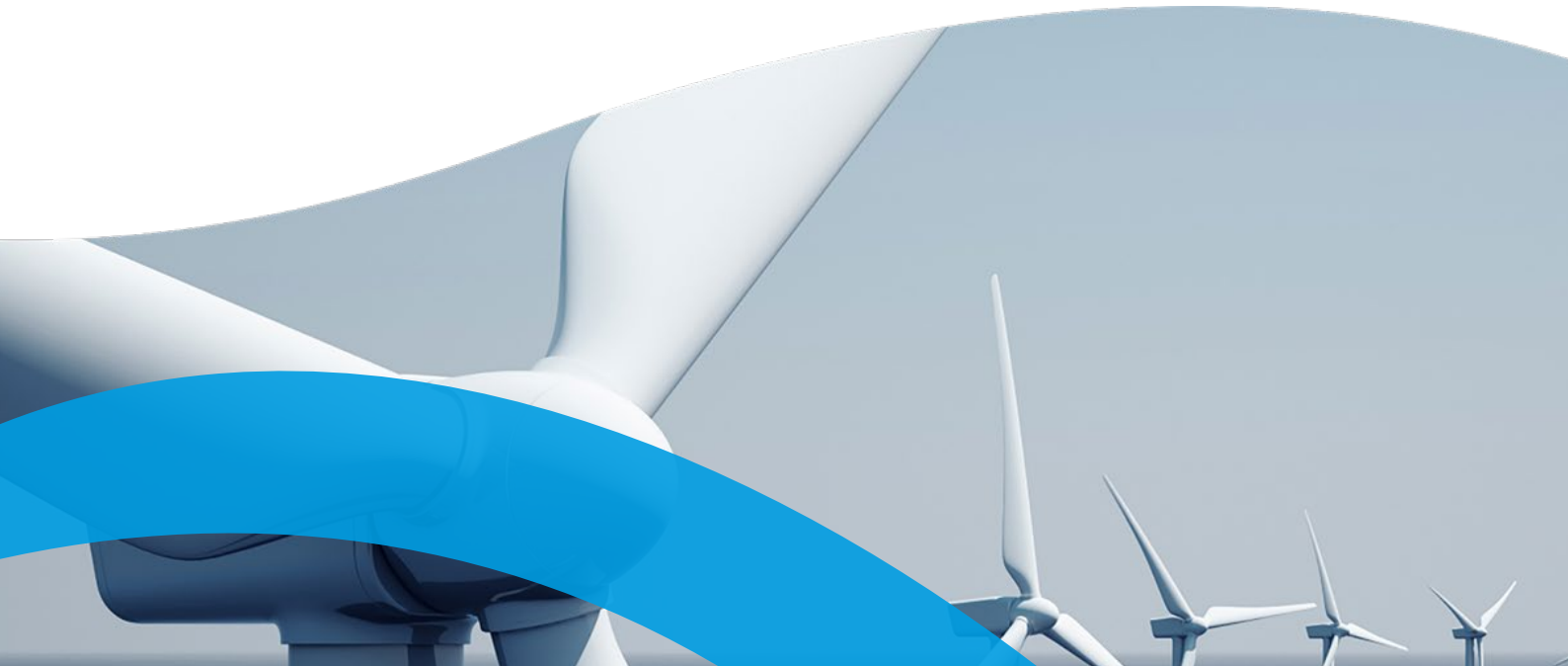
Muir Mhòr Offshore Wind Farm

Environmental Impact Assessment Report

Volume 2, Chapter 20: Major Accidents and Disasters



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Glossary

Term	Definition
Array Area	The area in which the generation infrastructure (including Wind Turbine Generators and associated foundations and inter-array cables), Offshore Electrical Platform(s), and an interconnector cable will be located.
Developer	Muir Mhòr Offshore Wind Farm Limited
Disaster	May be a natural hazard (e.g. earthquake) or a man-made/external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident (IEMA, 2020).
E2	The ScotWind Plan Option Area where the Proposed Development is located
EIA Regulations	Collectively the term used to refer to The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017, The Marine Works (Environmental Impact Assessment) Regulations 2007, and The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017.
Floating Foundations	The floating structures on which the Wind Turbine Generators are installed.
Foundation anchors	The structures which anchor the Floating Foundations to the seabed, connected to the foundation mooring.
Inter-array cables	Cables which link the Wind Turbine Generators to each other and the Offshore Electrical Platform(s).
Interconnector cable	Cable which links the Offshore Electrical Platform(s) to one another, allowing for power to be transferred between the platforms.
Landfall	The area between Mean High Water Springs (MHWS) and Mean Low Water Springs (MLWS) where the offshore export cables are brought onshore.
Major Accident	Events that threaten immediate or delayed serious environmental effects to human health, welfare and/or the environment and require the use of resources beyond those of the Developer or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events (IEMA, 2020).
Mitigation Measure	Measure which would avoid, reduce, or remediate an impact.
Offshore Energy Platform (OEP)	Offshore platform consisting of High Voltage Alternating Current (HVAC) equipment, details depending on the final electrical set up of the Project.
Offshore Export Cable Corridor (ECC)	The area within which the offshore export cable(s) will be installed.
Offshore export cables	The subsea electricity cable circuits running from the Offshore Electrical Platform(s) to the landfall which will transmit the electricity generated by the offshore wind farm to the onshore export cables for transmission onwards to the onshore substation and the national electrical transmission system along with auxiliary cables such as fibre optic cables.
Offshore transmission infrastructure	The proposed transmission infrastructure comprising: Offshore Electrical Platform(s) and associated foundations and substructures; the interconnector cable, the offshore export cables; and the landfall area up to Mean High Water Springs (MHWS).
Project	Muir Mhòr Offshore Wind Farm – comprises the wind farm and all associated offshore and onshore components.
Proposed Development	The offshore Muir Mhòr Offshore Wind Farm project elements to which this Offshore EIA Report relates.

Term	Definition
Risk	The likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur (IEMA, 2020).
Supervisory Control and Data Acquisition (SCADA)	SCADA system is a collection of both software and hardware components that allow supervision and control of plant and systems, both locally and remotely.
Source	The original cause of the hazard, which has the potential to cause harm (IEMA, 2020).
Vulnerable	Describes the potential for harm as a result of an event, for example due to sensitivity or value of receptors. In the context of the EIA Directive, the term refers to the 'exposure and resilience' of the development to the risk of a major accident and/or disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact (IEMA, 2020).
Wind Turbine Generator (WTG)	The wind turbines that generate electricity consisting of tubular towers and blades attached to a nacelle housing mechanical and electrical generating equipment.

Acronyms

Term	Definition
AIS	Automatic Identification System
ALARP	As Low As Reasonably Practicable
AMSL	Above Mean Sea Level
ATC	Air Traffic Control
AtoN	Aid to Navigation
BEIS	Business, Energy & Industrial Strategy
CAA	Civil Aviation Authority
CBRA	Cable Burial Risk assessment
CEA	Construction Equipment Association
CMIP	Coupled Model Intercomparison Project
CMS	Construction Method Statement
CNS	Central North Sea
°C	Celsius
COMAH	Control of Major Accident Hazards
DECC	Department for Energy & Climate Change
DGC	Defence Geographic Centre
DPV	Dynamic Positioning Vessel
DSLP	Development Specification and Layout Plan
EC	Export Cable
ECC	Export Cable Corridor
EEA	European Environment Agency
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EMF	Electromagnetic Fields
EPA	European Protected Area
EPS	European Protected Species
ERCoP	Emergency Response and Cooperation Plan
EU	European Union
ft	Feet
FIR	Flight Information Region
FL	Flight Level
FLAGS	Far North Liquids and Associated Gas System
FLO	Fisheries Liaison Officer
FLOWW	Fishing Liaison with Offshore Wind and Wet Renewables

Term	Definition
FMMS	Fisheries Management and Mitigation Strategy
FSA	Formal Safety Assessment
GW	Gigawatt
HFC	Hybrid Fibre Coaxial
HNS	Hazardous and Noxious Substances
HSE	Health and Safety Executive
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
IEMA	Institute of Environmental Management & Assessment
IMO	International Maritime Organisation
INTOG	Innovation and Targeted Oil & Gas
IOU	Infrastructure and Other Users
Km	Kilometre
LAT	Lowest Astronomical Tide
LMP	Lighting and Marking Plan
LSE	Likely Significant Effects
m	Metre
MARPOL	International Convention for Prevention of Pollution from Ships
MCA	Maritime and Coastguard Agency
MD-LOT	Marine Directorate-Licensing Operations Team
MGN	Marine Guidance Note
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MM	Muir Mhòr
MSFD	Marine Strategy Framework Directive
MSL	Mean Sea Level
MW	Megawatt
NATS	National Air Traffic Service
NERL	NATS [En-Route] plc
NLB	Northern Lighthouse Board
NMP	National Marine Plan
nm	Nautical Mile
NNR	National Nature Reserves
NSP	Navigational Safety Plan
OEP	Offshore Energy Platform
OESEA	Offshore Energy Strategic Environmental Assessment
OWF	Offshore Wind Farm
PL	Pipeline

Term	Definition
RCP	Representative Concentration Pathway
SAR	Search and Rescue
SCADA	Supervisory Control and Data Acquisition
SOLAS	Safety of Life at Sea
TRA	Temporary Reserved Area
UK	United Kingdom
UKCP	United Kingdom Climate Projections
UKHO	UK Hydrographic Office
UXO	Unexploded Ordnance
VFR	Visual Flight Rules
VMP	Vessel Management Plan
WSP	Wet Storage Plan
WTG	Wind Turbine Generators

20. MAJOR ACCIDENTS AND DISASTERS

20.1. INTRODUCTION

20.1.1. Muir Mhòr Offshore Wind Farm Limited (hereafter referred to as 'the Developer') is proposing to develop the Muir Mhòr Offshore Wind Farm (hereafter 'the Project'). The Project is made up of both offshore and onshore components. The subject of this offshore Environmental Impact Assessment Report (EIAR) is the offshore infrastructure of the Project seaward of Mean High-Water Springs (MHWS) which is hereafter referred to as 'the Proposed Development'.

