Salamander Offshore Wind Farm

Offshore EIA Report

Volume ER.A.3, Chapter 21: Major Accidents and Disasters (Offshore)

SALAMANDER

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Glossary

Term	Definition
Applicant	Salamander Wind Project Company Limited (formerly called Simply Blue Energy (Scotland) Limited), a joint venture between Ørsted, Simply Blue Group and Subsea7.
Disaster	As defined in the IEMA (2020) Guidance 'Major Accidents and Disasters in EIA: A Primer', a 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.
Dropped Objects	Any object accidentally dropped into the marine environment.
EIA Regulations	The regulations that apply to this project are the Electricity Works (EIA) (Scotland) Regulations 2017, the Marine Works (EIA) (Scotland) Regulations 2017, the Marine Works (EIA) Regulations 2007, and the Town and Country Planning (EIA) (Scotland) Regulations 2017.
Environmental Impact Assessment	A statutory process by which the potential significant effects of certain projects must be assessed before a formal decision to proceed can be made. It involves the collection and consideration of environmental information, which fulfils the assessment requirements of the EIA Regulations, including the publication of an Environmental Impact Assessment Report (EIAR).
Environmental Impact Assessment Report	A document reporting the findings of the EIA and produced in accordance with the EIA Regulations.
Landfall	The generic term applied to the entire landfall area between Mean Low Water Spring (MLWS) tide and the Transition Joint Bay (TJB) inclusive of all construction works, including the offshore and onshore Export Cable Corridor, intertidal working area and landfall compound, where the offshore cables come ashore north of Peterhead.
Major Accident	As defined in the Institute of Environmental Management and Assessment (IEMA) (2020) Guidance 'Major Accidents and Disasters in EIA: A Primer', Major Accidents are "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 client 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."

Term	Definition
Offshore Array Area (OAA)	The offshore area within which the wind turbine generators, foundations, mooring lines and anchors, and inter-array cables and associated infrastructure will be located.
Offshore Development	The entire Offshore Development, including all offshore components of the Project (WTGs, Inter-array and Offshore Export Cable(s), floating substructures, mooring lines and anchors, and all other associated offshore infrastructure) required across all Project phases from development to decommissioning, for which the Applicant is seeking consent.
Offshore Development Area	The total area comprising the Offshore Array Area and the Offshore Export Cable Corridor.
Offshore Export Cable Corridor (ECC)	The area that will contain the Offshore Export Cable(s) between the boundary of the Offshore Array Area and Mean High Water Springs (MHWS).
Onshore Development	The entire Onshore Development, including Construction Compounds at the Landfall, temporary working areas, Onshore Export Cables, Transition Joint Bay, Joint Bays, Onshore Substation and Energy Balancing Infrastructure, Construction Compounds, any associated landscaping (if required) and access (and all other associated infrastructure) across all Project phases from development to decommissioning, for which the Applicant is seeking consent.
Project Design Envelope	A description of the range of possible elements that make up the Salamander Project design options under consideration, as set out in detail in the project description. This envelope is used to define Salamander Project for Environmental Impact Assessment (EIA) purposes when the exact engineering parameters are not yet known.
Receptor	Any physical, biological or anthropogenic element of the environment that may be affected or impacted by the Salamander Project. Receptors can include natural features such as the seabed and wildlife habitats as well as man-made features like fishing vessels and cultural heritage sites.
Safety Zones	A marine area declared for the purposes of safety around a renewable energy installation or works/ construction area under the Energy Act 2004.
Salamander Project	The proposed Salamander Offshore Wind Farm. The term covers all elements of both the offshore and onshore aspects of the project
Salamander Project Team	The project team from Salamander Wind Project Company Ltd. (SWPC), responsible for developing the Salamander Project.
Scoping	An early part of the EIA process by which the key potential significant impacts of the Salamander Project are identified, and methodologies identified for how these

Term	Definition
	should be assessed. This process gives the relevant authorities and key consultees opportunity to comment and define the scope and level of detail to be provided as part of the EIAR – which can also then be tailored through the consultation process.
ScotWind	Crown Estate Scotland offshore wind leasing programme.
Wind Turbine Generator	All the components of a wind turbine, including the tower, nacelle, and rotor.

Acronyms

Term	Definition
AI	Artificial Intelligence
ALARP	As Low As Reasonably Practicable
CBRN	Chemical, Biological, Radiological and Nuclear
CRR	Community Risk Register
CEMP	Construction Environmental Management Plan
COLREGs	International Regulations for the Prevention of Collision at Sea
COMAH	Control of Major Accident Hazards
DEFRA	Department for Environment, Food and Rural Affairs
ECC	Export Cable Corridor
EPS	European Protected Species
ERCoP	Emergency Response Cooperation Plan
ERM	Environmental Resources Management
FIR	Fisheries Industries Representative
FLO	Fisheries Liaison Officer

Term	Definition
FMMS	Fisheries Management and Mitigation Strategy
HAZOP	Hazard and Operability Study
IEMA	Institute of Environmental Management and Assessment
INTOG	Innovation and Targeted Oil and Gas Decarbonisation
MARPOL	International Convention for the Prevention of Pollution from Ships
MCA	Maritime Coastguard Agency
MoD	Ministry of Defence
MPCP	Marine Pollution Contingency Plan
MPS	Marine Policy Statement
NATO	North Atlantic Treaty Organisation
OAA	Offshore Array Area
OEMP	Operational Environmental Management Plan
RRP	Regional Resilience Partnership
SBES	Simply Blue Energy (Scotland) Ltd.
SOLAS	Safety of Life at Sea
SWPC	Salamander Wind Project Company Ltd. (formerly called SBES)
UK	United Kingdom
UN	United Nations
UXO	Unexploded Ordnance
VMP	Vessel Management Plan
WTG	Wind Turbine Generator

