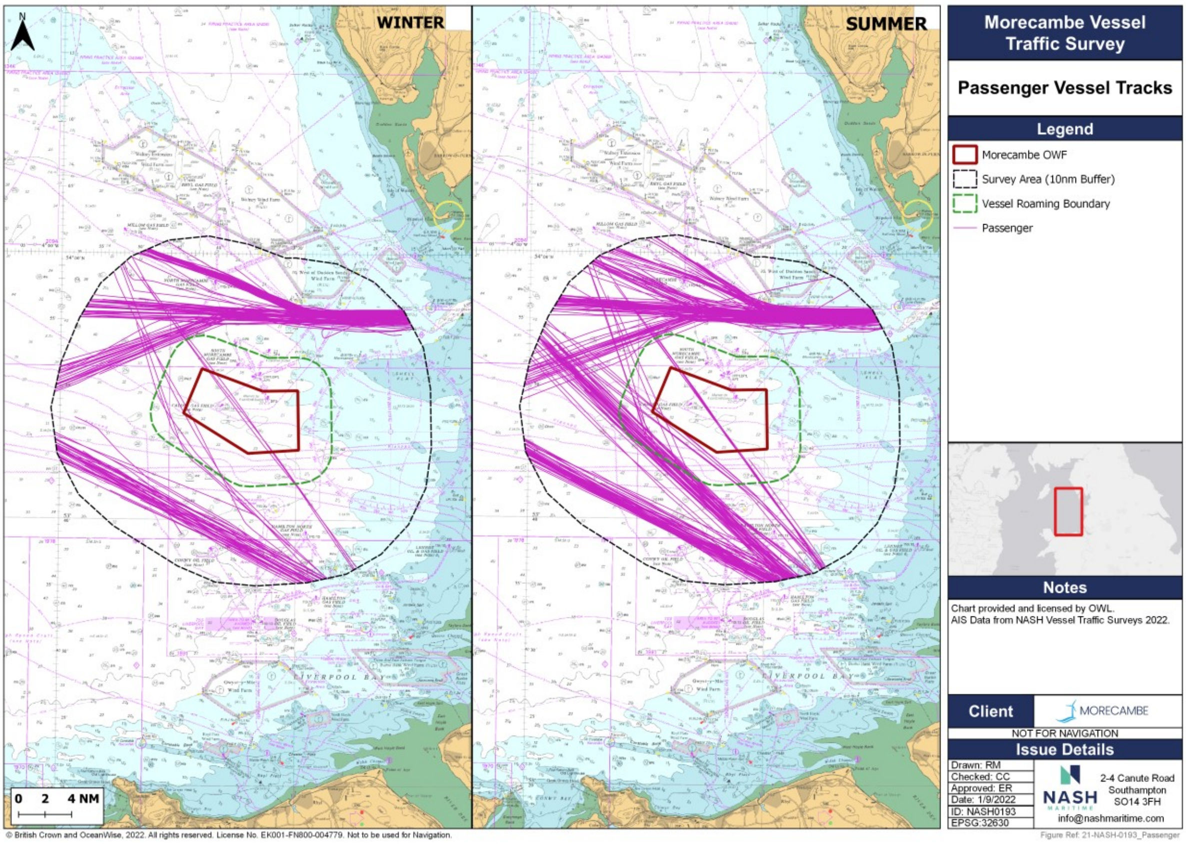

Figure 8: Passenger Vessel Tracks.

3.1.4 Fishing

There were 73 fishing vessel tracks identified during the winter survey period and 25 tracks during the summer period as shown in **Figure 9**. The tracks during the winter survey period indicate fishing activity in locations corresponding to known areas used for scallop fishing activity. The tracks during the summer survey period were identified as whelk fishing vessels.

During the winter survey, vessel tracks recorded were associated to seven unique fishing vessels. During the summer survey, 24 fishing vessels tracks were accounted for by Ivy May, a trawler operating out of Fleetwood.

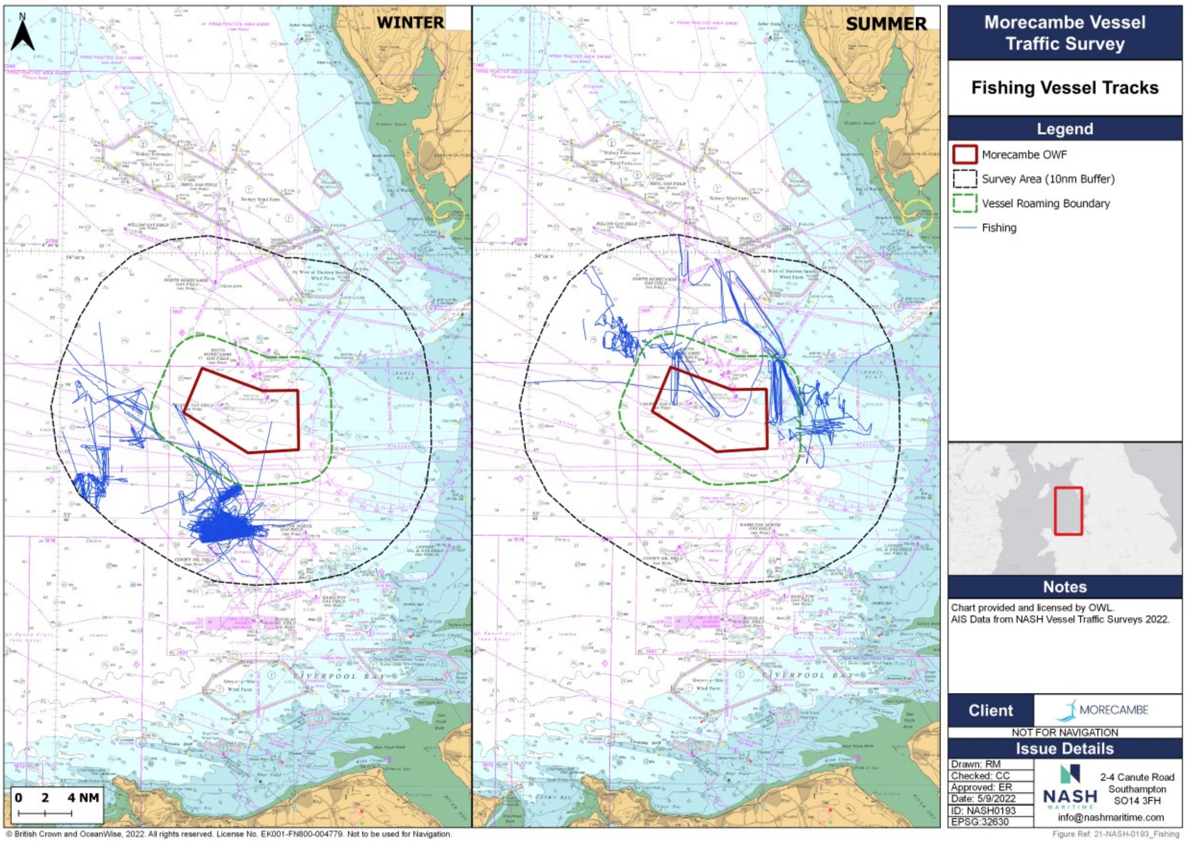

Figure 9: Fishing Vessel Tracks.

3.1.5 Recreational

Figure 10 shows no recreational use of the area during the winter survey period and some use during the summer period with 12 tracks identified. Six of these tracks intersected the OWF site. Each one of the identified tracks is attributed to a different vessel indicating that the vessels are likely to be involved in offshore cruising rather than regularly using the area.

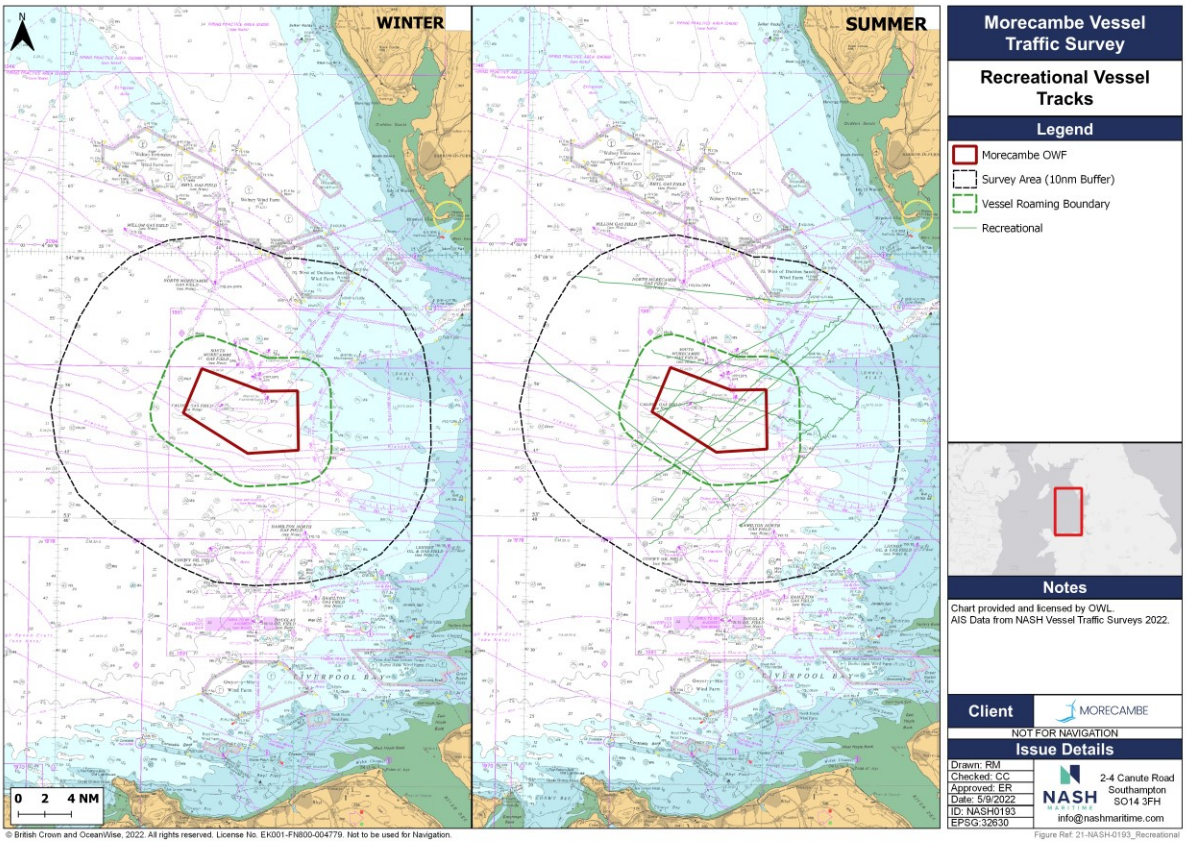

Figure 10: Recreational Vessel Tracks.

3.1.6 Tug and Service

Figure 11 shows regular tug and service activity to the north and south of the OWF site. There were 89 tug and service tracks identified during the winter period, and 173 tracks during the summer survey.

A total of 30 tug and service vessel tracks during the winter period were associated with operations by two vessels at the South Morecambe Gas Field to the north of the site (Grampian Fortress and Grampian Talisman). The majority of activity to the south of the OWF site was by Vos Endurance at the Conwy Oil Field, with 29 tracks recorded.

Tug and service vessel activity during the summer survey period was recorded at the South Morecambe Gas Field, Conwy Oil Field and West of Duddon Offshore Wind Farm. Dredging operations were also captured south of Hamilton North Gas Field to the south of the OWF site.

During the winter period, 14 tug and service vessel tracks transited through the OWF site, and 13 vessel tracks transited during the summer survey. A majority of these movements were vessels on passage between South Morecambe Gas Field and Conwy Oil Field. Some vessel tracks engaged in activities to the north of the OWF site entered exited the site on several occasions during a single transit.