20.1.2. The Muir Mhòr Array Area covers an area of approximately 200 km^2 and is located approximately 63 km east of Peterhead on the east coast of Scotland. The offshore infrastructure of the Proposed Development includes Wind Turbine Generators (WTGs) and associated floating foundations, the Offshore Electrical Platform(s) (OEP(s)) and associated foundations, the inter-array cables, interconnector cable, offshore export cables and landfall.

20.1.3. This Chapter of the Offshore EIAR presents an assessment of the potential impacts and associated Likely Significant Effects (LSE) on the vulnerability of the Proposed Development to risks of major accidents and disasters during the construction, operation and maintenance and decommissioning phases

20.1.4. This Chapter should be read alongside the following other Chapters:

- Volume 1, Chapter 3 (Project Description);
- Volume 2, Chapter 13 (Commercial Fisheries);
- Volume 2, Chapter 14 (Shipping and Navigation);
- Volume 2, Chapter 16 (Military and Civil Aviation);
- Volume 2, Chapter 18 (Climate); and
- Volume 2, Chapter 19 (Infrastructure and Other Users)

20.1.5. The structure of this Chapter is guided by the Institute of Environmental Management and Assessment (IEMA) 'Major Accidents and Disasters in EIA: A Primer' guidance (IEMA, 2020). This provides direction on using a risk-based assessment that is split into three stages; Screening, Scoping and Assessment. Further detail on the difference in assessment methodology can be found in paragraph 20.5.3.

20.1.6. The IEMA guidance defines a major accident as an event that threatens immediate or delayed serious environmental effects to human health, welfare, and/or the environment. Additionally, major accidents can be caused by disasters resulting from both man-made and natural hazards. A disaster can therefore be an external hazard (e.g. an act of terrorism) or a natural hazard (e.g. an earthquake) with the potential to cause an event and/or situation that meets the definition of a major accident.

20.1.7. This Chapter has been prepared by GoBe Consultants Limited.

20.2. PURPOSE OF THE CHAPTER

20.2.1. The primary purpose of the EIAR is defined in Volume 1, Chapter 1 (Introduction).

20.2.2. The key objective of this Chapter is to provide Scottish Ministers and statutory and non-statutory stakeholders, the information required to assess for LSE of major accidents and disasters. This assessment will consider those effects from the Proposed Development in isolation, the whole project (including overlap with onshore infrastructure) and cumulative effects (the effects of the Proposed Development combined with the effects from other plans and projects).

20.2.3. This Chapter presents the following:

- A description of current environmental baseline conditions relevant to major accidents and disasters. These have been established from literature review; desk studies, site specific surveys and stakeholder consultation;
- Discussion of assumptions and any limitations with respect to the information used to define the baseline;
- Identification of potential impacts and any resulting LSE of major accidents and disasters related to Proposed Development activities. This process is informed by the application of embedded commitments;
- Consideration of the need for any 'secondary' mitigation measures (in addition to embedded commitments) to avoid, minimise, reduce, or offset LSE on major accidents and disasters from the Proposed Development;
- Consideration of any residual effects following application of secondary mitigation; and
- Identification of monitoring measures to support proposed mitigation.

KEY DEFINITIONS

20.2.4. At present, there are no clear definitions for the terms 'major accident' or 'disaster' within the context of the EIA Directive. For the purpose of this assessment, key terms used in this Chapter are set out below and are based on Institute for Environmental Management and Assessment (IEMA) Major Accidents and Disasters in EIA – A Primer (IEMA, 2020):

- Accident – something that happens by chance or without expectation;
- Disaster – a natural hazard (e.g. earthquake) or a man-made / external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident;
- Major Accident – events that threaten immediate or delayed serious environmental effects to human health, welfare and / or the environment and require the use of resources beyond those of the Developer or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events;
- Risk – the likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur;
- Risk event – an identified, unplanned event, which is considered relevant to the Proposed Development and has the potential to result in a major accident and / or disaster, subject to assessment of its potential to result in a significant adverse effect on an environmental receptor;
- Vulnerability – describes the potential for harm as a result of an event, for example due to sensitivity or value of receptors. In the context of the EIA Directive, the term refers to 'exposure and resilience' of the Proposed Development to the risk of a major accident

and / or disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact; and

- Significant environmental effect (in relation to a major accident and / or disaster assessment) – includes the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration.

20.2.5. The assessment of major accidents and disasters reported in this Chapter considers the occurrence of extreme and highly unlikely incidences. As such, it considers accident scenarios that would not reasonably be covered by other topics.

20.3. LEGISLATION AND POLICY CONTEXT

20.3.1. Overarching legislation, policy, and guidance in relation to the EIAR for the Proposed Development is provided in Volume 1, Chapter 2 (Legislation and Policy Context) of the EIAR. Below is provided a summary of legislation, policy, and guidance directly relevant to Major Accidents and Disasters.

LEGISLATION AND POLICY

20.3.2. All legislation and policy directly applicable to Major Accidents and Disasters is illustrated in Table 20-1.

Table 20-1 Legislation and Policy relevant to Major Accidents and Disasters

Legislation/Policy	Summary	How Chapter has considered this
European Commission 2014 Environmental Impact Assessment (EIA) Directive (2001/92/EU as amended by 2014/52/EU) and implementing EIA Regulations	To ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment.	This Chapter meets the requirement to consider whether the Proposed Development will be vulnerable to major accidents and/or disasters.
The EIA Regulations	Consisting of: • Electricity Works (EIA)(S) Regulations 2017; • Marine Works (EIA)(S) Regulations 2017; and • Marine Works (EIA) Regulations 2007.	Any potential adverse effects on or caused by the Proposed Development in relation to Major Accidents and Disasters are assessed in Section 20.6 of this document.
European Commission 2014 Environmental Impact Assessment (EIA) Directive (2001/92/EU as amended by 2014/52/EU) Article 3	1. The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors: (a) population and human health; (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC; (c) land, soil, water, air and climate; (d) material assets, cultural heritage and the landscape; (e) the interaction between the factors referred to in points (a) to (d). 2. The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned.';	Section 20.6 of this document identifies, describes and assesses the direct and indirect effects of the Proposed Development in relation to the stated factors.
European Commission 2014 Environmental Impact Assessment (EIA) Directive (2001/92/EU as amended by 2014/52/EU) Annex IV	Point 5: A description of the likely significant effects of the project on the environment resulting from, inter alia: (d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters). Point 8: A description of the expected significant adverse effects of the	Section 20.6 details the likely effects of the Proposed Development on the environment resulting from major accidents and disasters and includes details of preparedness and emergency response.

Legislation/Policy	Summary	How Chapter has considered this
	project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. […] Where appropriate, this description should include […] details of the preparedness for and proposed response to such emergencies.	
European Commission, 2012 Directive 2012/18/EU – The Seveso III Directive Article 1	This Directive lays down rules for the prevention of major accidents which involve dangerous substances, and the limitation of their consequences for human health and the environment, with a view to ensuring a high level of protection throughout the Union in a consistent and effective manner.	Major accidents that involve dangerous substances are considered in paragraph 20.6.4 *et seq.*
Health and Safety at Work etc. Act 1974 (HSWA) and Regulations Made Thereunder	The HSWA is the primary legislative instrument covering workplace health and safety in Great Britain. The HSWA establishes various obligations to ensure, so far as is reasonably practicable, that persons are not exposed to risks to their health and safety. The Health and Safety Executive (HSE), along with local authorities, are responsible for enforcing the Act.	This Chapter demonstrates that the Proposed Development has suitable processes in place to reduce risks to persons to as low as reasonably practicable (ALARP) and complies with good risk management practice. Both the Control of Major Accident Hazard Regulations 2015 and The Major Off-Site Emergency Plan (Management of Waste from Extractive Industries) (England and Wales) Regulations 2009 are made under HSWA.
The Control of Major Accident Hazards (COMAH) Regulations 2015	The COMAH Regulations lay down rules for the prevention of major accidents which might result from certain industrial activities sites involving the production, use or storage of dangerous substances at or above certain thresholds, and the limitations of their consequences.	Major accidents that involve dangerous substances are considered in paragraph 20.6.4 *et seq*.
Construction (Design and Management) Regulations 2015 (CMD Regulations)	The CDM Regulations place specific duties on developers, designers and contractors, so that health and safety is considered throughout the life of a project from its inception to its subsequent final decommissioning. They include the requirement to appoint a Principal Designer and Principal Contractor to co-ordinate health and safety aspects during construction. Under the CDM Regulations, designers must avoid foreseeable risks so far as reasonably practicable by: eliminating hazards from the construction, cleaning, maintenance, and proposed use and demolition of a structure; reducing risks from any remaining hazard; and giving collective safety measures priority over individual measures.	The CDM Regulations expand upon the requirements of the HSWA to apply specific requirements for construction projects. The measures explained in this Chapter demonstrate how the Proposed Development will achieve the requirements and intention of the CDM Regulations, which include management of construction risk to ALARP.