21 Major Accidents and Disasters (Offshore)

21.1 Introduction

21.1.1.1 The Applicant, Salamander Wind Project Company Ltd. (SWPC), a joint venture (JV) partnership between Ørsted, Simply Blue Group and Subsea7, is proposing the development of the Salamander Offshore Wind Farm (hereafter 'Salamander Project'). The Salamander Project will consist of the installation of a floating offshore wind farm (up to 100 megawatts (MW) capacity) approximately 35 kilometres (km) east of Peterhead. It will consist of both offshore and onshore infrastructure, including an offshore generating station (wind farm), export cables to Landfall, and connection to the electricity transmission network (please see **Volume ER.A.2, Chapter 4: Project Description** for full details on the Project Design).

21.1.1.2 This chapter of the Environmental Impact Assessment Report (EIAR) presents the results of the EIA of potential effects of the Salamander Project on Major Accidents and Disasters. Specifically, this chapter considers the potential impact of the Salamander Project seaward of Mean High Water Springs (MHWS) during the construction, operation and maintenance, and decommissioning phases of the Offshore Development.

21.1.1.3 The chapter provides an overview of the existing environment for the proposed Offshore Development Area, followed by an assessment of significance of risk on Major Accidents and Disasters receptors.

21.1.1.4 This Chapter has been written in accordance with the Institute of Environmental Management and Assessment (IEMA) (2020) Guidance 'Major Accidents and Disasters in EIA: A Primer'. This guidance defines Major Accidents and Disasters as described below:

- 'Major Accidents' are 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 client 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*"; and
- A '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*".

21.1.1.5 The Major Accidents and Disasters assessment will consider two categories of project risks for the Offshore Development, these include:

- The potential risks of the Offshore Development to cause a major accident and/or disaster; and
- The vulnerability of the Offshore Development to a potential major accident and/or disaster external to the Salamander Project.

21.1.1.6 This chapter should be read alongside and in consideration of the following:

- **Volume ER.A.2, Chapter 4 : Project Description;**
- **Volume ER.A.3, Chapter 8: Water and Sediment Quality;**
- **Volume ER.A.3, Chapter 9: Benthic Ecology and Intertidal Ecology;**
- **Volume ER.A.3, Chapter 10: Fish and Shellfish Ecology;**
- **Volume ER.A.3, Chapter 11: Marine Mammals;**
- **Volume ER.A.3, Chapter 12: Offshore and Intertidal Ornithology;**
- **Volume ER.A.3, Chapter 13: Commercial Fisheries;**

- **Volume ER.A.3, Chapter 14: Shipping and Navigation;**
- **Volume ER.A.3, Chapter 15: Aviation and Radar;**
- **Volume ER.A.3, Chapter 18: Other Users of the Marine Environment;**
- **Volume ER.A.3, Chapter 20: Climate Change and Carbon;**
- **Volume ER.A.4, Annex 14.1: Navigational Risk Assessment; and**
- **Volume ER.A.4, Annex 4.1: Underwater Noise Modelling Report.**

21.1.1.7 This chapter has been authored by Environmental Resources Management (ERM) Ltd. Further competency details of the authors of this chapter are outlined in **Volume ER.A.4, Annex 1.1: Details of the Project Team.**

21.2 Purpose

21.2.1.1 The primary purpose of this EIAR is for the application for the Salamander Project satisfying the requirements of Section 36 of the Electricity Act 1989 and associated Marine Licences. This EIAR chapter describes the potential environmental impacts from the Offshore Development and assesses the significance of their effect.

21.2.1.2 The EIAR has been finalised following the completion of the pre-application consultation (**Volume RP.A.4, Report 1: Pre-Application Consultation (PAC) Report**) and the Salamander EIA Scoping Report (Simply Blue Energy (Scotland) Ltd. (SBES), 2023), and takes account of the relevant advice set out within the Scoping Opinion from Marine Directorate – Licensing Operations Team (MD-LOT) (MD-LOT, 2023) relevant to the Offshore Development. Comments relating to the Energy Balancing Infrastructure (EBI) will be addressed within the Onshore EIAR. The Offshore EIAR will accompany the application to MD-LOT for Section 36 Consent under the Electricity Act 1989, and Marine Licences under the Marine (Scotland) Act 2010 and the Marine and Coastal Access Act 2009.

21.2.1.3 This EIAR chapter:

- Outlines the existing environmental and hazard baseline determined from assessment of publicly available data; a Salamander Project specific risk assessment and stakeholder consultation;
- Presents the potential environmental impacts and resulting effects arising from the Salamander Project on Major Accidents and Disasters receptors;
- Identifies mitigation measures designed to prevent, reduce, or offset adverse effects and enhance beneficial effects on the environment;
- Identifies any uncertainties or limitations in the methods used and conclusions drawn from the compiled environmental information.

21.3 Planning and Policy Context

21.3.1.1 The preparation of the Major Accidents and Disasters Chapter has been informed by the following policy, legislation, and guidance outlined in **Table 21-1**.