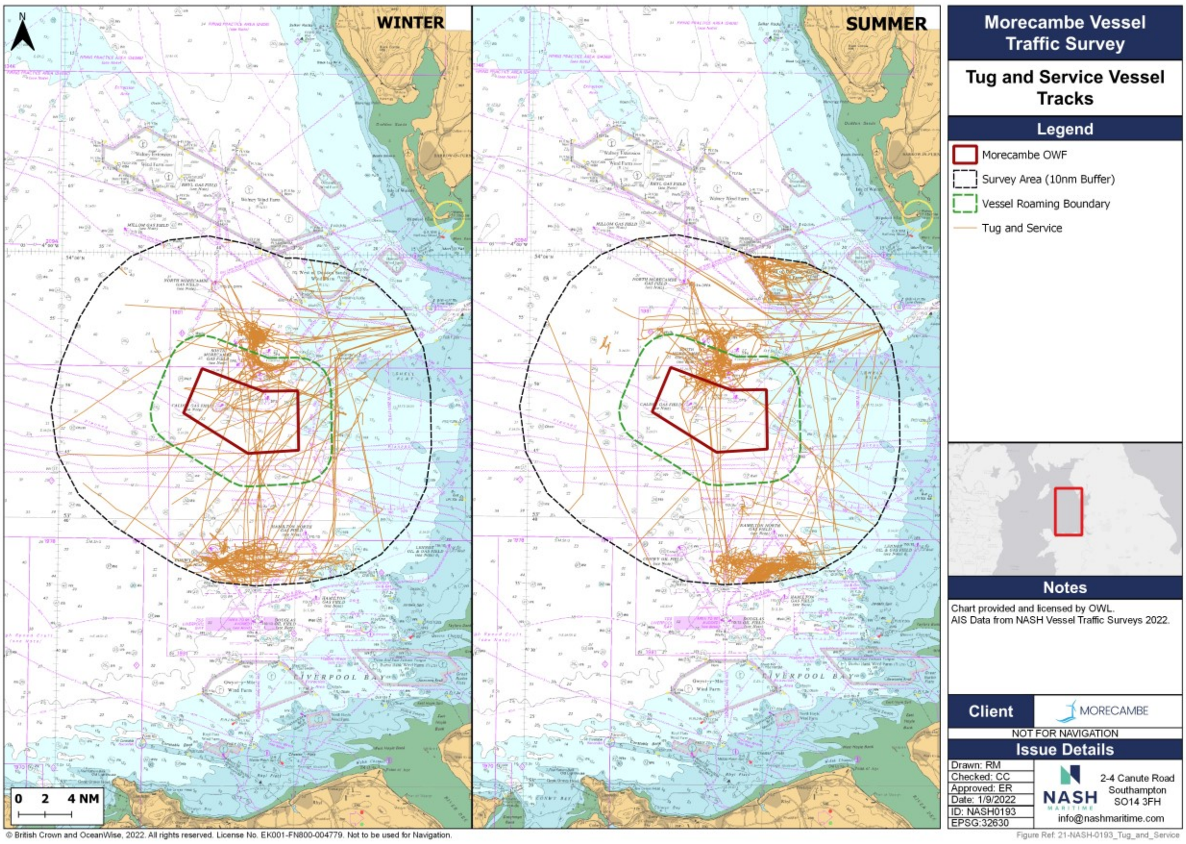

Figure 11: Tug and Service Vessel Tracks.

3.2 VESSEL COUNTS

Figure 12 shows the daily counts of vessel tracks either through the OWF site or within the 10nm buffer for the winter survey and the summer survey. There were 355 individual tracks identified during the winter survey period averaging 25.3 per day, 31 of these passed through the OWF site. For the summer survey period there was 460 total tracks averaging 32.9 per day, of these 34 tracks passed through the OWF site.

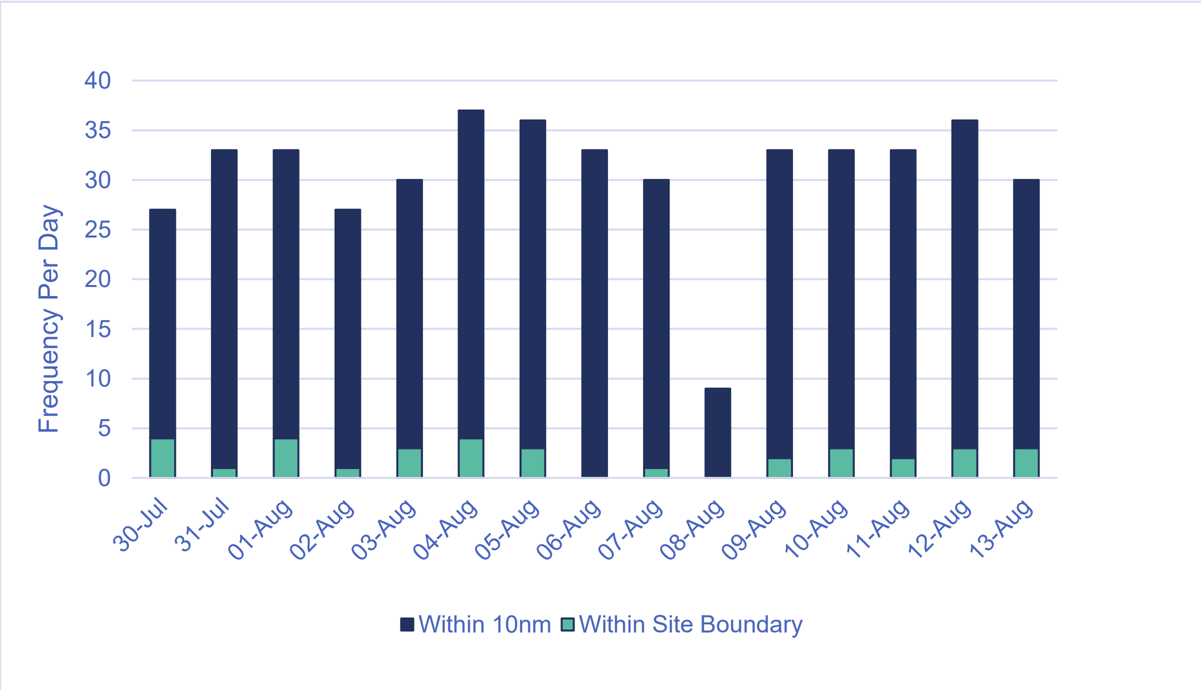

Figure 12: Vessel counts during survey

3.3 VESSEL SIZE

The distribution of vessels by size for the winter and summer survey periods is presented in **Figure 13**. For both periods, the majority of vessels were in the 100-150m length category which is accounted for by the frequency of passenger ferry services. The seasonality difference is due to the presence of the vessel Manannan running between Liverpool and Douglas during the summer period

Both survey periods show a peak of vessels around the 200-250m category which is due to movements from Stena Line passage vessels. As these vessels are on regular routes, they show less seasonality in movements.

Figure 13: Vessel Size Distribution During Surveys

3.4 VESSEL DESTINATIONS

Table 6 shows a summary of the destinations for the vessels identified by AIS for the winter and summer survey periods.

Most of the vessels identified were passenger vessels on routes between Liverpool/Belfast (26%), Douglas/Heysham (23%) and Warrenpoint/Heysham (19%). The most common destination for tankers was Liverpool on passage from Ireland (40% of all tanker traffic, 1% of all traffic).

Table 6: Destination count for Commercial Vessels

Route/Destination	Cargo	Passenger	Tanker	Total
Belfast-Heysham	0	15	0	15
Belfast-Liverpool	0	66	0	66
Douglas-Heysham	1	17	0	18
Douglas-Liverpool	0	40	0	40
Dublin-Heysham	0	7	0	7
Europe-Barrow-in-Furness	0	2	0	2
Europe-Glasson Dock	1	0	0	1
Europe-Liverpool	3	0	2	5
Glasson Dock-Europe	1	0	0	1
Heysham-Belfast	0	2	0	2
Heysham-Douglas	2	81	0	83
Heysham-Dublin	0	38	0	38
Heysham-Warrenpoint	0	55	0	55
Ireland-Liverpool	1	0	6	7
Liverpool-Belfast	2	48	1	51
Liverpool-Cambeltown	1	0	0	1
Liverpool-Douglas	0	8	0	8
Liverpool-Europe	3	0	1	4
Liverpool-Ireland (Unspecified)	0	0	1	1
Liverpool-Larne	0	0	1	1
Liverpool-Sandbank	1	0	0	1
UK-Europe	1	0	0	1
UK-Glasson Dock	1	0	0	1
UK-Ireland (Unspecified)	0	0	2	2
UK-Liverpool	0	0	1	1
Unknown-Barrow-in-Furness	2	0	0	2
Warrenpoint-Heysham	0	29	0	29

4. SUMMARY

This report presents analysis of a 28-day dedicated marine traffic survey carried out for the Morcambe OWF site. The following periods of survey were undertaken:

- 09-Feb-22 (09:50 UTC) and 26-Feb-22 (00:30 UTC) by the survey vessel Karelle; and
- 30-Jul-22 (06:00 UTC) and (13-Aug-22 23:40 UTC) by the survey vessel Morning Star.

The most frequently identified vessel type during both the winter and summer periods was passenger (50%) followed by tug and service (32%) and fishing (12%).

Most vessels were in the 100-150m length category which is accounted for by the frequency of passenger ferry services within the study area. Both survey periods show a peak of vessels around the 200-250m category which is due to movements from Stena Line passenger vessels. The largest vessel identified was a 349m container ship loitering in and out of the southwest region of the study area.

The most common destinations (excluding unspecified) for commercial vessels recorded during the survey periods were between Liverpool/Belfast (26%), Douglas/Heysham (23%) and Warrenpoint/Heysham (19%).

There were 31 tracks recorded intersecting the Morecambe OWF site during the winter survey period and 34 during the summer period.

Appendix A
Daily Radar Log

WINTER SURVEY RADAR LOG

Date	09/02/2022	**Start Time (UTC)**	1612	**1End Time (UTC)**	
U-ID Track No	4	**Photo Taken?**	YES/NO	**Photo ID**	
Average Speed (kts)					
Longitude	53,40.27N		**Longitude**	03,42.84	
Vessel Details	F/V ROIS MHAIRI				
Observations	PICKED UP RADAR,HE'S ON MARINE TRAFFIC BUT NOT SHOWING AIS				

Date	09/02/22	**Start Time (UTC)**	1755	**End Time (UTC)**	
U-ID Track No	5	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)					
Latitude	53,44.9		**Longitude**	003,56.2	
Vessel Details	Likely fishing				
Observations					

Date	09/2/22	**Start Time (UTC)**	1755	**End Time (UTC)**	
U-ID Track No	6-8-10	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)					
Latitude	53,48.4		**Longitude**	003,57.6	
Vessel Details	F/V NORDEEZE				
Observations	PICKED UP RADAR ,ON AIS SEEN ON MARINE TRAFFIC				

Date	09/2/22	**Start Time (UTC)**	1758	**End Time (UTC)**	
U-ID Track No	7-9	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)					
Latitude	53,48.98N		**Longitude**	003,57.6W	
Vessel Details	F/V CAM COUREGEOUS				

Observations	RADAR ,NO AIS SHOWING ON MARINE TRAFFIC

Date	09/02/2022	**Start Time (UTC)**	1152	**End Time (UTC)**	1231
U-ID Track No	3	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)					
Latitude	53,53.08		**Longitude**	003,22.8	
Vessel Details	UNKNOWN				
Observations	UNKNOWN				

Date	10/02/22	**Start Time (UTC)**	13:35	**End Time (UTC)**	Ongoing
U-ID Track No	12	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)					
Latitude	53 46.21N		**Longitude**	003 54.98W	
Vessel Details	Fishing				
Observations	Scalloper				

Date	11/02/22	**Start Time (UTC)**	0000	**1End Time (UTC)**	1454
U-ID Track No	4-16-1	**Photo Taken?**	YES/NO	**Photo ID**	
Average Speed (kts)	3.4				
Longitude	53,40.27N		**Longitude**	03,42.84	
Vessel Details	Scalloper				
Observations	PICKED UP RADAR,HE'S ON MARINE TRAFFIC BUT NOT SHOWING AIS				

Date	11/2/22	**Start Time (UTC)**	0000	**End Time (UTC)**	1528
U-ID Track No	12,13-2	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	3,2				
Latitude	53 46.21N	**Longitude**	003 54.98W		
Vessel Details	Fishing				
Observations	Scalloper				

Date	13/02/22	**Start Time (UTC)**	02:14	**1End Time (UTC)**	Ongoing
U-ID Track No	4-10-11-21	**Photo Taken?**	YES/NO	**Photo ID**	
Average Speed (kts)					
Longitude	53 39.24N	**Longitude**	003 37.41W		
Vessel Details	FV				
Observations					

Date	13/02/22	**Start Time (UTC)**	03:09	**End Time (UTC)**	Ongoing
U-ID Track No	5,6,16 18 22	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)					
Latitude	58 38.43N	**Longitude**	003 36.68W		
Vessel Details	Fishing				
Observations	Scalloper				

Date	13/2/22	**Start Time (UTC)**	1222	**End Time (UTC)**	Ongoing
U-ID Track No		**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)					
Latitude	53.48.18N	**Longitude**	003,44.49W		
Vessel Details	Fishing				
Observations	Scalloper				

Date	14/02/22	**Start Time (UTC)**	00:00	**1End Time (UTC)**	1438
U-ID Track No	21-24-26-5	**Photo Taken?**	YES/NO	**Photo ID**	
Average Speed (kts)	3.1				
Longitude	53 39.24N		**Longitude**	003 37.41W	
Vessel Details	FV RHOIS MHAOIRI				
Observations	SCALLOPER				

Date	14/02/22	**Start Time (UTC)**	00:00	**End Time (UTC)**	Ongoing
U-ID Track No	22,23,2,4	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	3.4				
Latitude	58 38.43N		**Longitude**	003 36.68W	
Vessel Details	FV SCALLOPS				
Observations					