Legislation/Policy	Summary	How Chapter has considered this
Scottish National Marine Plan (NMP) Scottish Government, 2015)	Marine planners and decision makers must ensure that renewable energy projects demonstrate compliance with Environmental Impact Assessment and Habitats Regulations Appraisal legislative requirements. The NMP is relevant to the Proposed Development as it addresses the potential for interactions between renewable energy development and other marine users. It also sets several minimum requirements including: • achieving a sustainable marine economy; • ensuring a strong, healthy and just society; • living within environmental limits; • promoting good governance; and • using sound science responsibly.	Section 20.6 assesses the likelihood of the Proposed Development interacting with other marine users via potential major accidents and/or disasters.
Scottish National Marine Plan (NMP) Scottish Government, 2015) GENERAL 4 Co-existence 4.16	Where it becomes apparent that different activities are incompatible or mutually exclusive, some areas may be identified within regional marine plans for preferential use by specific sectors. Any selection of such areas should follow: • A scoping exercise to determine where potential interactions may occur and the likely effect of interaction; • Sustainability appraisal considering the potential range of impacts on the environment and the range of other potential users, and others who could be less directly impacted; and • Consideration of any cumulative impact.	Section 20.6 and Section 20.7 of this document identify, describe and assess the direct and indirect effects of the Proposed Development in relation to the stated factors.
Scottish National Marine Plan (NMP) Scottish Government, 2015) GENERAL 5 Climate Change	Marine planners and decision makers must act in the way best calculated to mitigate, and adapt to, climate change.	Paragraph 20.4.61 *et seq.* details the relationship of the Proposed Development with potential climate change effects.
Marine Strategy Framework Directive (MSFD) (Directive 2008/56/EC)	The Directive includes the following wide-ranging descriptors which Member States must use as the basis for their more detailed characterisation of good environmental status: • Biological diversity is maintained; • The quality and occurrence of habitats and the distribution and abundance of species are in line with prevailing physiographic, geographic and climatic conditions; • Non-indigenous species introduced by human activities are at	This Chapter assesses the likelihood of a major accident or disaster that could affect the points outlined within the Directive.

Legislation/Policy	Summary	How Chapter has considered this
	levels that do not adversely alter the ecosystems; • Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock; • All elements of the marine food web, to the extent that they are known, occur at normal abundance and diversity levels capable of ensuring the long-term abundance of the species and the retention of their full reproductive capacity; • Human-induced eutrophication is minimised, especially the adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters; • Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems; • Sea floor integrity is at a level that ensures that the structure and functions of the ecosystem are safeguarded and benthic ecosystems, in particular, are not adversely affected; • Concentrations of contaminants are at levels not giving rise to pollution effects; • Properties and quantities of marine litter do not cause harm to the coastal and marine environment; and • Introduction of energy, including underwater noise, is at levels that do not adversely affect the marine environment.	

GUIDANCE

20.3.3. All guidance used to define structure and methodology of assessment for Major Accidents and Disasters is outlined below:

- Institute of Environmental Management and Assessment (IEMA) (2020). Major Accidents and Disasters in EIA: A Primer; and
- European Commission (2017) Environmental Impact Assessment of Projects- Guidance on the preparation of the Environmental Impact Assessment Report (while not applicable to Scotland, this document has been designed to be useful to EIA practitioners globally when conducting risk assessments and has been used as a reference to provide a wider vision of the assessment of the Proposed Development.)

20.3.4. All guidance considered directly applicable to individual topics referenced within the Major Accidents and Disasters assessment are included in the technical Chapters themselves.

CONSULTATION

20.3.5. Ongoing statutory and non-statutory consultation and incorporation of feedback is an integral part of developing a robust EIAR. The Offshore Scoping Report (Volume 3, Appendix 5.1 (Offshore Scoping Report)) for the Proposed Development was submitted to MD-LOT in June 2023. A detailed response to the Scoping Report's content and questions was provided from MD-LOT, and multiple additional consultees in the September 2023 Scoping Opinion (Volume 3, Appendix 5.2 (Offshore Scoping Opinion).

20.3.6. Table 20-2 provides a summary of the stakeholder consultation activities specific to Major Accidents and Disasters. The issues raised and actions to address and incorporate this feedback into the EIAR are outlined. Further detail on the Proposed Development's overall EIA stakeholder consultation process and actions is presented in Volume 1, Chapter 5 (Consultation).

Table 20-2 Consultation Relevant to Major Accidents and Disasters

Date	Consultee and Type of Consultation	Description/ Issues Raised	How this has been considered in this Chapter
September 2023	Scottish Ministers, Scoping Opinion	The Scottish Ministers note that risks of major accidents and/or disasters has been scoped out, however, it is advised that this is scoped into the EIA Report.	The risks of major accidents and disasters is considered throughout this Chapter.

20.4. BASELINE ENVIRONMENT

20.4.1. This Section presents a summary of the major accidents and disasters baseline environment, the methodology, limitations and assumptions of the data used.

METHODOLOGY TO INFORM BASELINE

20.4.2. Baseline data to inform the major accidents and disasters assessment was collected using the following methods:

DESKTOP STUDY

20.4.3. For the purposes of this major accidents and disasters Chapter, a desk-based review was undertaken using relevant spatial and scientific data sources by reviewing the EIAR Chapters for the Proposed Development, these included:

- Volume 2, Chapter 13 (Commercial Fisheries);
- Volume 2, Chapter 14 (Shipping and Navigation);
- Volume 2, Chapter 16 (Military and Civil Aviation);
- Volume 2, Chapter 18 (Climate); and
- Volume 2, Chapter 19 (Infrastructure and Other Users)

SITE-SPECIFIC SURVEYS

20.4.4. No specific site-specific surveys have been undertaken to inform the assessment for major accidents and disasters. This is because receptor information and data related to this topic can be readily collected through desktop study.

20.4.5. Furthermore, the baseline presented in this Chapter has been informed by the site-specific surveys undertaken for Volume 2, Chapter 14 (Shipping and Navigation). A detailed overview of the methodology of the shipping and navigation site-specific surveys for the Proposed Development is presented in Section 10.2 *et seq.* of the technical appendix associated with the Shipping and Navigation Chapter (Volume 3, Appendix 14.1 (Navigational Risk Assessment)).

DESCRIPTION OF BASELINE ENVIRONMENT

20.4.6. A summary of the major accidents and disasters baseline environment is provided in the following Sections.

20.4.7. There are several baseline features that contribute a potential source of both anthropogenic and biogenic sources of hazards in the vicinity of the Proposed Development and these are addressed within this Section to set the framework for the assessment of the Proposed Development.

SHIPPING AND NAVIGATION

20.4.8. In Volume 2, Chapter 14 (Shipping and Navigation), the baseline environment was established using an industry standard study area of a 10 nautical mile (nm) (18.5 km) buffer of the Array Area and a 2 nm (3.7 km) buffer of the offshore Export Cable Corridor (ECC). This captures relevant routeing in the region whilst still remaining site-specific and providing local context to the analysis of risks.

20.4.9. Peterhead Port, the largest fishing port in Europe, is the closest port to the Proposed Development at approximately 34 nm (62.9 km) to the west of the Array Area and 1 nm (1.85 km) south of the offshore ECC.

20.4.10. Site-specific surveys were also carried out to collect data to inform assessment of Shipping and Navigation. Each survey consisted of 14 full days of vessel traffic data collection via Automatic Identification System (AIS), Radar, and visual observation which combined comply with Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 654 (MCA, 2021) requirements. The dataset from each survey was supplemented with AIS collected from alternate AIS receivers to ensure optimal coverage. These surveys were undertaken:

- 10 to 26 February 2023 (14 days, winter); and
- 23 July to 6 August 2023 (14 days, summer).

20.4.11. A plot of the vessel traffic recorded via AIS, Radar, and visual observations over the summer and winter survey periods within the Shipping and Navigation study area is colour-coded by vessel type and presented in Figure 20-1.

20.4.12. The main vessel types recorded within the Shipping and Navigation study area overall were oil and gas vessels (58%), cargo vessels (17%), and fishing vessels (15%). Both recreational vessels and passenger vessels were seasonal and only recorded during the summer survey period. Excluding the proportion of vessels for which length was not available (2% of vessels), the average length of vessels within the Shipping and Navigation study area throughout both survey periods was 95 m (vessel length ranged from 10 m for a recreational sailing vessel to 333 m for a cruise liner; this cruise liner intersected the south-west of the Array Area during the summer survey period).