Table 21-1 Relevant policy, legislation and guidance relevant to the Major Accidents and Disasters assessment

Relevant policy, legislation, and guidance
Policy
UK Marine Policy Statement (MPS) (Department for Environment, Food and Rural Affairs (DEFRA), 2011)
Scotland's National Marine Plan (The Scottish Government, 2015)
Legislation
Marine and Coastal Access Act 2009
Construction (Design and Management) Regulations 2015
Health and Safety at Work etc. Act 1974
The Management of Health and Safety at Work Regulations 1999
Electricity at Work Regulations (1989)
Offshore Installations (Offshore Safety Directive) (Safety Case etc.) Regulations 2015
The Planning (Hazardous Substances) (Scotland) Act 1997
The Town and Country Planning (Hazardous Substances) (Scotland) Regulations 2015
Control of Major Accident Hazards (COMAH) Regulations 2015
The Civil Contingencies Act 2004 ("the Act")
The Civil Contingencies Act 2004 (Contingency Planning) (Scotland) Regulations 2005 ("the Regulations")
Guidance
IEMA (2020) Guidance: Major Accidents and Disasters in EIA: A Primer
HSE 004 Risk Assessment Matrix: Bringing it to Life (Heart and Minds, 2016)
Regulatory Expectations for Emergency Response Arrangements for the Offshore Renewable Energy Industry (HSE and MCA, 2019)
Regulatory expectations on moorings for floating wind and marine devices (HSE and MCA, 2017)
G+ Floating Offshore Wind Hazard Identification (HAZID) (Energy Institute, 2022)

Relevant policy, legislation, and guidance
Global Offshore Wind Health and Safety Organisation – Good Practice Guidelines (Global Offshore Wind Health and Safety Organisation, 2024)

21.3.1.2 Further details on the requirements for EIA are presented in **Volume ER.A.2, Chapter 2: Legislative Context and Regulatory Requirements**.

21.4 Consultation

21.4.1.1 Consultation is a key part of the application process. It has played an important part in ensuring that the baseline characterisation and impact assessment is appropriate to the scale of development as well as meeting the requirements of the regulators and their advisors.

21.4.1.2 An overview of the Salamander Project consultation process is outlined in **Volume ER.A.2, Chapter 5: Stakeholder Consultation**. Consultation regarding Major Accidents and Disasters has been conducted during the EIA scoping process with relevant comments being provided by MD-LOT on behalf of Scottish Ministers in the EIA Scoping Opinion.

21.4.1.3 The issues raised during consultation specific to Major Accidents and Disasters are outlined in **Table 21-2**, including consideration of where the issues have been addressed within the EIAR.

Table 21-2 Consultation Responses Specific to Major Accidents and Disasters Topic

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
Marine Directorate – Licensing Operations Team (MD-LOT)	21 June 2023; Scoping Opinion	Risks of Major Accidents and/or Disasters The EIA Report must include a description and assessment of the potential significant effects deriving from the vulnerability of the Proposed Development to major accidents and disasters. The Developer should make use of appropriate guidance, including the recent Institute of Environmental Management and Assessment ("IEMA") 'Major Accidents and Disasters in EIA: A Primer', to better understand the likelihood of an occurrence and the Proposed Development susceptibility to potential major accidents and hazards. The description and assessment should consider the vulnerability of the Proposed Development to a potential accident or disaster and also the Proposed Development potential to cause an accident or disaster.	The 'Major Accidents and Disasters in EIA: A Primer' guidance from IEMA has been used to inform this chapter of this EIAR. Furthermore, the Major Accidents and Disasters assessment considers the potential for the Offshore Development to cause a major accident and/or disaster as well as the vulnerability of the Offshore Development to a potential major accident and/or disaster.
MD-LOT	21 June 2023; Scoping Opinion	Risks of Major Accidents and/or Disasters The Scottish Ministers advise that existing sources of risk assessment or other relevant studies should be used to establish the baseline rather than collecting survey data and note the IEMA Primer provides further advice on this. This should include the review of the identified hazards from your baseline assessment, the level of risk attributed	Publicly available sources and a Salamander Project specific geophysical survey risk assessment have been used to inform the baseline of hazards for the Offshore Development such as those in **Section 21.6**. The baseline hazards have been assessed and those relevant to the Offshore Development have been assigned a level of risk and the relevant receptors have been considered as shown in **Table 21-11**.

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
		to the identified hazards and the relevant receptors to be considered.	
MD-LOT	21 June 2023; Scoping Opinion	Risks of Major Accidents and/or Disasters The assessment must detail how significance has been defined and detail the inclusions and exclusions within the assessment. Any mitigation measures that will be employed to prevent, reduce or control significant effects should be included in the EIAR.	Inclusions and exclusions are described in **Table 21-4** which details whether hazards have been scoped in or out of the assessment. The embedded mitigation measures and management plans are outlined in **Table 21-5**. The assessment methodology section describes the process of identifying the significance of a hazard and is outlined in **Section 21.10**.
MD-LOT	21 June 2023; Scoping Opinion	Decommissioning Section 4.8 of the Scoping Report states that a decommissioning programme will be prepared prior to construction but for the purposes of the Scoping Report, it is anticipated that all infrastructure above the seabed or ground level will be completely removed with any rock and/or scour protection being left in situ.	The decommissioning phase has been considered throughout the risk assessment, specifically in **Section 21.11.3**.
MD-LOT	21 June 2023; Scoping Opinion	Mitigation The Scottish Ministers advise that where the mitigation is envisaged to form part of a management or mitigation plan, the EIAR must set out these plans or the reliance on these in sufficient detail so the significance of the residual effect can be assessed and evaluated. This should also include identification of any monitoring and remedial	Mitigation measures are described in **Table 21-5**. This includes descriptions of the plans that have been committed to within **Volume ER.A.4, Annex 6.1: Commitments and Mitigations Register** by the Salamander Project that are relevant to Major Accidents and Disasters.