Date	14/02/22	**Start Time (UTC)**	00:00	**End Time (UTC)**	2157
U-ID Track No	24,27,,5	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)					
Latitude	53.48.18N		**Longitude**	003,44.49W	
Vessel Details	Scalloper				
Observations	Fishing vessel				

Date	15/02/22	**Start Time (UTC)**	00:00	**1End Time (UTC)**	Ongoing
U-ID Track No	4,7,8,9 ,	**Photo Taken?**	YES/NO	**Photo ID**	
Average Speed (kts)	3.1				
Longitude	58 38.43N		**Longitude**	003 36.68W	
Vessel Details	F/V STAR OF JURA				
Observations	SCALLOPER				

Date	15/2/22	**Start Time (UTC)**	0840	**End Time (UTC)**	Ongoing
U-ID Track No	10	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	3,3				
Latitude	53,37.62N	**Longitude**	003,32,14W		
Vessel Details					
Observations					

Date	16/02/22	**Start Time (UTC)**	00:00	**1End Time (UTC)**	0725
U-ID Track No	9,13	**Photo Taken?**	YES/NO	**Photo ID**	
Average Speed (kts)	3.1				
Longitude	58 38.43N	**Longitude**	003 36.68W		
Vessel Details	F/V STAR OF JURA				
Observations	SCALLOPER				

Date	16/02/22	**Start Time (UTC)**	0000	**End Time (UTC)**	0840
U-ID Track No	10,11,12	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	3,3				
Latitude	53,37.62N	**Longitude**	003,32,14W		
Vessel Details	Scalloper				
Observations	Fishing				

Date	25/2/2022	**Start Time (UTC)**	1900	**1End Time (UTC)**	ongoing
U-ID Track No	2	**Photo Taken?**	YES/NO	**Photo ID**	
Average Speed (kts)	3.1				
Longitude	53,45.68N	**Longitude**	003,51.08W		
Vessel Details	F/V NORDEEZE				
Observations	SCALLOPER				

Date	25/2/2022	**Start Time (UTC)**	1938	**End Time (UTC)**	2052
U-ID Track No	3	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	3,3				
Latitude	53,42.93N	**Longitude**	003,52.79W		
Vessel Details	F/V CAMM COURAGEOUS				
Observations	SCALLOPER				

Date	4/8/22	**Start Time (UTC)**	0720	**End Time (UTC)**	1910
U-ID Track No	12	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	2-8 KTS				
Latitude	53,46.6N	**Longitude**	003,23.1W		
Vessel Details	F/V IVY MAY FDI34				
Observations	WHELK FISHING I THINK /				

SUMMER SURVEY RADAR LOG

Date	30-7-22	**Start Time (UTC)**	1230	**End Time (UTC)**	1854
U-ID Track No	1-5	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	5,4kts				
Latitude	53,43.5n	**Longitude**	003,42.0n		
Vessel Details	Sailing yachty gbr 738				
Observations	Small yacht,				

Date	30-7-22	**Start Time (UTC)**	1404	**End Time (UTC)**	
U-ID Track No	6 ais	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	4,5				
Latitude	53,53,6n	**Longitude**	003,46.23w		
Vessel Details	Survey fugro mercator				
Observations	Vessel is on survey ops was first tracked then ais was picked up				

Date	31/7	**Start Time (UTC)**	0826	**End Time (UTC)**	1631
U-ID Track No	7	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	From 3kts to 12 kts				
Latitude	53,52.5n	**Longitude**	003,47.3w		
Vessel Details	Fishing ivy may				
Observations	Ships speed was up n down all day not sure what kind fishing was involved				

Date	1/8	**Start Time (UTC)**	0944	**End Time (UTC)**	
U-ID Track No	8,9,10,11	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	4.6				
Latitude	53,53.5n	**Longitude**	003,50.5w		
Vessel Details	f/v ivy mary whelk boat				
Observations	Same f/v yesterday,,				

Date	4/8/22	Start Time (UTC)	2002	End Time (UTC)	2230
U-ID Track No		Photo Taken?	Yes / No	Photo ID	
Average Speed (kts)	5.6KTS				
Latitude	53,49.9N	Longitude	003,32,2W		
Vessel Details	FLAIR V SAILING YACHT				
Observations	TRACKING WSW COURSE				

Date	5/8/22	Start Time (UTC)	0932	End Time (UTC)	1530
U-ID Track No	14	Photo Taken?	Yes / No	Photo ID	
Average Speed (kts)	5KTS				
Latitude	53,44.4N	Longitude	003,24.7W		
Vessel Details	IVY MAY F/V				
Observations	F/V WHELK BOAT WORKING HAS AIS BUT VERY SHORT RANGE				

Date	5/8/22	Start Time (UTC)	0945	End Time (UTC)	1230
U-ID Track No	15	Photo Taken?	Yes / No	Photo ID	
Average Speed (kts)	5.3KTS				
Latitude	53,50.6N	Longitude	003,47.6W		
Vessel Details	UNKNOWN YACHT				
Observations	SMALL YACHT TRACKING EASTERLY DIRECTION				

Date	5/8/22	Start Time (UTC)	1156	End Time (UTC)	1415
U-ID Track No	16,17,18	Photo Taken?	Yes / No	Photo ID	
Average Speed (kts)	5.6KTS				
Latitude	53,39.5N	Longitude	003,32.6W		
Vessel Details	SMALL YACHT				
Observations	YACHT --- SHIMONI				

Date	6/8/22	**Start Time (UTC)**	09;03	**End Time (UTC)**	11;40
U-ID Track No	19	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	7kts				
Latitude	53,47.5n	**Longitude**	003,22.3w		
Vessel Details	Likely recreational				
Observations	Sailing				

Date	6/8/22	**Start Time (UTC)**	12;15	**End Time (UTC)**	15;03
U-ID Track No	20	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	4.6kts				
Latitude	53,52.6n	**Longitude**	003,44.4w		
Vessel Details	Small sail yacht				
Observations	Yacht tracked east was constantly called by standby ship in morecombe field no reply				

Date	10/8/22	**Start Time (UTC)**	0710	**End Time (UTC)**	0736
U-ID Track No	5	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	15 KTS				
Latitude	53,47.6N	**Longitude**	003,21,4W		
Vessel Details	CREW TRANSFER SHIP DEVELOPER				
Observations					

Date	10/8/22	**Start Time (UTC)**	1605	**End Time (UTC)**	1706
U-ID Track No	6	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	7.5KTS				
Latitude	53,42.3N	**Longitude**	003,38.0W		
Vessel Details	LARGE SAIL YACHT				
Observations	YACHT UNDER WAY POWER DRIVEN/NO SAILS UP				

Date	10/8/22`````` ````````````````	**Start Time (UTC)**	23;22	**End Time (UTC)**	
U-ID Track No	7	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)					
Latitude	53,44.7N		**Longitude**	003,45.4W	
Vessel Details	UNKNOWN				
Observations					

Date	11/8/22	**Start Time (UTC)**	04;43	**End Time (UTC)**	05;30
U-ID Track No	8	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	5.7KTS				
Latitude	53,45.2N		**Longitude**	003,45,3W	
Vessel Details					
Observations	FALSE ECHO				

Date	11/8/22	**Start Time (UTC)**	05;13	**End Time (UTC)**	05;40
U-ID Track No	9	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	5.2				
Latitude	53,52.0N		**Longitude**	003,22.1W	
Vessel Details					
Observations	FALSE ECHO				

Date	11/8/22	**Start Time (UTC)**	10;26	**End Time (UTC)**	17;24
U-ID Track No	10,11	**Photo Taken?**	Yes / No	**Photo ID**	
Average Speed (kts)	4.5				
Latitude	53,53.0N		**Longitude**	003,42.4W	
Vessel Details	F/V IVY MAY				
Observations	WHELK BOAT…WORKING WITH WEAK AIS				

Appendix B
Weather Log

WINTER SURVEY

Date / Time	Survey Day	Wind (Dir / Ave. Speed [Knots])	Visibility (nm)	Atmospheric Pressure (mb)	Sea State (e.g. calm/slight /moderate/rough)	Comments (e.g. swell height and direction, precipitation, trends)
Wed 09/02/2022 0000	0	SW 20 KTS	5NM	1020	MODERATE	2MTR/LIGHT RAIN
Wed 09/02/2022 0600	0.25	SW 10 KTS	6NM	1019	SLIGHT	1 MTR/CLEAR
Wed 09/02/2022 1200	0.5	SW 15KTS	6NM	1019	SLIGHT	1 MTR/CLEAR
Wed 09/02/2022 1800	0.75	SW 10 KTS	6NM	1020	CALM	CLEAR
Thu 10/02/2022 0000	1	SW 15 KTS	6NM	1020	SLIGHT	1-2MTR/CLEAR
Thu 10/02/2022 0600	1.25	SW 25KTS	6NM	1018	MODERATE	2-3MTR/CLEAR
Thu 10/02/2022 1200	1.5	W 25-30 KTS	6NM	1019	MOD/ROUGH	2-3MTR/CLEAR
Thu 10/02/2022 1800	1.75	W 25 KTS	6NM	1020	MOD/ROUGH	2MTR/CLEAR
Fri 11/02/2022 0000	2	NW 15 KTS	6NM	1027	SLIGHT	1-2MTR/CLEAR
Fri 11/02/2022 0600	2.25	W 5 KTS	6NM	1029	CALM	CLEAR
Fri 11/02/2022 1200	2.5	W 5KTS	6NM	1030	CALM	CLEAR
Fri 11/02/2022 1800	2.75	SW 10kts	6NM	1031	SLIGHT	CLEAR
Sat 12/02/2022 0000	3	SSW 30 kts	6NM	1022	MODERATE	2-3MTR/CLEAR
Sat 12/02/2022 0600	3.25	SW 40 KTS	5NM	1012	ROUGH	3-4MTR/SHOWERS
Sat 12/02/2022 1200	3.5	SW 40KTS	3-4NM	1009	ROUGH	3-4MTR/RAIN
Sat 12/02/2022 1800	3.75	SW20-25KTS	5NM	1010	MODERATE	2-3 MTR/RAIN
Sun 13/02/2022 0000	4	SW 10 KTS	6NM	1004	SLIGHT	1MTR/CLOUDY
Sun 13/02/2022 0600	4.25	SW 15 KTS	6NM	998	SLIGHT	1MTR/RAIN
Sun 13/02/2022 1200	4.5	SW 10-15KTS	2NM	986	SLIGHT	1 MTR/HEAVY DRIZZLE
Sun 13/02/2022 1800	4.75	SW 5KTS	5NM	987	CALM	CLEAR
Mon 14/02/2022 0000	5	SW 20 KTS	6NM	988	MODERATE	2MTR/CLEAR
Mon 14/02/2022 0600	5.25	W 25 KTS	5NM	989	MODERATE	2MTR/SHOWERS
Mon 14/02/2022 1200	5.5	NW 25 KTS	5NM	997	MODERATE	2MTR/HEAVY SHOWERS
Mon 14/02/2022 1800	5.75	NW 30-35 KTS	5NM	1003	MODERATE/ROUGH	2-3MTR/RAIN
Tue 15/02/2022 0000	6	NW 20 KTS	6NM	1005	MODERATE	1-2MTR/CLEAR
Tue 15/02/2022 0600	6.25	SW 30 KTS	4NM	998	MODERATE	2-3MTR/RAIN
Tue 15/02/2022 1200	6.5	W 20 KTS	6NM	999	SLIGHT	1-2 MTR/CLEAR
Tue 15/02/2022 1800	6.75	W 10-15KTS	5NM	997	CALM	1 MTR/CLEAR
Wed 16/02/2022 0000	7	SW 25 KTS	4NM	987	MODERATE	1-2 MTR/RAIN
Wed 16/02/2022 0600	7.25	W 30 KTS	6NM	989	MODERATE/ROUGH	2-3MTR/CLEAR
Wed 16/02/2022 1200	7.5	SW 35—40KTS	4NM	985	ROUGH	3-4MTR/RAIN
Wed 16/02/2022 1800	7.75	SW 35-40KTS	4NM	986	ROUGH	4-5MTR/RAIN
Thu 17/02/2022 0000	8	W 40-45KTS	6NM	992	VERY ROUGH	4-5MTR/CLEAR
Thu 17/02/2022 0600	8.25	W 30-35KTS	6NM	1002	ROUGH	3-4MTR/CLEARNW
Thu 17/02/2022 1200	8.5	NW 30-35KTS	4NM	1002	ROUGH	3MTR/RAIN