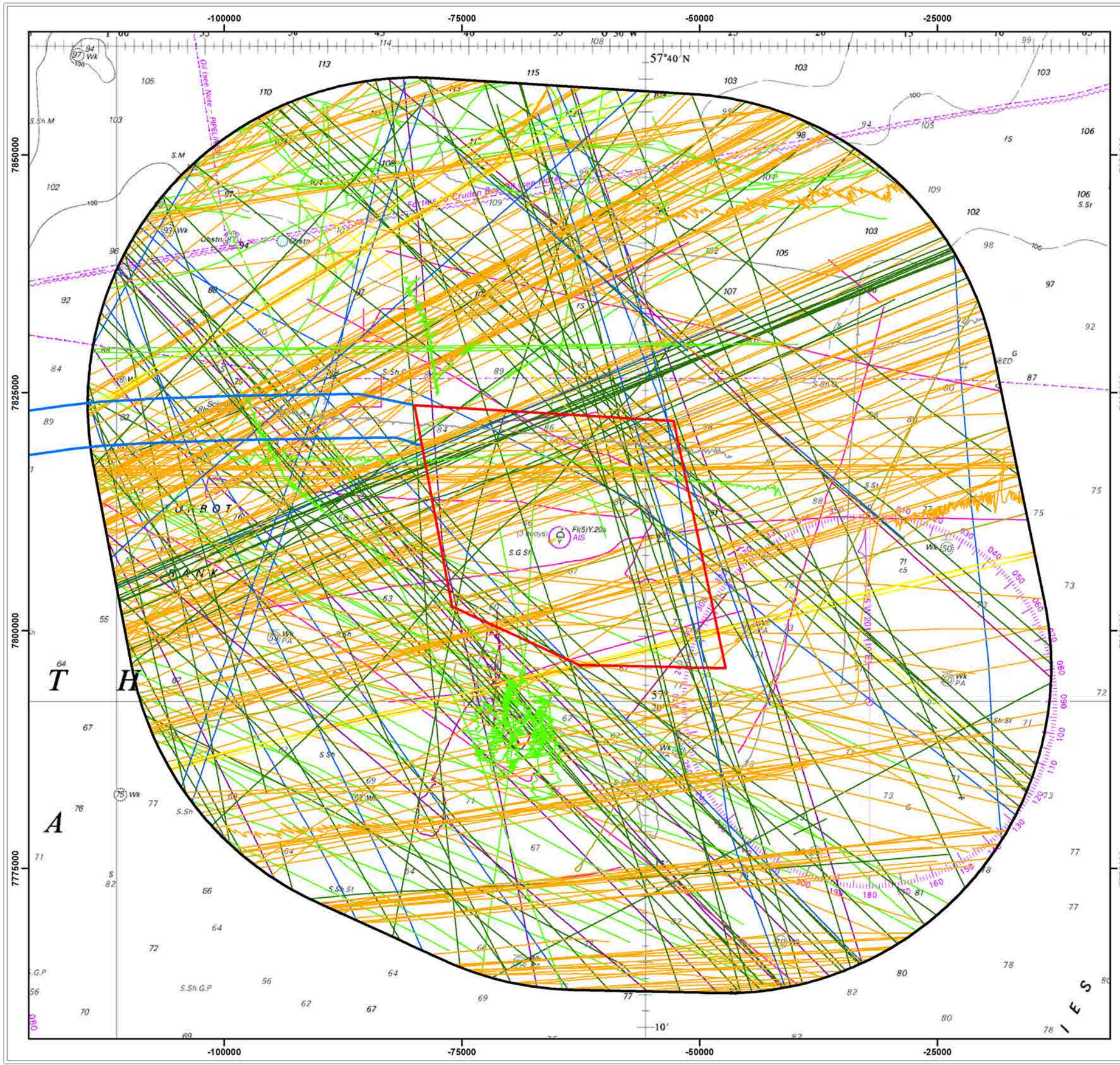
20.4.13. There was an average of 48 unique vessels per day recorded within the Shipping and Navigation offshore ECC study area, and 39 unique vessels every day recorded crossing the offshore ECC itself during the winter data period.

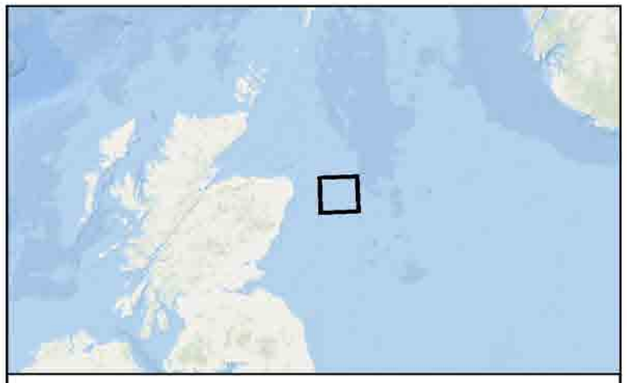
20.4.14. For the summer data period, there was an average of 62 unique vessels per day recorded within the Shipping and Navigation offshore ECC study area, and 45 unique vessels every day recorded crossing the offshore ECC itself.

20.4.15. The main vessel types recorded within the Shipping and Navigation offshore ECC study area overall were oil and gas vessels (36%), fishing vessels (31%), and cargo vessels (13%). Excluding the proportion of vessel for which length was not available (less than 1%), the average length of vessels within the Shipping and Navigation offshore ECC study area throughout both survey periods was 70m (vessel length ranged from a 5 m potter to a 333 m cruise liner; this cruise liner crossed the offshore ECC on two occasions in the east of the offshore ECC study area during the summer data period).

20.4.16. No vessels were deemed to be at anchor within the Shipping and Navigation offshore ECC study area.

20.4.17. It is noted that no IMO routeing measures, marine aggregate dredging areas, military practice and exercise areas (PEXA), or anchorage areas were identified in proximity to the Proposed Development. It is also noted that no vessels were deemed to be at anchor within the Shipping and Navigation study area.





Legend:

- Array Area
- Offshore Export Cable Corridor
- Shipping and Navigation Study Area

Vessel Type

- Unspecified
- Fishing
- Military
- Tug
- Passenger
- Cargo
- Tanker
- Other
- Recreational
- Oil and Gas

Project:	Report:
Muir Mhòr	Environmental Impact Assessment Report

28-Day Vessel Traffic Survey Data by Vessel Type (2023)

Figure: 20.1	Drawing No: ANA-EIAR-MA&D-001		
Revision:	**Date:**	**Drawn:**	**Checked:**
01	28/10/24	RR	JM

Map scale 1:392,263 @ A3

0 3 6 nm

N

Co-ordinate system: WGS 1984 World Mercator **EPSG:** 3395

anatec

MUIR MHÒR OFFSHORE WIND FARM

A Joint venture between Fred.Olsen Seawind & Vattenfall

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COMMERCIAL FISHERIES

20.4.18. Volume 3, Chapter 13 (Commercial Fisheries) provides detail on the fishing industry in the commercial fisheries study area. The Proposed Development is located within the north-west portion of the International Council for the Exploration of the Sea (ICES) Division 4b (central North Sea) statistical area; within the United Kingdom (UK) Exclusive Economic Zone (EEZ) waters.

20.4.19. The Array Area is located within ICES rectangle 43E9; and while not overlapping ICES rectangle 44E9, it is located very close to the boundary between 43E9 and 44E9. The EEC extends across ICES rectangles 43E8, 43E9 and 44E8. These three ICES rectangles, together with the ICES rectangle immediately north of the Array Area (44E9) form the commercial fisheries local study area for the purposes of the EIAR (presented in Figure 20-2).

20.4.20. To understand fishing activity in waters adjacent to the Proposed Development, a commercial fisheries regional study area was defined to include the commercial fisheries local study area together with the surrounding ICES rectangles, as such there are two scales of commercial fisheries study areas:

- Commercial fisheries local study area: 43E8-E9 and 44E8-E9; and
- Commercial fisheries regional fisheries study area: 42E7-F0, 43E7-F0, 44E7-F0, 45E7-F0.

20.4.21. The key fleet métiers operating across the commercial fisheries local and regional study areas include (in no particular order):

- UK, Norwegian, Irish, Danish, Dutch and German pelagic trawlers targeting mackerel;
- UK demersal otter trawlers targeting *Nephrops*, haddock and mixed demersal species;
- UK demersal seine targeting haddock and mixed demersal species;
- UK scallop dredgers targeting king scallop;
- UK potting vessels targeting brown crab and lobster; and
- UK vessels using line to target mackerel.

20.4.22. Vessel Monitoring System (VMS) data indicate high values of catch taken by the pelagic otter trawl fleet in areas surrounding the Array Area, but not specifically within the project boundary. This fishery is highly seasonal, with activity for approximately eight to 12 weeks in the year.

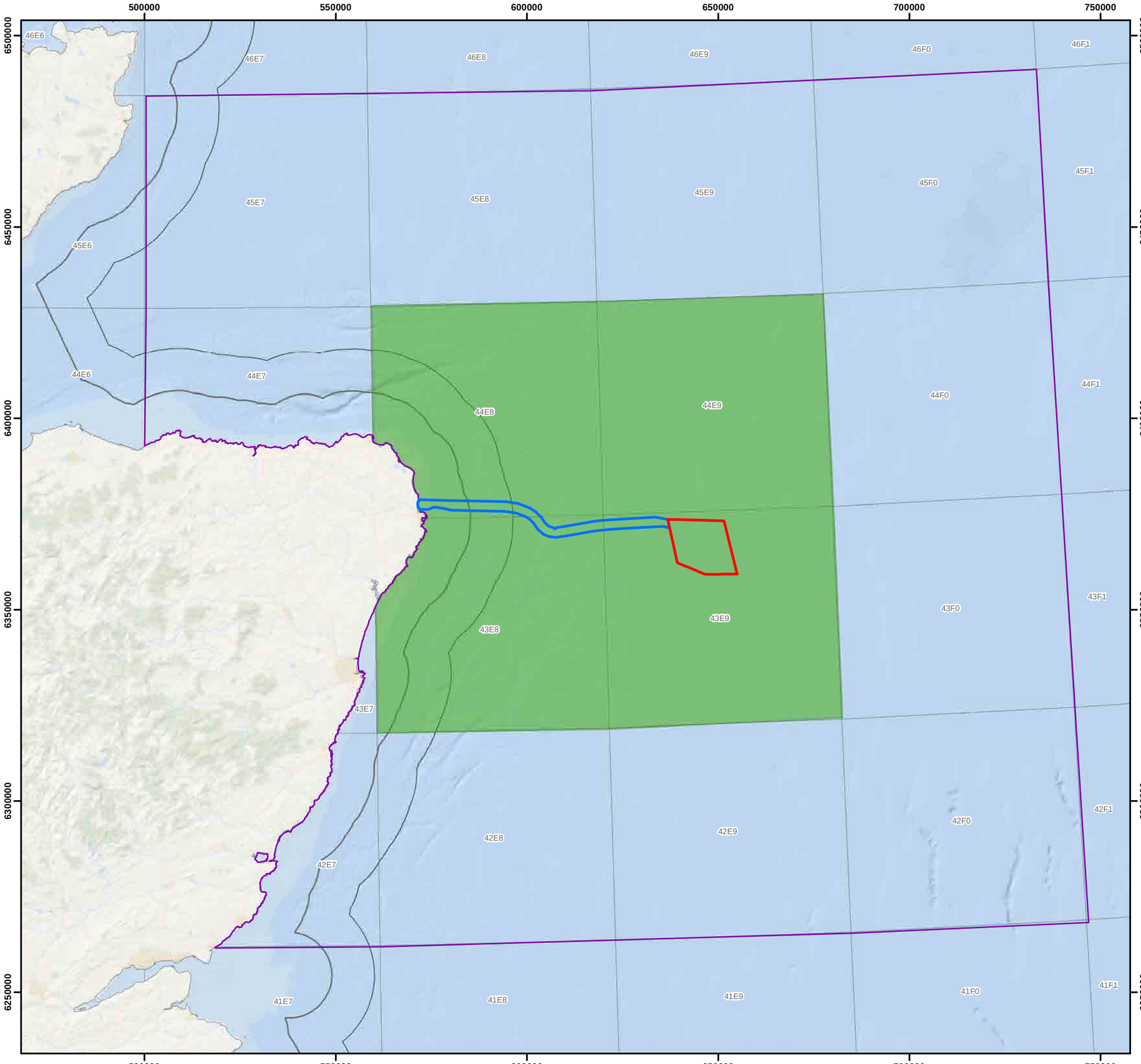
20.4.23. Demersal otter trawl activity indicates that the majority of activity in the Commercial Fisheries study area occurs north of the Proposed Development. Demersal seine activity, which shows similar grounds targeted by the demersal otter trawl fleet, occurs predominately to the north of the Proposed Development.