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
		actions (if relevant) in the event that predicted residual effects differ to actual monitored outcomes. Commitment to develop plans without sufficient detail is not considered to be suitable mitigation in itself.	
MD-LOT	21 June 2023; Scoping Opinion	Mitigation The EIAR must include a table of mitigation which corresponds with the mitigation identified and discussed within the various chapters of the EIAR and accounts for the representations and advice attached in Appendix I.	Mitigation measures are described in **Table 21-5** which align with the wider **Volume ER.A.4, Annex 6.1: Commitments and Mitigations Register**.
MD-LOT	21 June 2023; Scoping Opinion	Consultation The Scottish Ministers are satisfied that the requirements for consultation have been met in accordance with the EIA Regulations.	Noted.
Health and Safety Executive	21 June 2023; comments on EIA Scoping Report	Salamander Project Location The development is not located within a safeguarding zone of an explosives site licensed under the Explosives Regulations 2014 or the Dangerous Goods in Harbour Area Regulations 2016.	Noted.
Health and Safety Executive	21 June 2023; comments on EIA Scoping Report	Major Accidents and Disasters	Noted.

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
		The development is not located within HSE's land-use-planning consultation zones for hazardous substances consented sites.	
Green Volt Offshore Wind Farm	21 June 2023; comments on EIA Scoping Report	Project Overlap In addition to the Green Volt offshore export cable route being <1 km from the Salamander Offshore Wind Farm site, the two projects have identified a similar landfall location. Green Volt's primary option (St Fergus South) is in the vicinity of the Salamander project proposed landfall at Scotstown Beach between Lunderton and Kirkton. Therefore, there is the potential for interactions between the two project's offshore export cable corridors, including possible cable crossings.	It is noted that the Green Volt offshore export cable route is <1 km from Salamander Offshore Wind Farm with potential for interactions between the two projects Offshore Export Cable Corridors (ECCs). This falls under the hazard of simultaneous marine operations which has been addressed in **Table 21-4**.
NatureScot	21 June 2023; comments on EIA Scoping Report	Mitigation We welcome the embedded environmental measures described in each of the relevant sections of the Scoping Report. However, much of the embedded mitigation detailed throughout includes the development and adherence to post consent plans/programmes, these do not strictly constitute mitigation. The EIAR must clearly articulate those mitigation measures that are informed by the EIA (or HRA) and are necessary to avoid or reduce	The Major Accidents and Disasters topic was not included in the Scoping Report however mitigation measures are described in **Table 21-5** which have been committed to by the Salamander Project within **Volume ER.A.4, Annex 6.1 Commitments and Mitigations Register**. These include plans/programmes as well as mitigation measures such as design features.

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
		predicted significant adverse environmental effects of the proposed development.	
NatureScot	21 June 2023; comments on EIA Scoping Report	**Wet storage** Section 4.6.2 (Floating Substructures) refers to the potential for wet storage of the substructures prior to their installation within the array area, either at the initial assembly site, the wind turbine integration site or a separate dedicated storage location. Section 4.7.1 (Floating Assembly) also indicates that once operational the substructures and WTGs will form an integrated assembly piece – the replacement of any major component parts of which is expected to be achieved by towing the assembly to port. Wet storage could represent a significant impact. Consideration of the potential impacts on all receptors needs to be addressed with the EIAR and HRA. We would welcome further discussion on this as and when further details are confirmed, noting the intention to seek a separate marine licence application for any requirements for wet storage out with the array area.	Wet storage of the floating substructures (and integrated WTGs) prior to tow-out to the Offshore Array Area (OAA) is considered to be outside the scope of this EIA and the Marine Licence applications for the Offshore Development. This is due to the fact that at this stage of the Salamander Project it is not known which port(s) will be used for wet storage and therefore it is challenging to undertake a meaningful assessment of impacts related to wet storage. The intent is that the Salamander Project will utilise the services of a port(s) that offer wet storage sites, which will have appropriate consents (obtained by the port authority) for wet storage of floating substructures, fabrication and assembly with the WTGs. To enable the availability of this option for the Salamander Project within the required timeframe, SBES is an official member of the TS-FLOW UK-North Joint Industry Project (JIP) exploring the challenges of wet storage and identifying the opportunities and potentially suitable locations for these activities. This JIP is in collaboration with relevant ports and other floating offshore wind developers. Separate Marine Licences and associated impact assessments for wet storage areas out with the Offshore Development Area will be applied for and undertaken as appropriate.

Consultee	Date and Forum	Comment	Where it is addressed within this EIAR
Scottish Fire and Rescue Service	21 June 2023; comments on EIA Scoping Report	Scoping Report I had been forwarded an email from a colleague on the Scoping Report for Salamander Offshore Wind Farm, I have reviewed the document and believe we have no comments to make on the document.	Noted.
Ministry of Defence (MOD)	21 June 2023; comments on EIA Scoping Report	Health and Safety The potential for unexploded ordnance (UXO) to be present within the Study Area and the necessity for clearance is acknowledged within Section 4.6.8 of the Scoping Report. The potential presence of UXO and disposal sites should be a consideration during the installation and decommissioning of turbines, cables, and any other infrastructure, or where other intrusive works are necessary	UXO Presence has been considered in **Table 21-4**. The potential risk of accidental explosion in the construction and decommissioning phase has been considered in this assessment in **Table 21-11**.