Date / Time		Survey Day	Wind (Dir / Ave. Speed [Knots])	Visibility (nm)	Atmospheric Pressure (mb)	Sea State (e.g. calm/slight /moderate/rough)	Comments (e.g. swell height and direction, precipitation, trends)
Thu 17/02/2022	**1800**	8.75	SW 15-20KTS	6NM	1002	SLIGHT	2MTR CLEAR
Fri 18/02/2022	**0000**	9	SE 15 KTS	5NM	999	SLIGHT	EXIT SURVEY AREA
Fri 18/02/2022	**0600**	9.25	SW 35 KTS	6NM	980	ROUGH	SHELTER INSHORE
Fri 18/02/2022	**1200**	9.5	W 50-60KTS	1NM	977	ROUGH	SHELTER INSHORE
Fri 18/02/2022	**1800**	9.75	W 40-50 KTS	3nm	992	ROUGH	SHELTER INSHORE
Sat 19/02/2022	**0000**	10	W 35-40 KTS	6NM	1001	ROUGH	SHELTER INSHORE
Sat 19/02/2022	**0600**	10.25	SW 25 KTS	6NM	1004	MODERATE	3-4MTR/CLEAR
Sat 19/02/2022	**1200**	10.5	W 10kts	6nm	1002	calm	1 mtr/clear
Sat 19/02/2022	**1800**	10.75	W 10 kts	6nm	1004	calm	rain
Sun 20/02/2022	**0000**	11	W 30 KTS	4NM	998	MODERATE	2-3MTR/HEAVY RAIN
Sun 20/02/2022	**0600**	11.25	SW 30 KTS	6NM	995	MODERATE	2-3MTR/CLOUDY
Sun 20/02/2022	**1200**	11.5	WSW 50 KTS	1NM	987	ROUGH	EXIT SURVEY AREA
Sun 20/02/2022	**1800**	11.75	W 45-50KTS	4NM	988	ROUGH	SHELTER INSHORE
Mon 21/02/2022	**0000**	12	W 45-50 KTS	4NM	992	ROUGH	SHELTER INSHORE
Mon 21/02/2022	**0600**	12.25	W 45-50 KTS	4NM	993	ROUGH	SHELTER INSHORE
Mon 21/02/2022	**1200**	12.5	NW 45KTS	3NM	1008	ROUGH	SHELTER INSHORE
Mon 21/02/2022	**1800**	12.75	NW 15KTS	6NM	1017	CALM	1MTR/CLEAR
Tue 22/02/2022	**0000**	13	S 10 KTS	5NM	1015	SLIGHT	1MTR/CLOUDY
Tue 22/02/2022	**0600**	13.25	SW 25 KTS	6NM	1008	MODERATE	2MTR/SHOWERS
Tue 22/02/2022	**1200**	13.5	SW 20KTS	6NM	1012	MODERATE	2MTR/CLEAR
Tue 22/02/2022	**1800**	13.75	SW 25 KTS	6NM	1015	MODERATE	2MTR/CLEAR
Wed 23/02/2022	**0000**	14	SW 20 KTS	6NM	1019	MODERATE	2MTR/CLEAR
Wed 23/02/2022	**0600**	14.25	SW 25 KTS	6NM	1016	MODERATE	2MTR/CLOUD
Wed 23/02/2022	**1200**	14.5	SW30KTS	4NM	1010	MOD/ROUGH	2-3 MTR/DULL
Wed 23/02/2022	**1800**	14.75	SW 40 KTS	3-4NM	1005	ROUGH	3-4 MTR/SQUALLY
Thu 24/02/2022	**0000**	15	SW 25 KTS	6NM	1005	MODERATE	2-3MTR/CLEAR
Thu 24/02/2022	**0600**	15.25	SW 25 KTS	6NM	1001	MODERATE	2-3MTR/CLOUD
Thu 24/02/2022	**1200**	15.5	W 35KTS	6NM	1005	MODERATER	3-4MTR/CLEAR
Thu 24/02/2022	**1800**	15.75	W 30KTS	6NM	1008	MODERATE	2-3MTR/CLEAR
Fri 25/02/2022	**0000**	16	W 35 KTS	6NM	1011	ROUGH	3-4MTR/CLEAR
Fri 25/02/2022	**0600**	16.25	W 20KTS	6NM	1018	MODERATE	2-3MTR/CLEAR
Fri 25/02/2022	**1200**	16.5	WNW 15KTS	6NM	1026	CALM	1 MTR CLEAR
Fri 25/02/2022	**1800**	16.75	W 5 KTS	6NM	1027	CALM	0.5 MTR /CLEAR
Sat 26/02/2022	**0000**	17	Sw 15kts	6nm	1026	slight	1mtr clear

SUMMER SURVEY

Date/Time	Survey Day	Wind (Dir / Ave. Speed [Knots])	Visibility (nm)	Atmospheric Pressure (mb)	Sea State (e.g. calm/slight /moderate/rough)	Comments (e.g. swell height and direction, precipitation, trends)
Saturday 30/07/2022 00:00	0	S 15kts	4nm	1013	calm	1mtr /drizzle
Saturday 30/07/2022 06:00	0.25	S 15kts	5nm	1013	calm	1mtr/drizzle
Saturday 30/07/2022 12:00	0.5	Sw 10 kts	5nm	1014	calm	.5mtr/drizzle
Saturday 30/07/2022 18:00	0.75	Wsw 5 kts	6nm	1015	calm	Clear/dry
Sunday 31/07/2022 00:00	1	Wsw 5 kts	4nm	1015	calm	Drixxle /mucky
Sunday 31/07/2022 06:00	1.25	Nw 15 kts	6nm	1014	slight	1 mtr/clear
Sunday 31/07/2022 12:00	1.5	Nw 20kts	6nm	1016	slight	1.5mtr/clear dry
Sunday 31/07/2022 18:00	1.75	Nw 10 kts	6nm	1018	calm	0,5mtr/clear dry
Monday 01/08/2022 00:00	2	W 5 kts	6nm	1019	calm	Clear/dry
Monday 01/08/2022 06:00	2.25	variable	8nm	1020	calm	Clear/dry
Monday 01/08/2022 12:00	2.5	W 5 kts	8nm	1019	calm	Clear/dry
Monday 01/08/2022 18:00	2.75	S 15 kts	6nm	1014	calm	Drizzly/squally
Tuesday 02/08/2022 00:00	3	Sw 20 kts	5nm	1013	slight	1.5 mtr ,squally drizzle
Tuesday 02/08/2022 06:00	3.25	Sw 25 kts	4nm	1008	rough	2,5 mtr/squally rain
Tuesday 02/08/2022 12:00	3.5	Sw 20 kts	5nm	1008	moderate	2mtr/drixxly
Tuesday 02/08/2022 18:00	3.75	Sw25kts	5nm	1007	Mod/rough	2,5 mtr/squally
Wednesday 03/08/2022 00:00	4	Sw 20kts	6nm	1007	moderate	2mtr/drty
Wednesday 03/08/2022 06:00	4.25	Sw20 kts	6nm	1008	moderate	1.5/2 mtr/clear
Wednesday 03/08/2022 12:00	4.5	Sw15 kts	6nm	1010	slight	1 mtr/clear sunny spells
Wednesday 03/08/2022 18:00	4.75	Sw 10kts	6nm	1010	calm	Clear/dry
Thursday 04/08/2022 00:00	5	Sw 5 kts	6nm	1011	calm	Clear
Thursday 04/08/2022 06:00	5.25	W 15 kts	6nm	1014	slight	1 mtr/clear
Thursday 04/08/2022 12:00	5.5	WNW 15 kts	6nm	1017	Calm/slight	0.5-1 mtr clear
Thursday 04/08/2022 18:00	5.75	WNW 10 KTS	6NM	1018	CALM	0,5MTR/CLEAR
Friday 05/08/2022 00:00	6	NW 5 KTS	6NM	1019	CALM	CLEAR
Friday 05/08/2022 06:00	6.25	W 5 kts	6nm	1029	caqlm	clear
Friday 05/08/2022 12:00	6.5	W 4 kts	5nm	1030	calm	clear
Friday 05/08/2022 18:00	6.75	W 5 kts	5nm	1028	calm	clear
Saturday 06/08/2022 00:00	7	W 5 kts	6nm	1028	calm	clear
Saturday 06/08/2022 06:00	7.25	W 5 kts	6nm	1029	caqlm	clear
Saturday 06/08/2022 12:00	7.5	W 5 kts	6nm	1030	calm	clear
Saturday 06/08/2022 18:00	7.75	W 5 kts	6nm	1028	calm	clear
Sunday 07/08/2022 00:00	8	W 5 kts	6nm	1028	calm	clear
Sunday 07/08/2022 06:00	8.25	W15kts	6nm	1026	calm	clear
Sunday 07/08/2022 12:00	8.5	W 15 kts	6nm	1027	slight	Clear/dry

Date/Time	Survey Day	Wind (Dir / Ave. Speed [Knots])	Visibility (nm)	Atmospheric Pressure (mb)	Sea State (e.g. calm/slight /moderate/rough)	Comments (e.g. swell height and direction, precipitation, trends)
Sunday 07/08/2022 18:00	8.75	W 10 kts	6nm	1025	calm	Dry/clear
Monday 08/08/2022 00:00	9	W 5 kts	6nm	1027	calm	Dry
Monday 08/08/2022 06:00	9.25	Vessel Downtime				
Monday 08/08/2022 12:00	9.5					
Monday 08/08/2022 18:00	9.75					
Tuesday 09/08/2022 00:00	10	Nw 5 kts	8nm	1029	Calm	dry
Tuesday 09/08/2022 06:00	10.25	variable	8nm	1030	glassy	dry
Tuesday 09/08/2022 12:00	10.5	variable	8nm	1030	glassy	Dry/hoy
Tuesday 09/08/2022 18:00	10.75	N 5 kts	8nm	1029	glassy	Dry/hot
Wednesday 10/08/2022 00:00	11	Nw 5 kts	6nm	1028	glassy	dry
Wednesday 10/08/2022 06:00	11.25	variable	8nm	1026	glassy	HOT
Wednesday 10/08/2022 12:00	11.5	variable	8nm	1026	glassy	VERY HOT
Wednesday 10/08/2022 18:00	11.75	VARIABLE	8NM	1026	GLASSY	HOT
Thursday 11/08/2022 00:00	12	VARIABLE	6NM	1025	GLASSY	DRY/HUMID
Thursday 11/08/2022 06:00	12.25	W 5 KTS	6NM	1023	CALM	DRY/CLEAR
Thursday 11/08/2022 12:00	12.5	VARIABLE	6NM	1023	GLASSY	HOT/CLEAR
Thursday 11/08/2022 18:00	12.75	N 5 KTS	6NM	1022	RIPPLES	HOT/CLEAR
Friday 12/08/2022 00:00	13	N 5 KTS	6NM	1022	CALM	DRY/HUMID
Friday 12/08/2022 06:00	13.25	ENE 5 KTS	6NM	1021	CALM	DRY/CLEAR
Friday 12/08/2022 12:00	13.5	NE 5KTS	6NM	1019	CALM	DRY,CLEAR
Friday 12/08/2022 18:00	13.75	NE 5 KTS	6NM	1019	CALM	DRY/CLR
Saturday 13/08/2022 00:00	14	ENE	6NM	1019	CALM	HUMID/CLR
Saturday 13/08/2022 06:00	14.25	E 5 KTS	6NM	1016	CALM	DRY/CLEAR
Saturday 13/08/2022 12:00	14.5	VARIABLE	6NM	1015	CALM	HOT/DRY
Saturday 13/08/2022 18:00	14.75	VARIABLE	6NM	1013	CALM	DRY/CLR
Sunday 14/08/2022 00:00	15	ENE 10 KTS	6NM	1013	CALM	DRY/CLEAR

NASH
MARITIME

MORECAMBE OWF

Winter 2023 Vessel Traffic Survey Report

Offshore Wind Limited

Document No: 21-NASH-0193_VTS_Winter_2023 | 01-00

27-Mar-24

NASH MARITIME

PROJECT INFORMATION

PROJECT TITLE	Morecambe OWF
REPORT TITLE	Winter 2023 Vessel Traffic Survey Report
CLIENT	Offshore Wind Limited
CLIENT ADDRESS	One, St Peter's Square, Manchester, United Kingdom, M2 3DE

DOCUMENT CONTROL

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FIGURES

TABLES

APPENDICES

ABBREVIATIONS

Abbreviation	Detail
AIS	Automatic Identification System
EIA	Environmental Impact Assessment
ES	Environmental Statement
GPS	Global Positioning System
LOA	Length Overall
MCA	Maritime and Coastguard Agency
NRA	Navigation Risk Assessment
OREI	Offshore Renewable Energy Installation
OWF	Offshore Wind Farm
UTC	Coordinated Universal Time
VHF	Very High Frequency

1. INTRODUCTION

1.1 OVERVIEW AND DOCUMENT OBJECTIVE

NASH Maritime has been commissioned to undertake a Navigation Risk Assessment (NRA) for the Morecambe OWF, located in the Irish Sea. The NRA has been conducted to the standards of the MCA's MGN654 (MCA, 2021). As such, two 14-day vessel traffic surveys were undertaken to collect AIS data, radar and visual observations to inform the assessment. The results of these surveys are reported in Section 6.3 of the NRA.