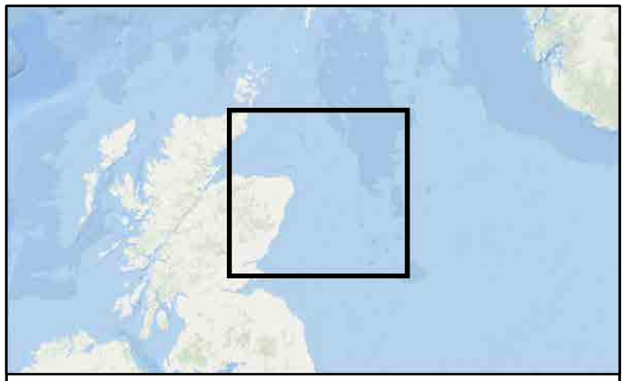
20.4.24. Beam trawl activity indicating negligible activity across the Proposed Development, and commercial fisheries local and regional study areas.

20.4.25. Dredge activity indicating high levels of activity within the ECC, especially between the 6 nm to 12 nm boundary; activity is also noted within the Array Area.

20.4.26. Potting activity is indicating negligible activity across the Array Area. The Array Area is located in grounds that would typically be beyond the normal operational range of potting vessels.

20.4.27. AIS data corroborates the very limited activity of fishing vessels across the Array Area. The Devil's Hole grounds targeted by demersal otter trawlers is notable within 42F0, corroborating this activity is outside the Array Area.





Legend:

- Array Area
- Offshore Export Cable Corridor
- Commercial Fisheries Local Study Area
- Commercial Fisheries Regional Study Area
- ICES statistical rectangles
- 12 nm boundary
- 6 nm boundary

Project:	Report:
Muir Mhòr	Environmental Impact Assessment Report

Commercial Fisheries Study Areas in relation to ICES Statistical Rectangles

Figure:	Drawing No:
20.2	GoBe-0001

Revision:	Date:	Drawn:	Checked:
01	14/11/24	FN	BPHB

Map scale 1:1,000,000 @ A3

0 10 20 km

N

Co-ordinate system: ETRS 1989 UTM Zone 30N **EPSG:** 25830

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MILITARY AND CIVIL AVIATION

20.4.28. In Volume 2, Chapter 16 (Military and Civil Aviation), a detailed description of the baseline environment is given. In summary, the airspace above and adjacent to the Array Area is used by civil and military aircraft and lies within the Scottish Flight Information Region (FIR) for Air Traffic Control (ATC). This airspace is regulated by the UK Civil Aviation Authority (CAA).

20.4.29. The nearest major UK civil airport to the Array Area is Aberdeen Airport, which is approximately 93.5 km to the west-south-west. Aberdeen Airport is Scotland's third busiest airport and the main heliport for offshore helicopter operations in the northern North Sea. Longside Airfield is an unlicensed tar airstrip approximately 70 km west of the Array Area and home to the Buchan Aero Club. Hatton Airstrip is a private grass strip approximately 72 km west of the Array Area.

20.4.30. From sea level to Flight Level (FL) 195, approximately 19,500 ft or 5,950 m Above Mean Sea Level (AMSL), the airspace in the vicinity of the Array Area is Class G uncontrolled airspace. This airspace is used predominantly by low level flight operations and generally by aircraft flying under Visual Flight Rules (VFR), meaning that pilots fly and navigate with reference to the natural horizon and terrain features they see outside. Above FL 195 is Class C controlled airspace in the form of a Temporary Reserved Area (TRA). This airspace, TRA 007B, has an upper vertical limit of FL 245, approximately 24,500 ft AMSL, and is available for use by both military and civil aircraft, though its main use is to accommodate VFR military flying activity.

20.4.31. National Air Traffic Service (NATS) [En-Route] plc (NERL) provides en-route civil air traffic services within the Scottish FIR and operates a network of radar facilities providing en-route information for ATC on both civil and military aircraft. The closest NERL radars to the Array Area are based at Allanshill, 88 km to the west-northwest, and Perwinnes, 89 km to the west-south-west

20.4.32. The Array Area lies beneath the Central Complex Danger Area, one of four such complexes in UK airspace that, when activated, provide segregated airspace for military flying training. Specifically, the Array Area is beneath Danger Area EG D613A which has vertical limits from FL 100, approximately 10,000 ft AMSL, to FL 660. Ordnance, munitions and explosives and high energy manoeuvre activities take place within this Danger Area.

INFRASTRUCTURE AND OTHER USERS

20.4.33. In Volume 2, Chapter 19 (Infrastructure and Other Users) a detailed review of offshore renewable energy projects, subsea cables, disposal sites and oil and gas infrastructure was conducted. This Chapter provides a summary of the information most relevant to the assessment of major accidents and disasters.

20.4.34. There are five offshore renewable energy projects, at varying stages of completion, within 10 nm (18.52 km) of the Proposed Development (ECC and the Array Area):

- Hywind Scotland Pilot Park (operational);
- Aberdeen Offshore Wind Farm (operational);
- Salamander Offshore Wind Farm (submitted consent application);
- Flora (pre-planning stage); and
- CampionWind (pre-planning stage).

20.4.35. There are no offshore tidal sites or offshore wave energy developments within 10 nm (18.52 km) of the Proposed Development.

20.4.36. Hywind Scotland is a floating Offshore Wind Farm (OWF) operated by Equinor that has an installed capacity of 30 MW. Hywind Scotland is 0.03 nm (0.06 km) away from the offshore

ECC for the Proposed Development and 19.20 nm (35.56 km) from the Array Area of the Proposed Development. Hywind Scotland covers approximately 4 km^2 and consists of five WTGs, four inter-array cables and one export cable connecting to Peterhead Grange substation (Equinor, 2023).

20.4.37. Aberdeen OWF is also known as the European Offshore Wind Deployment Centre (EOWDC) and is Scotland's largest offshore wind test and demonstration facility. The project is located 1.62 nm (3 km) east of Aberdeen, with the northern Section of the Array Area overlapping with the infrastructure and other users (IOU) study area for the Proposed Development. The Proposed Development's ECC is also 16.86 nm(31.23 km) from the Aberdeen OWF, and 41.85 (77.51 km) from the Array Area of the Proposed Development. The Aberdeen OWF project has a capacity of 93.2 MW and has been operational since 2018 (Vattenfall, 2023).

20.4.38. Salamander is an Investments Innovation and Targeted Oil and Gas (INTOG) application area, which is awaiting consent determination. The Salamander site is 4.91 nm (9.10 km) from the Proposed Development ECC, and 15.32nm (28.38 km) from the Proposed Development Array Area.

20.4.39. The Flora site is another INTOG site. It intersects the offshore ECC and is 19.32 nm (35.78 km) from the shore. The INTOG site is currently in the early planning stages, and it has been proposed that it should produce 50 MW.

20.4.40. CampionWind Ltd is based 54 nm (100 km) east of Peterhead and 23 nm (42.6 km) east of the Proposed Development's Array Area. CampionWind is currently in the early pre-planning stage and has been projected to generate 2 GW of electricity (ScottishPower and Shell, 2023).

20.4.41. There are three active subsea cables (telecommunication and power transmission cables) within 10 nm (18.52 km) of the Proposed Development and one subsea cable that is currently under construction:

- Tampnet Central North Sea (CNS) fibre optic cable;
- Hywind Scotland export cable;
- Aberdeen OWF export cables; and
- Moray East OWF export cables (under construction).

20.4.42. There are also nine proposed subsea cables that fall within 10 nm (18.52 km) of the Proposed Development:

- Peterhead to Drax High Voltage Direct Current (HVDC) cable(E4D3);
- Buchan Oil Field power cable;
- NorthConnect HVDC Scotland and Norway interconnector cable;
- Proposed export cables for the Caledonia Offshore Wind Farm;
- Proposed export cables for the Stromar Offshore Wind Farm;
- Proposed export cables for the MarramWind Offshore Wind Farm;
- Proposed export cables for the Green Volt Offshore Wind Farm; and
- Proposed export cables for the Salamander Offshore Wind Farm.

20.4.43. There are seven disposal sites which are in within 10 nm (18.52 km) of the Proposed Development: Middle Buchan Ness (closed), Peterhead (closed), North Buchan Ness (open and located 0.53 nm (0.98 km) from the offshore ECC, South Buchan Ness (closed), South Buchan Ness B (closed), and Peterhead Harbour (open and located 13.67 nm (25.31 km) from the offshore ECC).