21.5 Study Area

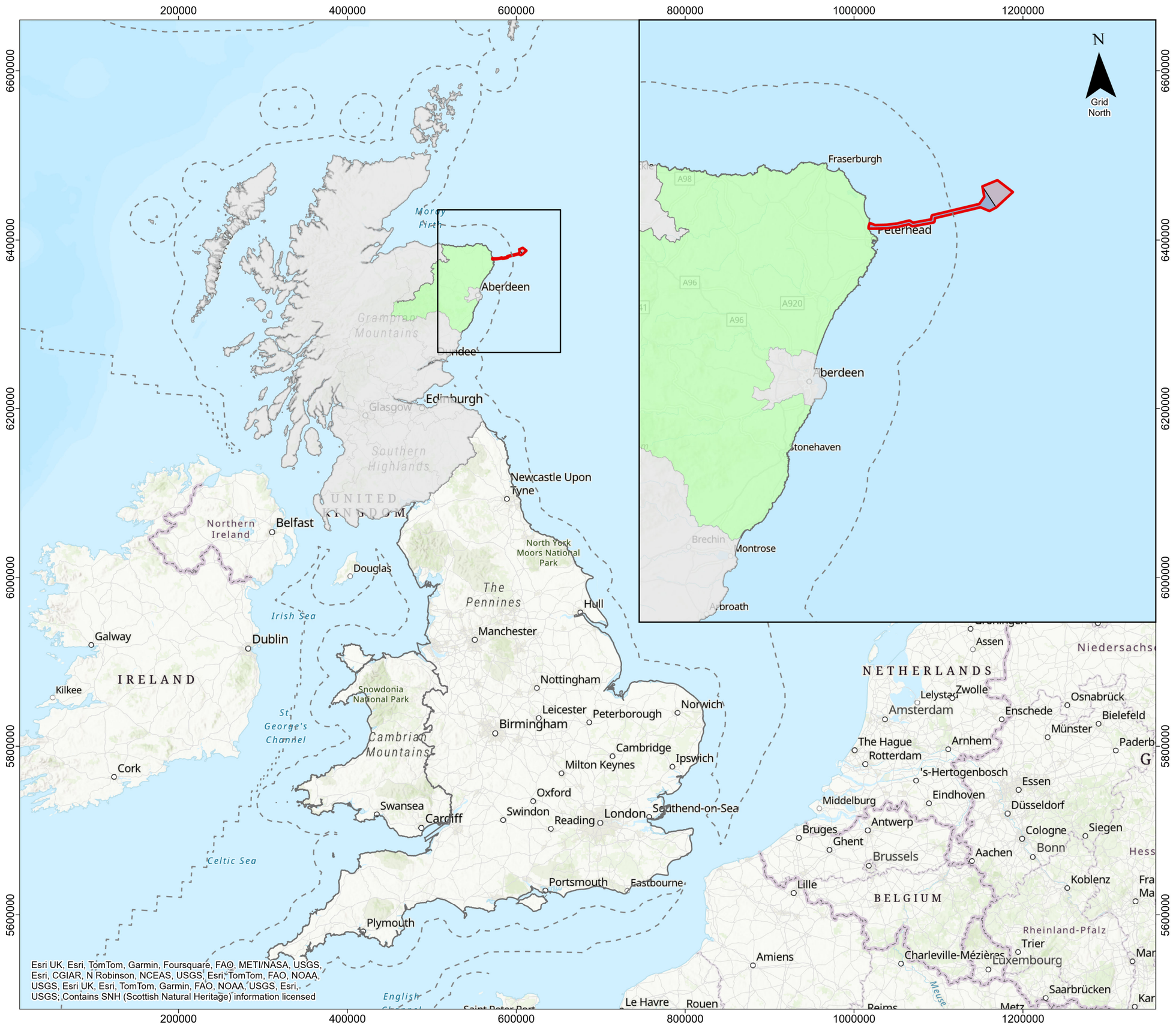
21.5.1.1 The Major Accidents and Disasters Study Area has been defined on the basis that the assessment will consider the potential for the Offshore Development to cause a major accident and/or disaster as well as the vulnerability of the Offshore Development to a potential major accident and/or disaster. Therefore, the initial Major Accidents and Disasters Study Area consists of the Offshore Development Area, defined as the total area comprising the Offshore Array Area (OAA) and the Offshore ECC. However, consideration is also given to the entire North of Scotland including the Aberdeenshire Council local authority area to identify potential hazards on a local level of Peterhead and regional level of Scotland. Furthermore, the whole of the United Kingdom (UK) will be considered in the assessment to determine any national hazards that may be relevant to the Offshore Development.

21.5.1.2 The Study Areas for Major Accidents and Disasters are shown in **Figure 21-1**.

Salamander

Figure 21-1

Major Accidents and Disasters Study Area



Legend

- Offshore Development Area
- Offshore Array Area
- Offshore Export Cable Corridor
- 12 nm limit
- Exclusive Economic Zone Limit
- UK
- Aberdeenshire
- Scotland

Coordinate System: WGS 1984 UTM Zone 30N

Scale @ A3 : 1:4,360,000

0 130 260 Kilometers

0 30 60 120 Nautical Miles

Rev	Description	Date
00	Final Issue	16/04/2024
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Doc. Title : Major Accidents and Disasters Study Area
Doc. No : SWF01ER0220
Created by : NB
Checked by : AN
Approved by : RB

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21.6 Methodology to Inform Baseline

21.6.1 Site Specific Surveys

21.6.1.1 No site specific surveys were undertaken for Major Accidents and Disasters in line with the IEMA guidance (IEMA, 2020) and the Scottish Ministers advice within the Scoping Opinion from the Scottish Ministers with stakeholders' input (MD-LOT, 2023). Alternatively, a desk-based assessment has been carried out to identify and assess the relevant hazards.