It is noted that MGN654 4.6b states that "For all OREI developments, subject to the planning process, the survey may be undertaken within 24 months prior to submission. If the EIA Report is not submitted within 24 months an additional 14 day continuation survey data may be required for each subsequent 12-month period".

The vessel traffic survey dates reported in Section 6.3 of the NRA are:

- 09-Feb-22 to 26-Feb-22
- 30-Jul-22 to 13-Aug-22

Therefore, the Morecambe OWF Project vessel traffic survey validity would expire in December 2023 and prior to Application. To address this, an additional vessel traffic survey was undertaken in December 2023 for the purposes of extending the validity of the survey data for a further 12-month period beyond the date of Application.

The objective of this report is twofold. Firstly, to provide a factual record of the additional marine vessel traffic dataset. Secondly, to compare the results of this survey with the findings of the NRA to confirm whether they are consistent with previous data collection and whether any differences would have a bearing on the conclusions of the NRA. This approach was shared with the MCA in July 2023.

2. MARINE VESSEL TRAFFIC SURVEY METHODOLOGY

2.1 SURVEY AREA AND DATA EXTENTS

The Shipping and Navigation Study Area and Survey Area have been defined within the Scoping Report and data was therefore collected for the OWF Site with a 10nm buffer as shown in **Figure 1**.

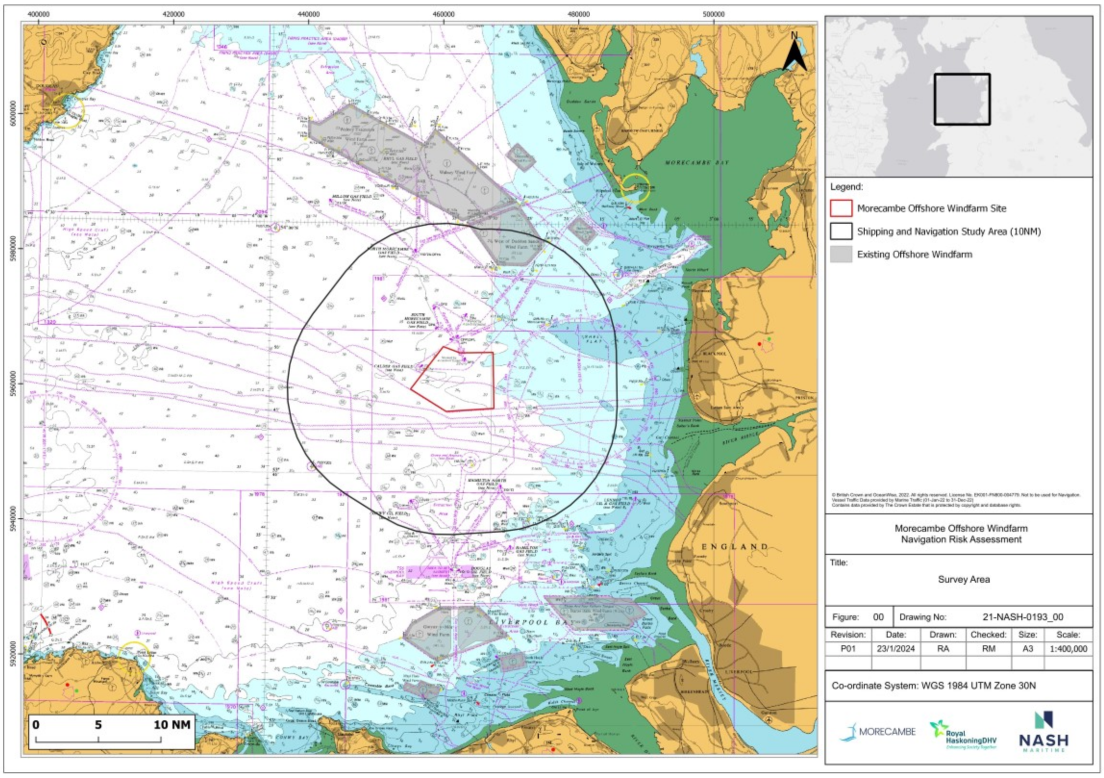

Figure 1: Offshore Windfarm Site and Shipping and Navigation Study Area

2.2 SURVEY VESSELS

The vessel based marine vessel traffic survey was undertaken using the Morning Star (see **Figure 2** and **Table 1**).

Table 1: Morning Star specifications

Feature	Value
Name	Morning Star
Callsign	MYXY7
Date built	1999
Hull	Steel
Length	23.0m
Breadth	7.0m
Depth	3.8m
Tonnage	146GT
Main Engine	Caterpillar C32 500KW
Auxiliary Engine	Daewoo 230KW
Speed	10kts cruising, 12kts max
Fuel Oil Capacity	24,000 litres
Freshwater Capacity	15,000 litres

Figure 2: Morning Star survey vessel

2.3 SURVEY EQUIPMENT

Survey equipment was installed on the survey vessels and was tested and maintained by NASH Maritime engineers throughout the survey period to integrate with the vessel's onboard systems. **Table 2** to **Table 3** provide an outline of general equipment on the vessels and the specific survey equipment used for vessel based AIS, radar and visual surveys.

Table 2: Survey Equipment

Item	No.	Purpose/Description
Survey Laptop Inc. logger software	2	1x laptop to record AIS and radar data outputs from vessel equipment – configured with chart and survey area layers for surveyor visual reference and context (to verify range/function etc..) and to record radar data outputs from vessel equipment 1x spare laptop for back-up Include battery for local power back-up to provide minimum of 1hr emergency power
Power adaptor	2	Power for laptops (inc. surge protection)
R232 Cable	2	For data connection from AIS and radar equipment to laptop (may vary)
USB Memory Stick	2	Hourly back up of survey data files and images (per laptop and in duplicate)

Table 3: Morning Star Vessel Equipment

Item	No.	Purpose/Description
ARPA Radar	2	Furuno ARPA AIS Chart overlay Koden ARPA AIS Chart overlay
AIS Receiver	1	Com NAV
Satellite Broadband	1	Vessel fit Used for daily data transfer
Mobile Phone Coverage 4G and 5G	1	Backup for the satellite broadband

2.4 SURVEY PERIODS

In accordance with MGN654, the data was collected over 14 days to capture vessel activity in winter.

The data was collected between 27-Nov-23 (09:00 UTC) and 13-Dec-23 (19:10 UTC).

Daily weather logs were collated from the vessel and provided in **Appendix A**

2.4.1 Vessel Downtime

Morning Star departed the Survey Area to seek shelter from strong winds and heavy rain at Whitehaven. This incurred the following downtime:

- 06-Dec-23 (10:30 UTC) to 08-Dec-23 (14:59 UTC)

The data presented in **Section 3** has been filtered to exclude downtime periods.

2.5 SURVEY VESSEL LOCATION

The location of the survey vessel was monitored using onboard GPS. The survey vessel track is presented in **Figure 3**.

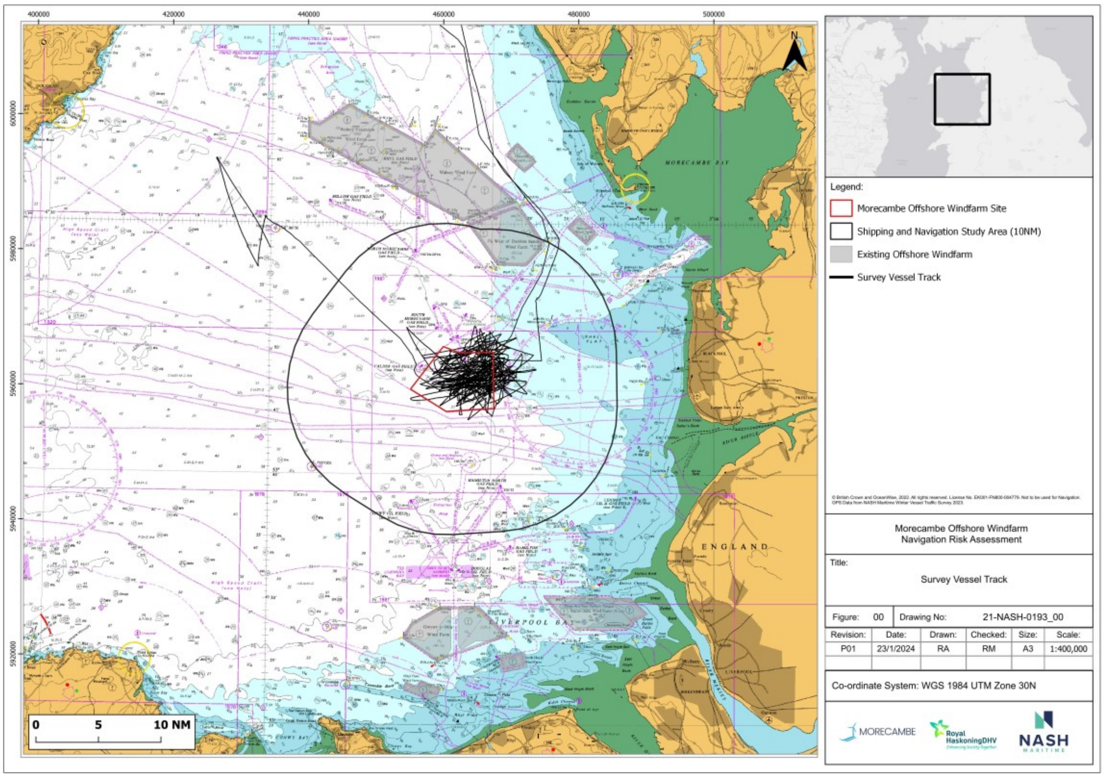

Figure 3: Survey vessel track.

2.6 WEATHER LOG

Weather was recorded by the survey vessel at 6 hourly intervals during each survey campaign (see **Appendix A** for the survey weather log).

During the survey period, the maximum wind experienced (excluding downtime) was 32 kts from the northwest which contributed to a moderate/rough sea state.

2.7 DATA COMPETENCY

Quality assurance checks on the survey vessel equipment and data collection was undertaken on a continuous basis throughout the surveys to ensure competency of equipment, area coverage and data collection fidelity.

It should be noted that some vessel tracks, as shown in this section, appear shortened or isolated. Reasons for this may include the below factors and, where notable for individual tracks, narrative is provided to accompany the plots.

- Coinciding with commencement or completion of survey (including survey vessel weather downtime events).
- Tracking vessels by radar initially and subsequently aligning with an AIS transmission (at which point radar tracking was ceased) or vice versa.
- Target vessel factors including:
    - Radar signature of the target vessel (shape and size of the vessel – for example a smaller vessel represents a smaller detectable radar signature).
    - Stability of the target vessel (shape and size of the vessel and motion in different sea states).
    - AIS transmission and detection range from target vessel can vary in strength and consistency due to factors including:
        - Whether equipment is on and transmitting (some small non mandatory vessels manually elect to transmit [and receive] infrequently for operational reasons)
        - Power and setting configuration of transmission equipment over VHF
        - Location/height of aerial
        - Partial/intermittent shielding of AIS transmission aerial by vessel structures (common on smaller vessels)
        - Interference with other ship borne systems/communication equipment
        - State of repair of equipment and ancillary cables / fittings

    - Distance and range between target vessel and survey vessel
- Met-ocean effects including:
    - Atmospheric pressure (ducting of AIS signals improves in higher pressure conditions)
    - Sea state and combination of swell waves and wind generated waves
    - Precipitation and poor visibility (e.g. fog) will reduce radar and VHF range due to attenuation of signal and also influence ability of watch keeper making visual contact to identify vessel

3. SURVEY RESULTS

This section presents a series of vessel traffic plots from the survey campaign.

3.1 SUMMARY

Figure 4 provides a count of identified vessels during the survey period by vessel type. With 181 transits, the most frequently identified vessel type was passenger. This was also the result in the winter 2022 and summer 2022 surveys. This is largely due to the proximity of multiple ferry routes in operation within the region, primarily between Heysham or Liverpool and Ireland or the Isle of Man. The summer 2022 survey had a higher number of passenger transits (240) this can be attributed to the seasonal service between Douglas and Liverpool and general increase in passenger services during peak season.

With 117 identified transits, tug and service vessels were the second most frequent. This remains consistent with the 2022 surveys. A total of 173 vessel transits were observed during summer 2022. This increased level of tug and service activity related to dredging efforts to the south of the Survey Area by hopper dredgers WILLEM VAN ORANJE and CAUSEWAY. In addition, there was an increase in vessel movements associated with wind farm servicing to the north of the Survey Area at West of Duddon Sands.