20.4.44. The Proposed Development is in the Central North Sea (CNS), a well-developed area for oil and gas infrastructure (DECC, 2016). These infrastructures include pipelines, wells, and surface and subsurface structures. Given the extensive infrastructure within the CNS, it is expected that decommissioning of existing assets will rapidly increase within the next 20-30 years (DECC, 2016). It is therefore possible that the decommissioning of these structures could overlap with the operations of the Proposed Development.

20.4.45. There are eight pipelines are present within 10 nm (18.85 km) of the Proposed Development. These are:

- 20" Gas Fulmar A – St Fergus (chemical pipeline);
- Forties C to Cruden Bay (PL8) (abandoned oil pipeline) & (PL721) (active water pipeline);
- Buzzard (P) to Forties Hot Tap (gas pipeline);
- Britannia to St Fergus (umbilical oil pipeline);
- The Sage Pipeline 20" Gas Goldeneye – St Fergus (abandoned oil pipeline);
- 4" Meg St Fergus – Atlantic Manifold;
- HFC to St Fergus South (umbilical hydraulic pipeline), and
- 36" Gas Brent A – St Fergus (FLAGS) (oil pipeline).

20.4.46. The 20" Gas Fulmar A – St Fergus is the closest pipeline to the Proposed Development at 0.44 nm (0.81 km) from the offshore ECC and 0.79 nm (1.46 km) from the Array Area.

20.4.47. There are a total of 18 subsea structures within 10 nm (18.52 km) of the Proposed Development: 13 active subsea structures and five inactive structures.

20.4.48. It is possible that unexploded ordnance (UXO) originating from World War I or World War II may be encountered during the construction or installation of offshore infrastructure. This poses a health and safety risk where it coincides with the planned location of infrastructure and associated vessel activity, and therefore it is necessary to survey for and carefully manage UXO.

20.4.49. The following methodologies are considered for UXO avoidance/clearance:

- Avoid and leave in situ;
- Micro-siting to avoid UXO;
- Relocation of UXO to avoid detonation;
- Low order (e.g. deflagration); and
- High order detonation (with associated mitigation measures).

20.4.50. Where it is not possible to avoid or relocate a UXO, the preferred method for UXO clearance is for a low order technique (subsonic combustion) with a single donor charge of up to 80 g Net Explosive Quantity (NEQ) for each clearance event. Due to the intensity of the surveys required to accurately identify UXO, this work cannot be conducted before detailed design work has confirmed the planned location of infrastructure.

FUTURE BASELINE CONDITIONS

20.4.51. In line with the EIA regulations, this EIAR requires a "description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort, on the basis of the availability of

environmental information and scientific knowledge". This reflects how the baseline relevant to major accidents and disasters is expected to evolve without the Proposed Development.

SHIPPING AND NAVIGATION

20.4.52. Given future commercial traffic trends are dependent on various factors, and are hence difficult to predict, the NRA has assumed potential increases of 10% and 20% within the commercial traffic allision and collision modelling, based on industry standards. The consideration of a range of conservative values is considered as covering potential increases over the course of the Project's operational lifespan.

20.4.53. These values also consider that oil and gas vessels may decrease over time due to the decommissioning of oil and gas structures in the North Sea but as noted by the UK Chamber of Shipping oil and gas vessels may be repurposed across the offshore wind industry and can balance out the reduction in oil and gas movements

20.4.54. There are no known developments which will increase the activity of recreational vessels within the area.

COMMERCIAL FISHERIES

20.4.55. Commercial fisheries patterns change and fluctuate based on a range of natural and management-controlled factors (such as market demand and prices, stock abundance and sustainability, fisheries and environmental management and gear improvements). The variations and trends in commercial fisheries activity are an important aspect of the baseline assessment and forms the principal reason for considering up to five years of key baseline data. Given the time periods assessed, the future baseline scenario would typically be reflected within the current baseline assessment undertaken.

20.4.56. Across the commercial fisheries regional study area, where UK fisheries primarily target non-quota shellfish species, it is expected that fleets are unlikely to be impacted by future quota transfers. It is possible that UK vessels will seek to exploit additional quota-species opportunities, but vessels would need to access quota holdings.

20.4.57. Market changes have the potential to impact fishing activity in the commercial fisheries regional study area; some of the catch landed by UK vessels is exported to EU markets (e.g. brown crab) and potential tariff/non-tariff barriers could affect which species are targeted and to what extent.

MILITARY AND CIVILIAN AVIATION

20.4.58. As oil and gas infrastructure in the North Sea is decommissioned, this will potentially reduce the volume of helicopter traffic to and from offshore platforms. However, this may be offset by traffic associated with offshore wind developments. An increase in low-level autonomous drone traffic can also be foreseen.

INFRASTRUCTURE AND OTHER USERS

20.4.59. The current baseline has been established and this has captured all known infrastructure and known proposed projects, the cumulative effects assessment has also captured all developments, pipelines, and oil and gas associated infrastructure within the Proposed Development's Zone of Influence (ZoI).

20.4.60. There is only so far that the future baseline can be predicted with regards to other developments that may come forward during the operational time of the Proposed Development. For the purposes of the assessment, it is predicted that the future baseline would remain the same as outlined in the baseline.

CLIMATE CHANGE EFFECTS

20.4.61. Volume 2, Chapter 18 (Climate) goes into significant detail regarding the effects of climate change on the Proposed Development and vice versa. The summary of relevant points in this Chapter looks at the changes in storm surge events and sea level rise.

20.4.62. There is potential for changes in the severity of future storm surge events, however, the Met Office finds no evidence for significant changes in future storm surges using the United Kingdom Climate Projections 2018 (UKCP18) model (Met Office, 2018).

20.4.63. While sea level rise over the coming centuries may affect tidal characteristics substantially (including total range), the atmospheric contribution to storm surges is unlikely to change. Extreme sea levels will increase due to the rise in mean sea level. However, best estimates suggest no additional change due to the atmospheric contribution to extreme sea level.

20.4.64. In relation to wave height and frequency, under the Representative Concentration Pathway 8.5 (RCP8.5) emission scenario, the Coupled Model Intercomparison Project 5 (CMIP5) simulations suggest an overall decrease in mean significant wave height around most of the UK coastline of 10-20% over the 21st century. The model projections show changes in annual maximum significant wave height also of up to 10-20%, but the sign of change differs among models and coastal location (Met Office, 2018).

DATA LIMITATIONS AND ASSUMPTIONS

20.4.65. The major accidents and disasters Chapter has captured all relevant and up-to-date data that has been publicly available, as cited in the relevant EIAR Chapters. The data are therefore limited to what is available and by what has been made available, at the time of writing the Offshore EIAR. It is considered that the data employed in the assessment are robust and sufficient for the purposes of the assessment of effects presented.

20.5. MAJOR ACCIDENTS AND DISASTERS ASSESSMENT METHODOLOGY

20.5.1. The major accidents and disasters assessment of effects has followed the methodology set out in the following guidance:

- Major Accidents and Disasters in EIA: A Primer (Institute of Environmental Management & Assessment (IEMA), September 2020).

20.5.2. This approach directs the assessment to focus on low likelihood but potentially high consequence events such as a major spill, explosion, fire, etc. Smaller incidents (spills, sediment loss, etc.) are addressed elsewhere in the Offshore EIA Report in the relevant topic Chapters and this Chapter therefore focuses on major events only.

20.5.3. The approach to assessment in this Chapter includes three steps:

- Screening: identifies if a development has a vulnerability to major accidents and/or disasters and to consider whether a development could lead to a significant effect
- Scoping: determine in more detail whether there is potential for significant effects as a result of major accidents and/or disasters associated with a development; and
- Assessment: provides further understanding on the likelihood of a risk event occurring and identifies the requirement for further mitigation.

20.5.4. In addition, the major accidents and disasters assessment of effects has considered the legislative framework as defined by Health and Safety at Work, etc Act 1974 and its relevant

statutory provisions, although it should be noted that under Great Britain's health and safety legislation, HSE does not have a role in examining risk or hazard assessments unless the circumstances are covered by specific regulations.

20.5.5. Major accidents and disasters specific assessment criteria and recognised guidance on assessing major accidents and disasters are provided below.

EMBEDDED COMMITMENTS

20.5.6. As part of the project design process, several designed-in measures have been proposed to reduce the potential for impacts on environmental receptors. As there is a commitment to implementing these measures, they are considered inherently part of the design of the Proposed Development and have therefore been considered in the assessment (i.e., the determination of magnitude and therefore significance assumes implementation of these measures).

20.5.7. The embedded commitments (C-02, C-03, C-05, C-07, C-08, C-10, C-11, C-12, C-13, C-16, C-17, C-18, C-19, C-21, C-22, C-23, C-24, C-25, C-26, C-27, C-29, C-31, C-32, C-33, C-36, C-40, C-41, and C-42) collectively aim to reduce the vulnerability of and the potential for the Proposed Development to be impacted by or cause major accidents and disasters. Marking of the Proposed Development on charts (C-16, C-25), appropriate lighting and marking of the Proposed Development (C-24 C-36, C-42), the promulgation of information about construction, O&M and decommissioning activities (C-16, C-19), and the use of guard vessels (C-18) and Safety Zones (C-17) will work to mitigate risks to and from surface navigation during all project phases. Snagging risks will be minimized by cable burial (C-29), adherence to a dropped objects procedure (C-07), protection of crossed cables and pipelines (C-41) and cable surveys (C-32).

20.5.8. These measures are considered standard industry practice for this type of development. The embedded commitments relevant to major accidents and disasters are presented in Table 20-3.

20.5.9. Volume 3, Appendix 6.1 (Commitments Register), provides additional information on how these commitments are secured.