21.6.2 Data Sources

21.6.2.1 In line with IEMA guidance, publicly available sources and a project-specific geotechnical survey risk assessment have been used to inform the baseline hazards. The data sources that have been used to inform this Major Accidents and Disasters Chapter of the EIAR are presented within **Table 21-3**.

Table 21-3 Summary of key publicly available and project specific datasets for Major Accidents and Disasters

Source	Year	Spatial Coverage	Summary
Community Risk Register (CRR) North of Scotland Regional Resilience Partnership (RRP)	2022	Covers the North of Scotland including Aberdeenshire	This CRR identifies the most probable risks with the potential for significant impact, leading to disruption to the North of Scotland region and its local communities.
National Risk Register	2023	Covers the United Kingdom (UK)	A Government assessment of the most serious risks facing the UK at a national level. It assesses the likelihood and impact of each risk.
Hazard and Operability Study (HAZOP)	2023	Offshore Development Area	A Salamander Project specific assessment of hazards identified for the Salamander Project Geotechnical Survey.
G+ Floating Offshore Wind Hazard Identification (HAZID)	2022	Global Coverage	Good practice guidelines specific to floating offshore wind that identifies hazards across key operational periods during a wind farms lifecycle.
Global Offshore Wind Health and Safety Organisation – Good Practice Guidelines	2024	Global Coverage	A series of good practice guidance documents to be used by all to improve global health and safety standards within offshore wind farms.

21.7 Baseline Characterisation

21.7.1 Baseline Major Accidents and Disasters Hazards

21.7.1.1 The hazard baseline that is used within the Major Accidents and Disasters assessment is characterised by the sources listed in **Table 21-3** such as the CRR and Salamander specific risk assessment. It is formed of the potential hazards listed within these sources that may be relevant to the Offshore Development. **Table 21-4**

outlines all the potential hazards that have been taken from the sources listed in **Table 21-3** and whether or not they have been scoped in or out of this risk assessment.

21.7.1.2 Following the IEMA guidance (IEMA, 2020), potential hazards that meet the below criteria have not been considered further in the Major Accidents and Disasters assessment and therefore are scoped out:

- The Offshore Development is not vulnerable to the hazard or does not have the potential to cause the hazard;
- The hazard is not likely to result in effects that lead to fatality, multiple fatalities, permanent injury, widespread/irreversible harm or damage i.e. the hazard will not result in a major accident and/or disaster;
- There is no potential pathway or receptor in terms of EIA regulations;
- It is a workplace hazard that will only impact the workers directly involved i.e. fall from height or misuse of tools. These are considered to be an occupational health and safety incident that is not included within an EIA and instead managed through compliance of the Management of Health and Safety at Work Regulations; or
- The hazard has been assessed within another chapter within this EIAR.

Table 21-4 Baseline Hazards

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
Human and Animal Health				
Pandemic Diseases	Construction, operations and maintenance, and decommissioning	No	The Offshore Development will not result in an outbreak of pandemic diseases, and it is not vulnerable to the risk of pandemic diseases. Should a pandemic disease break out, Salamander Project personnel will follow government guidance to ensure the Offshore Development is not significantly impacted. Therefore, this potential hazard has been scoped out of this assessment.	**Out**
Outbreak of an Emerging Infectious Disease	Construction, operations and maintenance, and decommissioning	No	The Offshore Development will not result in an outbreak of an emerging infectious disease e.g. Ebola, and it is not vulnerable to the risk of an emerging infectious disease. Should an emerging infectious disease break out, Salamander Project personnel will follow government guidance to ensure the Offshore Development is not significantly impacted. Therefore, this potential hazard has been scoped out of this assessment.	**Out**
Animal Disease	Construction, operations and maintenance, and decommissioning	No	The Offshore Development will not result in any specific animal related diseases i.e. foot and mouth disease, highly pathogenic avian influenza, African horse sickness or African swine fever. The Offshore Development is also not vulnerable to animal disease, therefore this potential hazard has been scoped out of the assessment.	**Out**
Pollution and Contamination	Construction, operations and maintenance,	Yes	There is a possibility that the Offshore Development may potentially result in pollution and contamination impacts from vessels and activities associated with hook up and operation and maintenance of the semi-submersible	**Out**

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
	and decommissioning		platforms. The use of hydraulic fluids on platforms has potential to lead to spillages. This risk has been assessed further within the relevant chapters including: • **Volume ER.A.3, Chapter 8: Water and Sediment Quality**; • **Volume ER.A.3, Chapter 9: Benthic and Intertidal Ecology**; • **Volume ER.A.3, Chapter 10: Fish and Shellfish Ecology**; • **Volume ER.A.3, Chapter 11: Marine Mammals**; • **Volume ER.A.3, Chapter 12: Offshore and Intertidal Ornithology**; and • **Volume ER.A.3, Chapter 14: Shipping and Navigation**. The Offshore Development will be vulnerable to pollution and contamination impacts directly from vessels, however these impacts are assessed within **Volume ER.A.3, Chapter 14: Shipping and Navigation** therefore this potential hazard has been scoped out of this assessment.	
Environmental				
Severe Weather (including storms and extreme temperatures)	Construction, operations and maintenance, and decommissioning	Yes	The Offshore Development may potentially be vulnerable to severe weather events, in particular high winds and storms. This has been further assessed within **Volume ER.A.3, Chapter 20: Climate Change and Carbon** of this EIAR and therefore has been scoped out of this assessment.	**Out**
Flooding	Construction, operations and maintenance,	No	As the Offshore Development is marine based it is not expected to contribute to flooding or be impacted by floods. Therefore, this potential hazard has been scoped out of this assessment. It should be noted that there is potential	**Out**