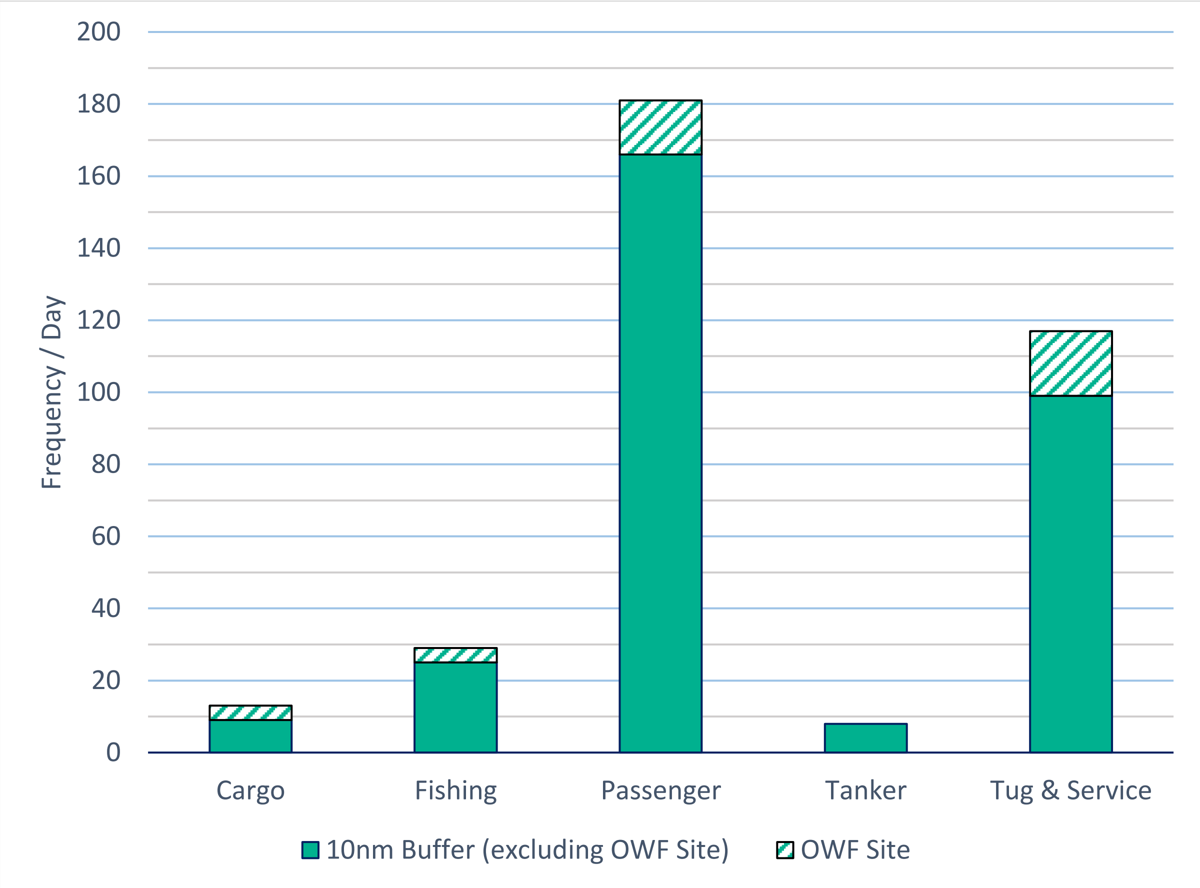

Figure 4: Vessel types for survey period.

Table 4: Summary of vessel traffic survey.

Attributes	Results
Vessel	Morning Star (23 m Fishing Vessel)
Dates	27-Nov-23 (09:00 UTC) and 13-Dec-23 (19:10 UTC).
Downtime	06-Dec-23 (10:30 UTC) to 08-Dec-23 (14:59 UTC)
Survey Area	OWF Site + 10nm
Total Vessels Recorded (OWF Site + 10nm)	348 (24.9/day)
Total Vessels Recorded (OWF Site)	41 (2.9/day)
Cargo	**Survey Area:** 13 (0.9/day) **OWF Site:** 4 (0.3/day)
Fishing	**Survey Area:** 29 (2.1/day) **OWF Site:** 4 (0.3/day)
Passenger	**Survey Area:** 181 (12.9/day) **OWF Site:** 15 (1.1/day)
Recreational	**Survey Area:** 0 (0/day) **OWF Site:** 0 (0/day)
Tanker	**Survey Area:** 8 (0.6/day) **OWF Site:** 0 (0/day)
Tug and Service	**Survey Area:** 117 (8.4/day) **OWF Site:** 18 (1.3/day)

3.1.1 Cargo

There were 13 cargo vessel tracks identified within Survey Area during the winter 2023 survey as shown in **Figure 5**. This is the same number identified in the 2022 winter survey and is consistent with the seven cargo vessels reported in the 2022 summer survey. Of the 13 tracks entering the Survey Area, four tracks crossed the OWF Site in the winter 2023 survey. Most of these tracks are progressing in a southwest northeast orientation which indicates they are on passage between Heysham and Ireland/Europe.

During the winter 2023 survey, the largest vessel was the Endurance, a 135m Length Overall (LOA) container ship likely transiting to/from the Liverpool container terminal. The longest cargo vessels in the winter 2022 and summer 2022 surveys were the 349m LOA APL Gwangyang and the 89m LOA Beaumare, respectively.

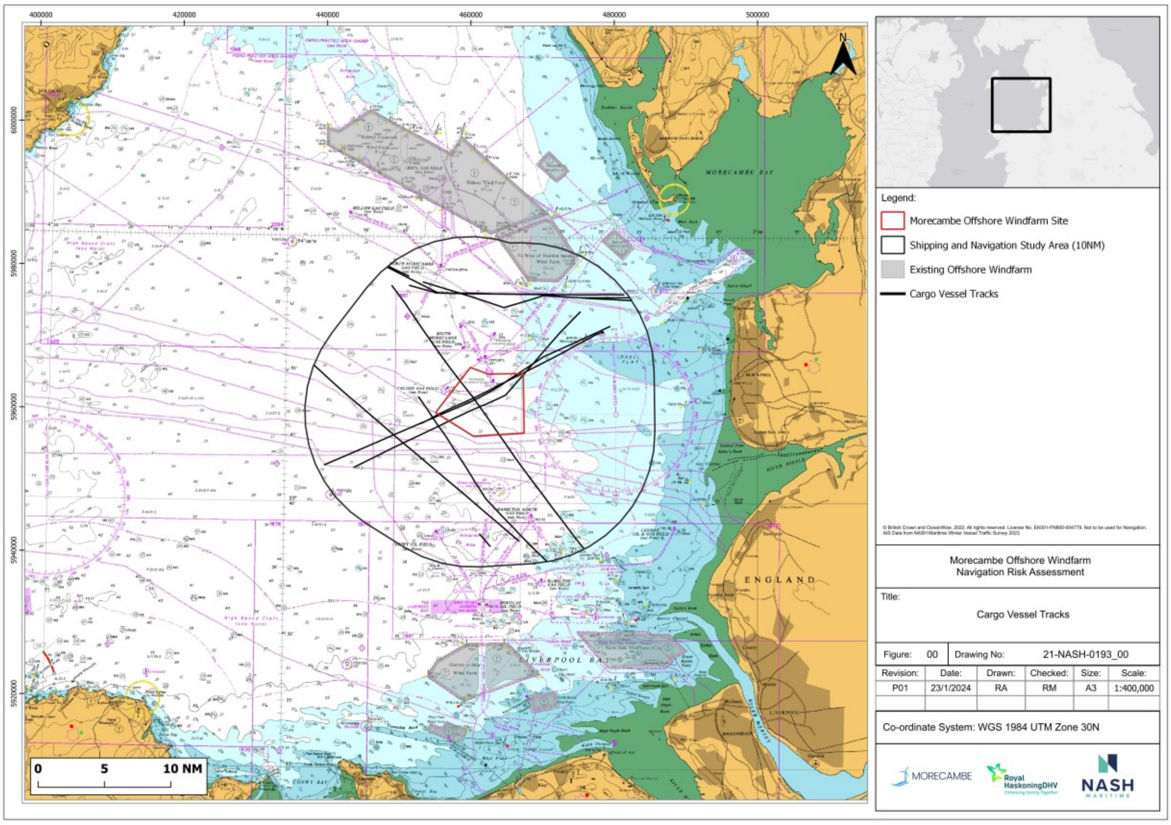

Figure 5: Cargo Vessel Tracks.

3.1.2 Tanker

There were eight tanker tracks identified passing through the Survey Area as shown in **Figure 6**. No tanker tracks crossed the OWF Site. During the 2022 winter survey, 12 tanker vessels were observed within the Survey Area with six intersecting the OWF Site. During the 2022 summer survey, three tankers were identified in the Survey Area with two intersecting the OWF Site. Tankers are primarily operating on a southeast northwest orientation in/out of Liverpool.

The largest tanker identified during the survey period was the 249m LOA shuttle tanker Nansen Spirit. The largest tankers recorded in the winter 2022 and summer 2022 surveys were the 77m LOA Keewhit (an oil products tanker which is regularly involved in vessel bunkering operations) and the 128m LOA Murray Star, respectively. Six of the tracks in the winter 2023 were movements by Keewhit.

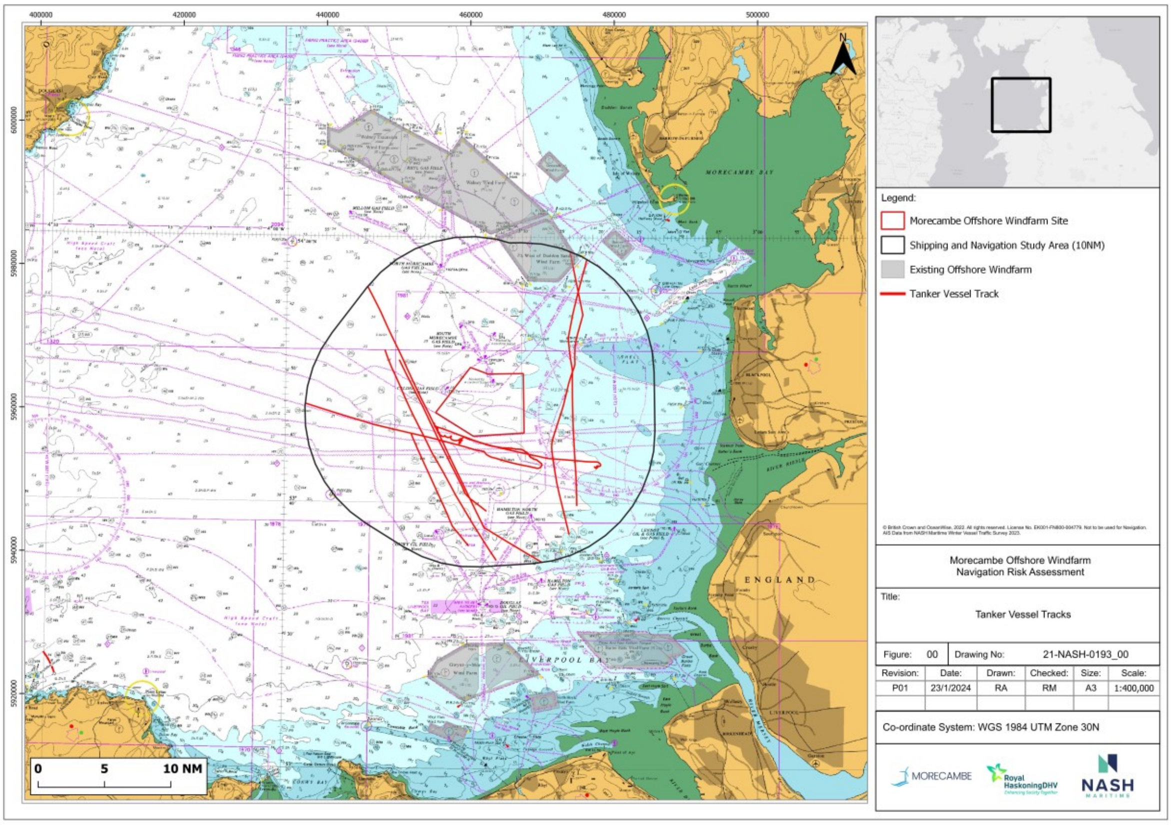

Figure 6: Tanker Vessel Tracks.

3.1.3 Passenger

Tracks of passenger vessels are presented in **Figure 7**. There were 181 passenger vessels identified during the winter 2023 survey, with 15 tracks crossing the OWF Site. These tracks are vessels operated by Stena Line on passage between Liverpool and Belfast. These results are consistent with those recorded in the winter 2022 survey where 168 passenger vessels were identified transiting the Survey Area, with five intersecting the OWF Site. The summer 2022 survey found a higher frequency of passenger vessels with 240 transiting the Survey Area and 10 crossing the OWF Site. The higher number of summer passenger vessel crossings is due to the general increase in services between Douglas and Liverpool during peak season.