Table 20-3 Embedded Commitments of relevance to Major Accidents and Disasters

Code	Commitment	How Commitment Secured
C-02	Development of and adherence to a Cable Plan (CaP). The CaP will confirm planned cable routing, installation methods, cable specifications and any additional protection and requirement for any post installation monitoring.	CaP
C-03	Development of and adherence to a Development Specification and Layout Plan (DSLP). The DSLP will confirm layout and relevant design parameters.	DSLP
C-04	The infrastructure will be designed in such a way to minimise the impacts and will be within the key parameters set out in the EIA Project Description and EIAR.	DSLP
C-05	Development of a Construction Method Statement (CMS). This will detail the construction procedures (including piling), good working practices for constructing the works, and how the construction-related mitigation steps are to be delivered.	CMS
C-07	All dropped objects will be reported. Where recovery is possible and the dropped object may cause a hazard, object will be retrieved.	Environmental Management Plan (EMP)

Code	Commitment	How Commitment Secured
C-08	Development of and adherence to an EMP. This will set out mitigation measures and procedures relevant to environmental management, including but not limited to chemical usage, invasive and non-native species, pollution prevention and waste management	EMP
C-10	Development of and adherence to a Vessel Management Plan (VMP). The VMP will confirm the types and numbers of vessels that will be engaged on the Proposed Development and consider vessel coordination including indicative transit route planning.	VMP
C-11	Development of and adherence to a Fisheries Management and Mitigation Strategy (FMMS). The FMMS will set out the means of ongoing fisheries liaison through construction and operation and maintenance (O&M) phases of the Proposed Development and detail any mitigation measures of relevance to commercial fisheries to be put in place.	FMMS
C-12	Ongoing liaison with fishing fleets will be maintained during construction, maintenance and decommissioning operations via an appointed Fisheries Liaison Officer (FLO) and Fishing Industry Representative.	FMMS
C-13	Adherence to best practice guidance with regards to fisheries liaison and procedures in the event of interactions between the Proposed Development and fishing activities (e.g., FLOWW, 2014; 2015).	FMMS
C-16	Development of and adherence to a Navigational Safety Plan (NSP). The NSP will describe measures put in place by the Proposed Development related to navigational safety, including information on Safety Zones, charting, construction buoyage, temporary lighting and marking, and means of notification of Proposed Development activity to other sea users (e.g., via Notice to Mariners).	NSP
C-17	Applications to be made, where appropriate, for Safety Zones (500 m) for construction and major maintenance works, and for pre commissioning works (50 m).	NSP
C-18	Use of guard vessels, where deemed appropriate, to ensure adherence with Safety Zones or advisory passing distances, as defined by risk assessment, and to mitigate any impact which poses a risk to surface navigation during construction, maintenance, and decommissioning phases. Such impacts may include partially installed structures or cables, extinguished navigation lights or other unmarked hazards.	NSP
C-19	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notices to Mariners and Kingfisher Bulletins.	NSP
C-21	Compliance with Maritime and Coastguard Agency (MCA) Marine Guidance Note (MGN) 654 (MCA, 2021a) and its annexes where applicable (including consideration of a Search and Rescue (SAR) checklist (MCA, 2021b), an Emergency Response and Cooperation Plan (ERCoP) and Under Keel Clearance.	CaP CMS DSLP
C-22	Compliance of all project vessels with international marine regulations as adopted by the Flag State, notably the	NSP

Code	Commitment	How Commitment Secured
	International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, 1974) and the International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974).	
C-23	Notification of damage or decay to cables to the MCA, Northern Lighthouse Board (NLB) Kingfisher and UK Hydrographic Office (UKHO) within 24 hours of discovery.	CaP NSP
C-24	Aids to navigation (marking and lighting) will be deployed in accordance with the latest relevant available standard industry guidance and as advised by NLB, MCA and CAA and Ministry of Defence (MoD) as appropriate. This will include a buoyed construction area around the Array Area in consultation with NLB.	NSP Lighting and Marking Plan (LMP)
C-25	Appropriate marking of the Proposed Development on Admiralty and aeronautical charts. This will include provision of the positions and heights of structures to the UKHO, CAA, MoD and Defence Geographic Centre (DGC).	NSP LMP
C-26	Compliance with regulatory expectations on moorings for floating wind and marine devices published by MCA and the Health and Safety Executive (HSE).	CMS
C-27	Crossing and proximity agreements with known existing pipeline and cables operators will be sought.	Secured by commercial agreements with pipeline and cable operators.
C-29	Where practicable, cable burial will be the preferred means of cable protection. Cable burial will be informed by the cable burial risk assessment (CBRA) and detailed within the CaP. In areas where CBRA deems burial not feasible, suitable implementation and monitoring of cable protection will be employed.	CaP
C-31	Unexploded ordnance (UXO) hazards will be avoided where practicable and appropriate. If avoidance is not possible, decision making will relate to removal, with detonation considered if avoidance or removal is not possible. If detonation is required, and where practicable and appropriate, low-order deflagration will be the preferred method. Licencing of UXO clearance works will be subject to a standalone Marine Licence (and European Protected Species [EPS] licence) application. These applications will provide details of measures to minimising impacts on marine mammals where appropriate.	Marine Licence European Protected Species (EPS) licence
C-32	Cable protection surveys of offshore export cables will be undertaken post construction where mechanical protection of cables laid on the seabed has been deployed. This may include over-trawl surveys and/or side-scan sonar. Cable monitoring of offshore export cables will be undertaken post construction to monitor Electromagnetic Fields (EMF).	CaP
C-33	Minimum blade clearance of 30 m above Mean Sea Level (MSL)	CMS DSLP
C-36	Development of and adherence to a Lighting and Marking Plan (LMP). The LMP will confirm compliance with legal requirements with regards to shipping, navigation and aviation marking and lighting.	LMP
C-40	Development of and adherence to a Wet Storage Plan (WSP) to provide details on requirements (if applicable) for	WSP

Code	Commitment	How Commitment Secured
	assembled WTGs and cabling.	
C-41	Where offshore export cables must cross third party infrastructure, such as existing cables and pipelines, both the third-party asset and the installed cables will be protected.	CaP
C-42	Lighting and marking failures appropriately reported/rectified as soon as possible and interim hazard warnings put in place as required.	LMP

20.6. ASSESSMENT OF LSE

IDENTIFICATION AND SCREENING

20.6.1. Following the guidance outlined within IEMA (2020) and given the location of the Proposed Development, the Proposed Development potentially has a vulnerability to major accidents and/or disasters and therefore this has been screened into assessment included in this Offshore EIA Report.

20.6.2. Although there are a significant number of embedded commitments in place, a full assessment of the vulnerability of the Proposed Development to risks of major accidents and disasters has been undertaken with consideration given to the potential for the Proposed Development to result in a major accident or disaster.

SCOPING

20.6.3. The scoping stage determines whether there is potential for significant effects as a result of major accidents and/or disasters associated with a development considering the embedded commitments. The scoping stage identifies whether accidents or disasters should be scoped in or out of the assessment stage for the Proposed Development.

20.6.4. Table 20-4 describes the hazards that have been scoped out of this assessment, and the justification for doing so.

20.6.5. It is generally considered that the risks associated with offshore developments are well understood and managed through existing processes and risk assessments.

Table 20-4 Hazards Scoped out of the Major Accidents and Disasters assessment.

Hazard Scoped Out	Receptor(s)	Justification
Workplace accidents	Population and human health / material asset	Workplace accidents are managed through existing health and safety legislation, processes and protocols. Potential major accidents or disasters are mitigated by the embedded commitments that ensure compliance with legislation and industry best practice.
Marine Pollution	Population and human health / environment	There is the potential for the Proposed Development to result in marine pollution events through the accidental release of hazardous substances contained within the WTG and vessels. The implementation of an EMP includes measures for compliance with international requirements of MARPOL and best practice for works in the marine environment. The embedded commitments and compliance with legislation and industry best practice standards ensures

Hazard Scoped Out	Receptor(s)	Justification
		possible major accidents and disasters are adequately covered.
Natural disasters	Population and human health / material asset	The National Risk Register (NNR) identifies several natural disasters (e.g. earthquakes, volcanic eruptions, severe space weather) as risks to the UK. Due to their extremely low likelihood of occurrence and low severity of consequence, they are not considered to result in a major accident or disaster and are not considered further in this assessment.
Act of Terrorism	Population and human health / material asset	The NNR identifies conventional terrorist attacks on infrastructure and the UK threat level is set at substantial (at time of writing). However, offshore wind is considered a low priority target as threats from terrorist attacks in the UK are aimed at iconic targets and locations to inflict large scale casualties (HM Government, 2023).
Act of War	Population and human health / material asset	Due to the location of the Proposed Development and its expected output, it is not expected to be a target of an act of war, similarly to the assessment of an act of terrorism being considered extremely low.
Cyber security attacks	Population and human health / material asset / economics	The Proposed Development will implement network segmentation where practical and systems will be monitored. All software will be kept up to date in line with industry best practice, guidelines and procedures. Potential attacks on a larger scale are considered to be adequately controlled through existing protocols, legislation, policy and strategy.

ASSESSMENT

20.6.6. Following the guidance outlined within IEMA (2020), all scoped in risk events have been assessed, both in terms of the potential vulnerability of the Proposed Development to existing major accident and/or disasters and in terms of its potential to cause accidents/disasters. Embedded commitments and the potential requirement of additional control measures are considered in assessing whether each potential risk event is being managed to an acceptable level.

20.6.7. The Developer has adopted a design envelope approach to impact assessment (also known as a ‘Rochdale Envelope’). In line with guidance from the Scottish Government, the design envelope approach offers flexibility in the EIA process by enabling impact assessment to be carried out against several potential design options.

20.6.8. The assessment of Major Accidents and Disasters impacts has been undertaken with respect to the details provided in Volume 1, Chapter 3 (Project Description).