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
	and decommissioning		for flooding to affect the Onshore Development and this has been included in **Volume ER.A.3, Chapter 20: Climate Change and Carbon** of this EIAR.	
Volcanic Eruption	Construction, operations and maintenance, and decommissioning	No	Considering the location of the Offshore Development it is not vulnerable to volcanic eruptions and the Offshore Development will not cause a volcanic eruption. Therefore, this potential hazard has been scoped out of the assessment.	**Out**
Earthquakes (including tsunamis)	Construction, operations and maintenance, and decommissioning	No	In the UK, earthquakes are rare and unlikely to be powerful enough to cause severe damage should they occur. The Offshore Development is not expected to be impacted by earthquakes or cause earthquakes. Therefore, this potential hazard has been scoped out of the assessment.	**Out**
Severe Space Weather	Construction, operations and maintenance, and decommissioning	No	The Offshore Development is at minimal risk from severe space weather such as solar flares and solar energetic particles, therefore these events are unlikely to disrupt operations. Consequently, the Offshore Development is not vulnerable to this hazard. Furthermore, the Offshore Development will not cause severe space weather. Therefore, this potential hazard is irrelevant and has been scoped out of the assessment.	**Out**
Poor Air Quality	Construction, operations and maintenance,	No	During Scoping, offshore Air Quality impacts were scoped out (Salamander, 2020) and the MD-LOT Scoping Opinion stated 'The Scottish Ministers are content with the potential impacts scoped out within the Scoping Report', therefore this potential hazard has not been assessed further.	**Out**

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
	and decommissioning			
Society and Public Utilities				
Interruption to Utilities (including widespread electrical failure)	Construction, operations and maintenance, and decommissioning	Yes	There is a possibility that the Offshore Development may cause potential hazard on utilities that society relies on within the local area. These potential hazards have been further assessed within **Volume ER.A.3, Chapter 15: Aviation and Radar** and **Volume ER.A.3, Chapter 18: Other Users of the Marine Environment** of this EIAR. The Offshore Development and operations could be impacted by external disruptions of the public utilities network such as electricity, gas, water and telecommunications. However, this has been scoped out of this assessment in line with IEMA guidance that suggests this would be unlikely to result in a risk of a major accident and/or disaster. There is no potential for the Offshore Development to cause widespread electrical failure and if this were to occur it would be controlled through the National Grid software and hardware solutions as part of the Grid Code compliance before the Offshore Development operations begin. The Offshore Development could be vulnerable to widespread electrical failure which may stop operations temporarily, however this would not cause a major accident and/or a disaster and therefore is scoped out of this assessment.	**Out**
Public Disorder and Industrial Action	Construction, operations and maintenance, and decommissioning	No	The Offshore Development is unlikely to result in society hazards such as public disorder and industrial action. Furthermore, the Salamander Project will comply with relevant UK legislation, policy and guidance which address these hazards. Therefore, this potential hazard has been scoped out of this assessment.	**Out**
Major Accidents				

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
Industrial Site Accidents	Construction, operations and maintenance, and decommissioning	Yes	The Offshore Development may result in site accidents, which may include falls, manual handling injuries, exposure to loud noises, excessive vibrations or hazardous substance resulting in adverse consequences, and injuries due to tool malfunction or improper usage. However, these incidents would be considered a workplace hazard and managed in line with Salamander Project specific Safety Management Systems. This potential hazard has therefore been scoped out of this assessment.	**Out**
Major Industrial Accidents	Construction, operations and maintenance, and decommissioning	Yes	This hazard differs from 'industrial Site Accidents' above as Major Industrial Accidents have potential to cause a greater impact beyond only affecting workers. There is potential of a Major Industrial Accident, such as an explosion, fire or electrical malfunction that leads to an explosion or fire at the Offshore Development. Should this occur there is a possibility of losing critical components like turbine blades, potentially leading to further major accidents. Therefore, this potential hazard has been scoped into the assessment. The St. Fergus Gas Terminal is located 3.4 km northwest of the Offshore Development Area and a major accident here may impact the Offshore Development and has been considered. However, the worst-case accident to be considered is an explosion and would be unlikely to impact the Offshore Development over this distance. As such, this outcome has not been further assessed in the assessment.	**In**
Transport Disruptions	Construction, operations and maintenance, and decommissioning	Yes	The Offshore Development has potential to cause transport disruptions to vessel trips offshore at all phases of the Salamander Project lifecycle. Potential hazards have been assessed within **Volume ER.A.3, Chapter 14: Shipping and Navigation** and **Volume ER.A.4, Annex 14.1: Navigational Risk Assessment** of this EIAR. As, a result these potential hazards have not been considered further here. There is potential that the Offshore Development is impacted by transport disruptions such as disruptions at operation and maintenance ports which could result in temporary impacts on operations. However, this has been	**Out**