The largest passenger vessels identified during the winter 2023 survey period were the 215m LOA Stena Line vessels Stena Edda and Stena Embla. These vessels were also the largest passenger vessels identified during the winter 2022 and summer 2022 surveys.

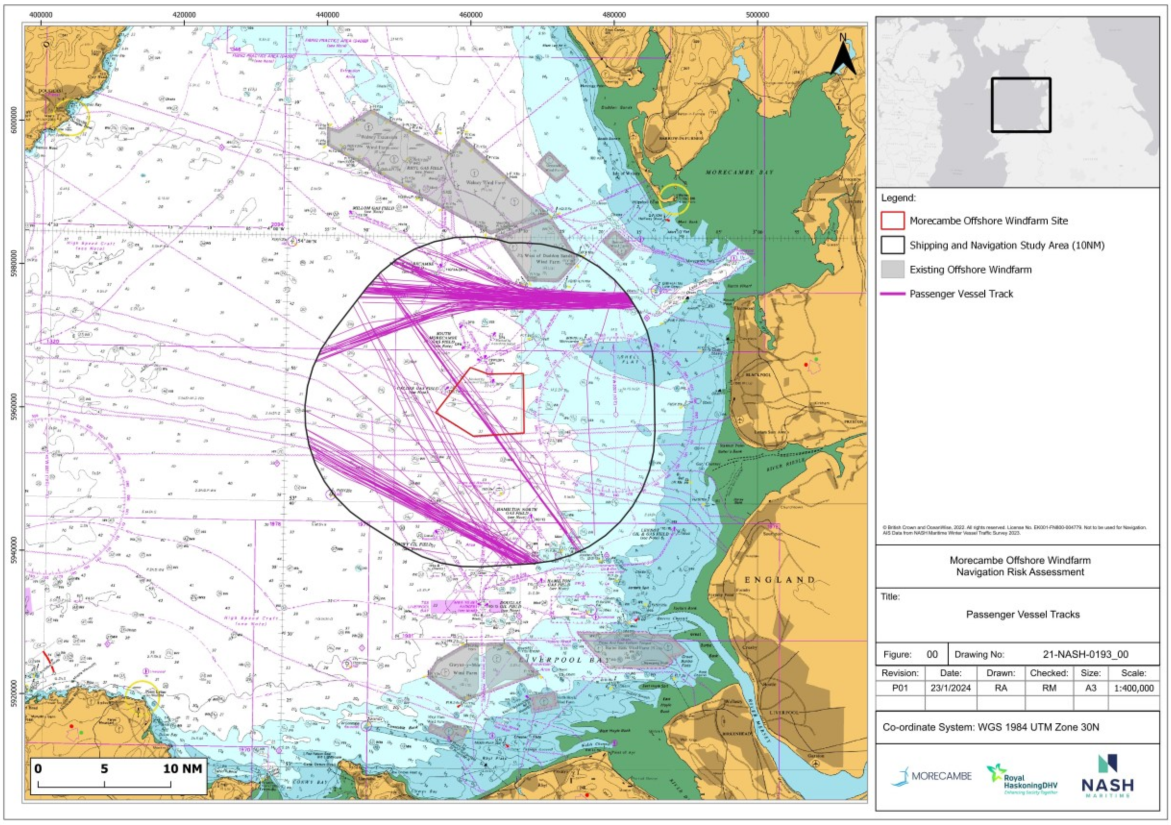

Figure 7: Passenger Vessel Tracks.

3.1.4 Fishing

There were 29 fishing vessel tracks identified during the winter 2023 survey period as shown in **Figure 8**. The tracks during the survey period indicate fishing activity in locations corresponding to known areas used for scallop fishing activity. Four unique fishing vessels were recording inside the Survey Area with the trawler vessel Custos Deus accounting for 12 of the 29 tracks.

A greater level of fishing activity was observed during the winter 2022 survey, during which 73 vessel transits were recorded, largely due to scallop fishing to the south of the OWF Site. This reduction is likely due to the adverse weather conditions experienced during the survey period resulting in fewer small fishing vessels leaving port.

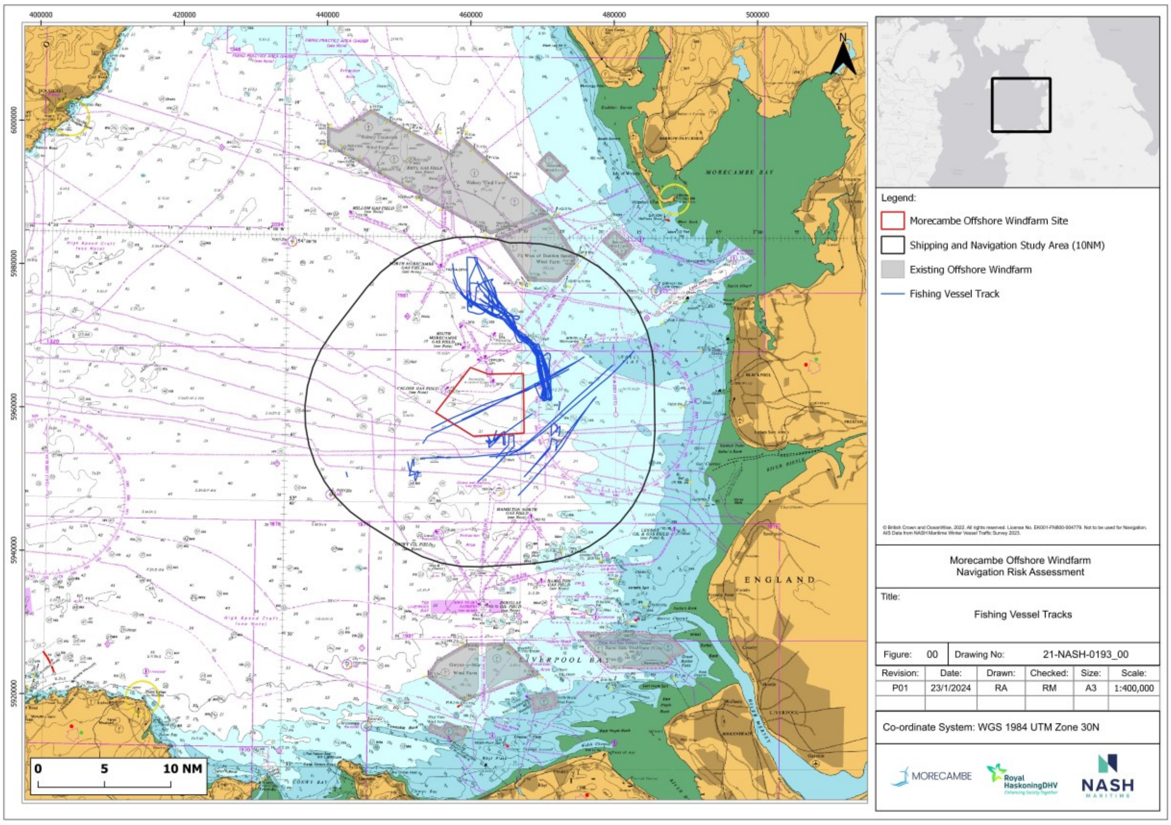

Figure 8: Fishing Vessel Tracks.

3.1.5 Recreational

The winter 2023 survey recorded no recreational vessels. No recreational vessels were observed during the winter 2022 survey and 12 tracks identified in the summer 2022 survey. Vessel transits during the summer period were attributed to different vessels indicating that the vessels are likely to be involved in offshore cruising rather than regularly using the area.

3.1.6 Tug and Service

Figure 9 presents regular tug and service activity to the north and south of the OWF Site. There were 117 tug and service tracks identified during the survey. A total of 89 tug and service tracks were recorded in winter 2022, and 173 tracks recorded in summer 2022.

The tug and service vessel tracks into the north of the OWF Site are primarily vessels associated with the South Morecambe Gas Field, eight of which are accounted for by the standby safety vessel the Grampian Fortress. The majority of activity to the south of the OWF Site was the Esvagt Don at the Hamilton North Gas Field, with 34 tracks recorded.

During the winter 2022 survey, tug and service vessels were recorded at the South Morecambe Gas Field to the north of the OWF Site and Hamilton North Gas Field to the south.

The summer 2022 survey found similar tug and service activity to the north and south of the OWF Site with the addition of dredging to the south and vessel movements associated with wind farm servicing to the north of the Survey Area at West of Duddon Sands.

In the winter 2023 survey, 18 tug and service vessels transited the OWF Site. This is consistent with the 14 vessels recorded in winter 2022 and 13 transiting tracks in summer 2022. The majority of movements were vessels on passage between South Morecambe Gas Field and Conwy Oil Field / Hamilton North Gas Field. Some vessel tracks engaged in activities to the north of the OWF Site entered and exited the site on several occasions during a single transit.

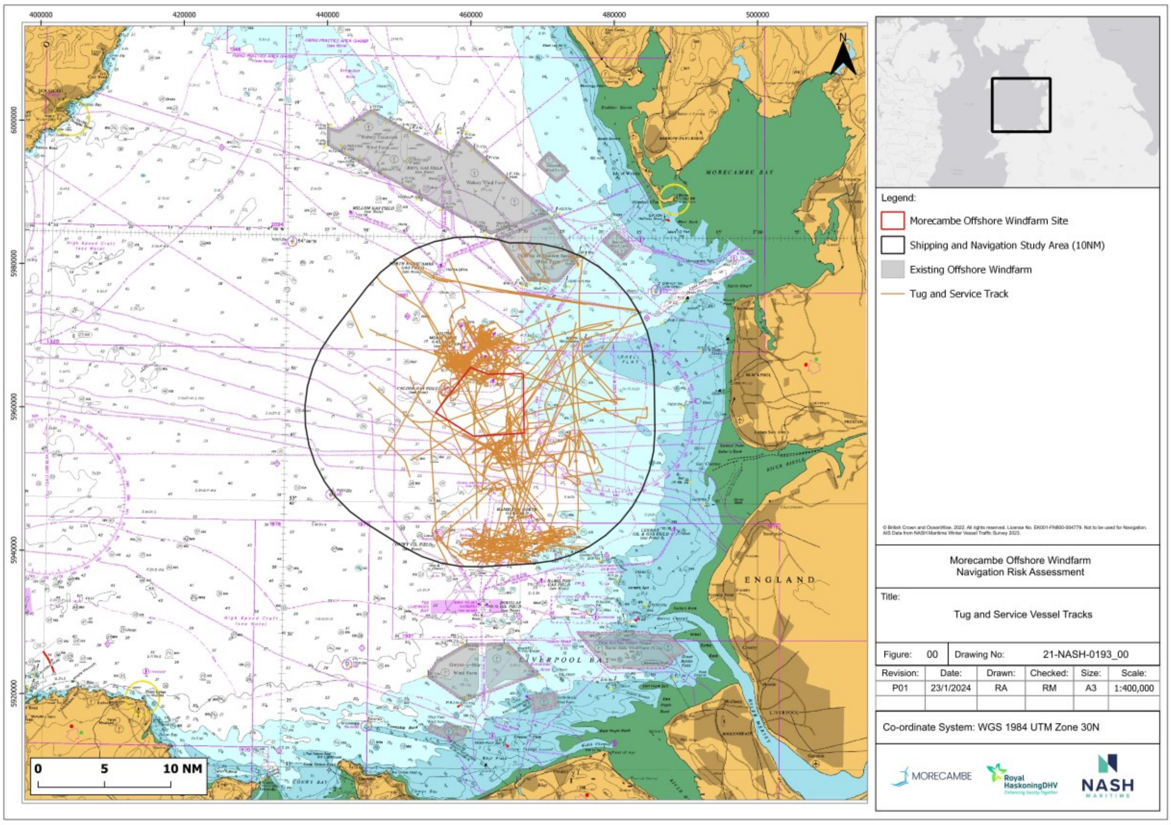

Figure 9: Tug and Service Vessel Tracks.

3.2 VESSEL COUNTS

Figure 10 shows the daily counts of vessel tracks either through the OWF Site or within the Survey Area. There were 348 individual tracks identified during the survey period, averaging 24.9 per day. A total of 41 transits passed through the OWF Site. The findings are consistent with the winter 2022 survey during which 355 individual tracks were identified (31 passing thorough the OWF Site), averaging 25.3 per day.

Vessel downtime due to adverse weather conditions was experienced between 06-Dec-23 (10:30 UTC) to 08-Dec-23 (14:59 UTC), contributing to the lower track counts between 02-Dec-23 and 09-Dec-23 as inclement weather approached the area.

Figure 10: Vessel counts during survey

3.3 VESSEL SIZE

The distribution of vessels by size for the winter 2023 survey is presented in **Figure 11**. The majority of vessels were in the 100-150m length category which is accounted for by the frequency of passenger ferry services and is consistent with the results of the winter 2022 survey. The summer 2022 survey showed a greater number of 100-150m vessels due to the presence of the seasonal vessel Manannan running between Liverpool and Douglas.