20.6.9. Table 20-5 details the assessment of the vulnerability of and the potential for the Proposed Development to be impacted by or cause major accidents and/or disasters.

Table 20-5 Assessment of Vulnerability of and Potential for the Proposed Development to be Impacted or Cause Accidents and/or Disasters

Risk Event	Source / Pathway	Relevant Project Phase(s)	Source Document / Chapter	Receptor(s)	Reasonable Worst Consequence if Event did Occur	Embedded Commitments to mitigate risk	Could this Reasonably Lead to a Major Accident and / or Disaster with Existing Control Measures in Place?	Is the Reasonable Worst Consequence Managed to an Acceptable Level with Existing Control Measures in Place?	If no, What Secondary Control Measures are Required to Reach an Acceptable Level?
Collision and allision risk	Vessels collide or allide with offshore infrastructure or vessels associated with the Proposed Development. Increased vessel to vessel collision due to presence of infrastructure.	Construction Operation and Maintenance Decommissioning	Volume 2, Chapter 14 (Shipping and Navigation) Volume 3, Appendix 14.1 (Navigation Risk Assessment)	Population and human health – Workforce for Proposed Development, mariners	Serious – Multiple minor injuries or injuries resulting in medium health concerns. Potential Loss of Life.	C-10 C-16 to C-19 C-22 C-24 and C-25 C-33 C-36 C-42	No	Yes	Not required
				Material assets – Infrastructure and vessels associated with the Proposed Development, third party vessels	Moderate – Damage to a single vessel or asset that is not critical to operations		No	Yes	Not required
Collision risk – aviation	Aircraft collide with offshore infrastructure or vessels associated with the Proposed Development.	Construction Operation and Maintenance Decommissioning	Volume 2, Chapter 16 (Military and Civil Aviation)	Population and human health – Workforce for Proposed Development, aircrew	Serious - Multiple minor injuries or injuries resulting in medium health concerns. Potential Loss of Life.	C-19 C-24 and C-25 C-36 C-42	No	Yes	Not required
				Material assets - Infrastructure and aircraft associated with the Proposed Development, third party aircraft	Moderate - Damage to a single aircraft that is not critical to operations		No	Yes	Not required
Subsea Cable snagging risk – Commercial Fisheries	Fishing vessels snagging on offshore export cables	Operation and Maintenance Decommissioning	Volume 2, Chapter 13 (Commercial Fisheries)	Population and human health – Fishing vessel crew	Serious – Multiple injuries and/or fatality.	C-02 C-11 to C-13 C-16 to C-19 C-21 to C-26 C-29 C-32	No	Yes	Not required
				Material assets – Infrastructure associated with the Proposed Development	Serious – Damage to cables resulting in fault that is crucial to operations. Severe damage to fishing equipment or vessel		No	Yes	Not required
Seabed anchoring cable snagging risk – Commercial Fisheries	Fishing vessels snagging on mooring lines	Operation and Maintenance Decommissioning	Volume 2, Chapter 13 (Commercial Fisheries)	Population and human health – Fishing vessel crew	Serious – Multiple injuries and/or fatality	C-02 C-11 to C-13 C-16 to C-19 C-21 to C-26 C-29 C-32	No	Yes	Not required
				Material assets – Infrastructure associated with the Proposed	Serious – Damage to mooring lines resulting in fault that is crucial to operations.		No	Yes	Not required

Risk Event	Source / Pathway	Relevant Project Phase(s)	Source Document / Chapter	Receptor(s)	Reasonable Worst Consequence if Event did Occur	Embedded Commitments to mitigate risk	Could this Reasonably Lead to a Major Accident and / or Disaster with Existing Control Measures in Place?	Is the Reasonable Worst Consequence Managed to an Acceptable Level with Existing Control Measures in Place?	If no, What Secondary Control Measures are Required to Reach an Acceptable Level?
				Development	Severe damage to fishing equipment or vessel				
UXO	Accidental or improper detonation of a UXO	Construction	Volume 1, Chapter 3 (Project Description)	Population and human health – Workforce for Proposed Development, mariners	Serious – Multiple serious injuries and/or fatality	C-02 C-05 C-07 C-31	No	Yes	Not required
				Material assets – Project infrastructure, vessels	Serious – Severe damage to infrastructure that is crucial to operations		No	Yes	Not required
Extreme weather events (lightning strikes, high winds, storm surges)	Extreme weather events resulting in damage to offshore assets or causing fires.	Operation and Maintenance Decommissioning	Volume 2, Chapter 18 (Climate)	Population and human health – Workforce for Proposed Development	Serious – Multiple severe injuries and/or fatality	C-03 C-05 C-08 C-21 C-26	No	Yes	Not required
				Material assets – Infrastructure associated with the Proposed Development	Serious – Damage or loss of infrastructure that is crucial to operations		No	Yes	Not required
Fire – WTG or offshore structures	Fire on a WTG or offshore structure caused by lightning strike, system, electrical or mechanical failure	Operation and Maintenance Decommissioning	Volume 1, Chapter 3 (Project Description)	Population and human health – Workforce for Proposed Development	Serious – Multiple severe injuries and/or fatality	C-03 C-08	No	Yes	Not required
				Material assets – Infrastructure associated with the Proposed Development	Serious – Damage or loss of infrastructure that is crucial to operations		No	Yes	Not required
External industrial hazards (i.e. major accidents at a nearby development)	Major accident at a nearby project that causes damage or increases risk to the Proposed Development.	Construction Operation and Maintenance Decommissioning	Volume 2, Chapter 19 (Infrastructure and Other Users)	Population and human health – Workforce for Proposed Development	Serious – Multiple severe injuries and/or fatality	C-03 C-08	No	Yes	Not required
				Material assets – Infrastructure associated with the Proposed Development	Serious – Damage or loss of infrastructure that is crucial to operations		No	Yes	Not required
Electrical /	Unexpected system failure results in loss of	Operation and	Volume 1, Chapter 3	Population and human health –	Serious – Multiple severe injuries and/or	C-08	No	Yes	Not required

Risk Event	Source / Pathway	Relevant Project Phase(s)	Source Document / Chapter	Receptor(s)	Reasonable Worst Consequence if Event did Occur	Embedded Commitments to mitigate risk	Could this Reasonably Lead to a Major Accident and / or Disaster with Existing Control Measures in Place?	Is the Reasonable Worst Consequence Managed to an Acceptable Level with Existing Control Measures in Place?	If no, What Secondary Control Measures are Required to Reach an Acceptable Level?
system failure	blade or station and/or fire	Maintenance	(Project Description)	Workforce for Proposed Development, mariners	fatality				
				Material assets – Infrastructure associated with the Proposed Development	Serious – Damage or loss of infrastructure that is crucial to operations		No	Yes	Not required
Floating WTG breaking free of mooring	Mooring failure leading to floating platform to drift creating navigational risk	Operation and Maintenance	Volume 1, Chapter 3 (Project Description) Volume 3, Appendix 14.1 (Navigational Risk Assessment)	Population and human health – Workforce for Proposed Development, mariners	Serious – Multiple severe injuries and/or fatality	C-26	No	Yes	Not required
				Material assets – Infrastructure associated with the Proposed Development	Serious – Damage or loss of infrastructure that is crucial to operations		No	Yes	Not required
Transit to and from site for installation, component repair / replacement	Weather or sea conditions unfavourable and create risk to the assets, vessels involved and project workforce	Construction Operation and Maintenance Decommissioning	Volume 1, Chapter 3 (Project Description) Volume 3, Appendix 14.1 (Navigational Risk Assessment)	Population and human health – Workforce for Proposed Development, mariners	Serious – Multiple severe injuries and/or fatality	C-10 C-16 to C-19 C-22 to C-26 C-36 C-40 C-42	No	Yes	Not required
				Material assets – Infrastructure and vessels associated with the Proposed Development	Serious – Damage or loss of infrastructure that is crucial to operations		No	Yes	Not required

20.7. CUMULATIVE, TRANSBOUNDARY AND INTER-RELATED EFFECTS ASSESSMENT

20.7.1. As it has been concluded that the Proposed Development will not reasonably lead to a major accident or disaster after consideration of the commitments adopted, no assessment of inter-related or transboundary effects has been undertaken.

20.7.2. There is a requirement to tow floating substructures during the construction phase and potentially during the operation and maintenance phase for major component replacement purposes. In terms of the cumulative effects of towing substructures, it is predicted that standard mitigation will be in place across all other offshore wind farms within the vicinity of the Proposed Development. As such, no likely significant cumulative effects have been identified.

20.8. CONCLUSION

20.8.1. Information on major accidents and disasters was collected through a desktop review of the following Chapters (and the Offshore Scoping Report) to establish the baseline for offshore energy projects, offshore cables and pipelines, carbon capture, natural gas storage and underground gasification, oil and gas, commercial fisheries, civil and military aviation, shipping and navigation and UXO:

- Volume 3, Appendix 5.1 (Offshore Scoping Report);
- Volume 2, Chapter 13 (Commercial Fisheries);
- Volume 2, Chapter 14 (Shipping and Navigation);
- Volume 2, Chapter 16 (Military and Civil Aviation);
- Volume 2, Chapter 18 (Climate); and
- Volume 2, Chapter 19 (Infrastructure and Other Users)

20.8.2. Table 20-5 details the assessment of the vulnerability of and potential for the Proposed Development to be impacted or cause major accidents and/or disasters. It was found that all reasonable worst consequences will be managed to an acceptable level with existing control measures in place.

20.8.3. In EIA terms, there are no likely significant effects identified in relation to major accidents and disasters. No likely significant cumulative effects have been identified.

20.8.4. As no likely significant major accidents and disasters risk events were identified, no transboundary or inter-related effects assessment was carried out.

20.9. REFERENCES

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