All three surveys show a peak of vessels around the 200-250m category which is due to movements from Stena Line vessels. As these vessels are on regular routes, they show less seasonality in movements.

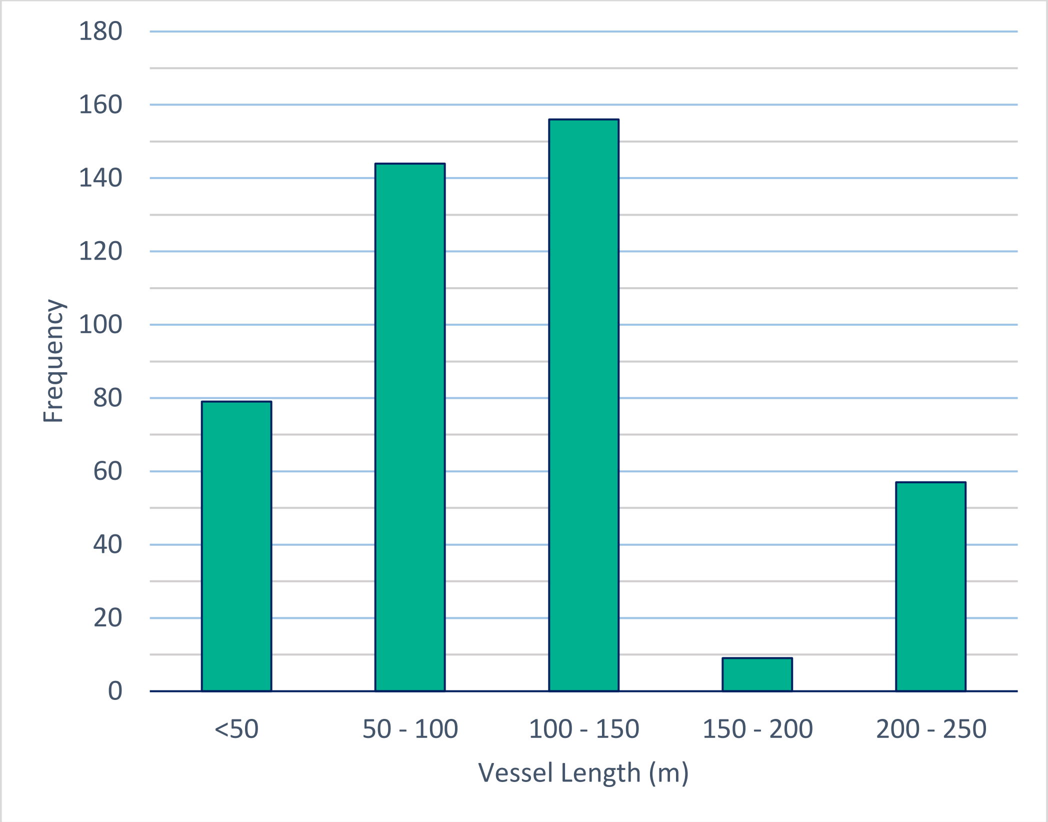

Figure 11: Vessel Size Distribution During Surveys

3.4 VESSEL DESTINATIONS

Table 5 shows a summary of the destinations for the vessels identified by AIS for the winter 2023 survey period.

Most of the vessels identified were passenger vessels on routes between Belfast/Liverpool (35%), Douglas/Heysham (29%) and Warrenpoint/Heysham (24%). The most common destination for tankers was Liverpool on passage from Ireland (75% of all tanker traffic, 3% of all traffic).

Table 5: Destination count for Commercial Vessels

Route/Destination	Cargo	Passenger	Tanker	Total
Belfast - Birkenhead		39		39
Belfast - Heysham		1		1
Belfast - Liverpool			4	4
Birkenhead - Belfast		25		25
Douglas - Heysham		15		15
Douglas - Liverpool		1		1
Dublin - Heysham		11		11
Europe - Glasson Dock	1			1
Heysham - Douglas	5	37		42
Heysham - Dublin		9		9
Heysham - Newport	1			1
Heysham - Warrenpoint		5		5
Liverpool - Belfast			2	2
Liverpool - Campbeltown	1			1
Liverpool - Greenock	1			1
Liverpool - Kilroot	1			1
UK - Barrow In Furness	1			1
UK - Heysham	1			1
UK - Liverpool	1		2	3
Warrenpoint - Heysham		38		38

4. SUMMARY

This report presents analysis of a 14-day dedicated marine traffic survey carried out for the Morecambe OWF Site. The survey was conducted from 27-Nov-23 (09:00 UTC) to 13-Dec-23 (19:10 UTC).by the survey vessel Morning Star.

The most frequently identified vessel type during the survey period was passenger (52%) followed by tug and service (34%) and fishing (8%).

The winter 2023 survey found 13 cargo vessel movements and 8 tanker vessel movements. These were judged to be consistent with the previous surveys reported in the NRA and is considered to have no impact on the findings of that NRA.

The winter 2023 survey found 181 passenger movements, consistent with those recorded in the previous surveys. The routes operated by Isle of Man Steam Packet Company and Stena Lines remained comparable to those identified in the previous surveys reported in the NRA and are considered to have no impact on the findings of that NRA.

The most common routes taken by cargo, tanker, and passenger vessels were between Belfast/Liverpool (35%), Douglas/Heysham (29%), and Warrenpoint/Heysham (24%).

The winter 2023 survey found 29 fishing movements with no defined routes identified. This was judged to be consistent with the previous summer 2022 but substantially smaller than that of the winter 2022 survey. This is considered to have no impact on the findings of that NRA.

The winter 2023 survey found no recreational movements. This was judged to be consistent with the previous winter vessel traffic survey reported in the NRA and is considered to have no impact on the findings of that NRA.

The winter 2023 survey found 117 tug and service movements generally concentrated at two areas of high activity in the Survey Area, Hamilton North Gas Field and South Morecambe Gas Field. This was judged to be consistent with the previous surveys reported in the NRA and is considered to have no impact on the findings of that NRA.

As found in the previous surveys, most vessels were in the 100-150m length category which is accounted for by the frequency of passenger ferry services within the study area. The survey showed a peak of vessels around the 200-250m category which is due to movements from Stena Line passenger vessels. The largest vessel identified was a 135m container recorded leaving Liverpool.

Therefore, it is concluded that the findings of the winter 2023 survey are consistent with both the previous vessel traffic surveys conducted in winter 2022 and summer 2022. As such, no impact on the conclusions reached within the NRA have been identified.

Given this finding the datasets used within the Morecambe Offshore Windfarm: Generation Assets NRA are concluded to be valid for a further 12 month period as per MGN654 4.6b (MCA, 2021).

Appendix A
Daily Weather Log

Date / Time	Survey Day	Wind (Dir / Ave. Speed [Knots])	Visibility (nm)	Atmospheric Pressure (mb)	Sea State (e.g. calm/slight /moderate/rough)	Comments (e.g. swell height and direction, precipitation, trends)
Mon 27/11/2023 00:00	0	SE 10	poor	1003	slight	rain
Mon 27/11/2023 06:00	0.25	N 10/12	moderate	1000	slight	showers
Mon 27/11/2023 12:00	0.5	N 14/16	good	1000	slight/moderate	dry
Mon 27/11/2023 18:00	0.75	N 22/25	good	1006	moderate	dry
Tue 28/11/2023 00:00	1	NE 18/22	GOOD	1010	slight/moderate	dry
Tue 28/11/2023 06:00	1.25	NE 10	good	1012	slight	dry/bright
Tue 28/11/2023 12:00	1.5	N 2	good	1011	calm	dry/bright
Tue 28/11/2023 18:00	1.75	NW 5	good	1009	calm	dry/cloudy
Wed 29/11/2023 00:00	2	N 10	good	1007	calm	dry
Wed 29/11/2023 06:00	2.25	NW10	good	1012	calm	dry
Wed 29/11/2023 12:00	2.5	N 2	good	1011	calm	dry
Wed 29/11/2023 18:00	2.75	NW 4	good	1009	calm	dry
Thu 30/11/2023 00:00	3	N 8/9	good	1007	calm	dry
Thu 30/11/2023 06:00	3.25	E 16/19	good	1006	slight	dry
Thu 30/11/2023 12:00	3.5	NE 15/18	good	1007	slight	dry/bright
Thu 30/11/2023 18:00	3.75	NE14/13	good	1008	slight	dry
Fri 1/12/2023 00:00	4	NE 11	good	1009	slight	dry
Fri 1/12/2023 06:00	4.25	E 9	good	1009	smooth	dry/sunny
Fri 1/12/2023 12:00	4.5	E 7	good	1011	smooth	dry/sunny
Fri 1/12/2023 18:00	4.75	E3	good	1012	smooth	dry
Sat 2/12/2023 00:00	5	S 5	good	1013	smooth	dry
Sat 2/12/2023 06:00	5.25	S 13/14	good	1012	slight	dry
Sat 2/12/2023 12:00	5.5	S 18/22	GOOD	1013	slight/moderate	dry
Sat 2/12/2023 18:00	5.75	S 18/20	good	1012	moderate	rain
Sun 3/12/2023 00:00	6	S 16/14	good	1009	slight/moderate	rain
Sun 3/12/2023 06:00	6.25	SE 19/9	good	1009	slight	dry
Sun 3/12/2023 12:00	6.5	E 13/12	good	1010	slight	dry
Sun 3/12/2023 18:00	6.75	E 13/14	good	1007	slight	showers
Mon 4/12/2023 00:00	7	E20/21	good	1004	slight/moderate	showers
Mon 4/12/2023 06:00	7.25	NE 23/26	good	999	slight/moderate	dry
Mon 4/12/2023 12:00	7.5	NE 20/22	good		slight/moderate	showers
Mon 4/12/2023 18:00	7.75	NE 18/20	moderate		slight/moderate	rain
Tue 5/12/2023 00:00	8	NE 20/21	good	1006	slight/moderate	showers
Tue 5/12/2023 06:00	8.25	NE 16/15	good		slight	dry
Tue 5/12/2023 12:00	8.5	NE 14/12	good		slight	dry
Tue 5/12/2023 18:00	8.75	E 10	good		slight	dry
Wed 6/12/2023 00:00	9	E 8	good		slight	dry

Wed 6/12/2023 06:00	VESSEL DOWNTIME					
Wed 6/12/2023 12:00						
Wed 6/12/2023 18:00						
Thu 7/12/2023 00:00						
Thu 7/12/2023 06:00						
Thu 7/12/2023 12:00						
Thu 7/12/2023 18:00						
Fri 8/12/2023 00:00	9.25	S 15/19	good	996	moderate	rain
Fri 8/12/2023 06:00	9.5	SW 19/26	moderate	997	moderate	showers
Fri 8/12/2023 12:00	9.75	SW 23/29	moderate	998	moderate/rough	dry
Fri 8/12/2023 18:00	10	SW 24/30	moderate	998	moderate/rough	showers
Sat 9/12/2023 00:00	10.25	SW 23/30	moderate	998	moderate/rough	dry
Sat 9/12/2023 06:00	10.5	SE 23/24	moderate	989	moderate	dry
Sat 9/12/2023 12:00	10.75	W 33/42	poor	983	rough	showers
Sat 9/12/2023 18:00	11	W 45/55	poor	987	very rough	showers
Sun 10/12/2023 00:00	11.25	NW 33/42	poor	999	very rough	wet
Sun 10/12/2023 06:00	11.5	SW 12/16	moderate	1001	moderate	showers
Sun 10/12/2023 12:00	11.75	S 23/30	moderate	993	moderate	heavy rain
Sun 10/12/2023 18:00	12	SW 27/36	poor	990	moderate/rough	rain
Mon 11/12/2023 00:00	12.25	NW 27/32	Poor	990	moderate/rough	showers
Mon 11/12/2023 06:00	12.5	NW16/20	Poor	998	moderate	dry
Mon 11/12/2023 12:00	12.75	NW 5/8	poor	1003	slight	showers
Mon 11/12/2023 18:00	13	S 5/7	good	1003	slight	dry
Tue 12/12/2023 00:00	13.25	SE 20/23	moderate	1001	slight/moderate	showers
Tue 12/12/2023 06:00	13.5	SE 16/19	moderate	995	slight	showers
Tue 12/12/2023 12:00	13.75	E 16/20	moderate	993	slight	showers
Tue 12/12/2023 18:00	14	NE 13/15	moderate	994	slight	showers
Wed 13/12/2023 00:00	14.25	NE 14/16	moderate	998	slight	dry
Wed 13/12/2023 06:00	14.5	NE 14/16	good	998	slight	dry
Wed 13/12/2023 12:00	14.75	NE 15/16	moderate	998	slight	dry
Wed 13/12/2023 18:00	15	NE 14/16	moderate	994	slight	dry

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