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
			scoped out of this assessment in line with IEMA guidance that suggests this would be unlikely to result in a major accident and/or disaster. Transport disruptions regarding onshore transport will be addressed in the Onshore EIAR.	
Major Transport Accidents	Construction, operations and maintenance, and decommissioning	Yes	Vessel will be used to support the Offshore Development throughout the construction, operation, and decommissioning phases. The potential for transport accidents involving vessels from the Offshore Development has been assessed within **Volume ER.A.3, Chapter 14: Shipping and Navigation** and **Volume ER.A.4, Annex 14.1: Navigational Risk Assessment** of this EIAR. The potential for collision with aircrafts has been assessed within **Volume ER.A.3, Chapter 15: Aviation and Radar**. Major transport accidents regarding onshore transport will be addressed in the Onshore EIAR. As, a result these potential hazards have not been considered further here.	**Out**
System Failure	Operations and maintenance	Yes	A system failure during the operational phase of the Offshore Development, in the form of hydraulic, electrical or communications, has potential to result in the loss of a turbine blade or a fire, which could cause a major accident and/or disaster. Therefore, this potential hazard has been included in the assessment.	**In**
Major Fires	Construction, operations and maintenance, and decommissioning	Yes	The Offshore Development is also vulnerable to fire hazards that are result of an external source (i.e. lightning strikes) causing fires or electrical surges that may result in a major accident and/or disaster. Therefore, this potential hazard has been scoped into the assessment.	**In**
Mooring Lines Breaking	Operations and maintenance	Yes	In the unlikely event that the mooring lines were to break, the WTG and floating substructure may break away. This could result in the infrastructure being lost at sea and may pose further impacts to other sea users. The Offshore Development will not cause this hazard, but it is vulnerable to it. Should one or more mooring lines break, it could	**In**

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
			result in engineering offsets that are greater than designed leading to damage to the Inter-array Cable(s). As there is a pathway for this hazard to damage the Offshore Development, this potential hazard has been scoped in. The potential impact of this hazard to vessels has been assessed further within **Volume ER.A.3, Chapter 14: Shipping and Navigation.**	
Malicious Attacks				
Significant Cyber Attack affecting a public sector organisation	Construction, operations and maintenance, and decommissioning	No	The Salamander Project is not a public sector organisation, therefore, this potential hazard is not relevant and has been scoped out of this assessment.	**Out**
Attacks on Infrastructure (including cyber attacks)	Operations and maintenance	Yes	An attack specifically on the Offshore Development may include the cutting of mooring lines or the deliberate explosion of the WTG/floating substructure. Appropriate procedures would be followed in the case of any attack around the UK to ensure minimum impact and a major accident/disaster does not occur. The impacts of the floating substructure becoming detached from the mooring lines is assessed within **Volume ER.A.3, Chapter 14: Shipping and Navigation**. The Offshore Development has potential to be impacted by a Cyber Attack however the risk is limited due to the size and location of the Salamander Project making it less of a target than other energy generation projects. To ensure protection against this potential impact the Offshore Development will follow safeguarding procedures (i.e. monitoring systems, following industry best practice, guidelines and procedures to keep data and software secure, and ensuring substations are physically secure). Following these procedures will ensure that any attack on material	**Out**

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
			assets is prevented and would not have a likelihood or consequence that would result in a major accident and/or disaster. Therefore, this potential hazard has been scoped out of the assessment.	
Attacks on Public Locations	Construction, operations and maintenance, and decommissioning	No	Due to the remote location of the Offshore Development it will not be vulnerable to this impact. Salamander Project activities associated with onshore infrastructure or ports may be impacted by an attack on a public location and in this situation all government guidance would be adhered to. Furthermore, the Offshore Development would not cause an attack on a public location therefore this impact has been scoped out of the assessment.	**Out**
Attacks on Transport Systems	Construction, operations and maintenance, and decommissioning	No	The Offshore Development is not transport infrastructure and therefore is not susceptible to attacks on transport. Any vessels or transport used to support the Offshore Development are not open to the public and will adhere to appropriate procedures and best practice guidance. Therefore, this potential hazard has been scoped out of the assessment.	**Out**
Chemical, Biological, Radiological and Nuclear (CBRN) Attacks	Construction, operations and maintenance, and decommissioning	Yes	The Offshore Development could be targeted by a CBRN attack however it is highly unlikely to occur. The UK government monitors and can detect the likelihood of an attack and could implement an emergency response protocol if required. The Offshore Development therefore is not vulnerable to this impact. The Offshore Development will also not cause a CBRN attack and therefore, this potential hazard has been scoped out of the assessment.	**Out**
Chronic risks				
Antimicrobial Resistance	Construction, operations and maintenance,	No	The Offshore Development will not influence antimicrobial resistance and it is not vulnerable to antimicrobial resistance either, therefore this potential hazard has been scoped out of the assessment.	**Out**

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
	and decommissioning			
Artificial Intelligence (AI) Systems and their capabilities	Construction, operations and maintenance, and decommissioning	Yes	The Salamander Project will adhere to any relevant AI safety strategies published by the UK Government. This potential hazard has been scoped out of this assessment as it is not relevant to the Offshore Development.	**Out**
Overseas Risks				
Overseas Risks	Construction, operations and maintenance, and decommissioning	Yes	The Offshore Development is located within the UK and will not have an impact on overseas territory. Any risks to the Offshore Development from overseas will be handled by following UK Government protocols. This includes cooperating with international entities such as the United Nations (UN) and the North Atlantic Treaty Organisation (NATO) to mitigate any potential hazards related to overseas risk. Where personnel from the Salamander Project are required to travel overseas, appropriate risk assessments and procedures will be followed. This potential hazard has therefore been scoped out of this assessment.	**Out**
Internally identified key hazards for the Salamander Project				
UXO presence	Construction, operations and maintenance, and decommissioning	Yes	UXO has been identified as one of the main hazards for the Salamander Project. The potential impacts of the clearance of UXOs are discussed within this EIAR for completeness. However, as it is not possible at this time to precisely define the number of UXO which may require detonation, a separate Marine Licence application and European Protected Species (EPS) Licence application (with associated environmental assessments) will be	**In**

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
			submitted for the detonation of any UXO which may be identified as requiring clearance in pre-construction surveys. Intrusive activities associated with the Offshore Development have potential to interact with UXO that may be present within the Offshore Development Area. However, prior to any works appropriate measures will be taken to identify if UXO are present. For example, prior to construction, pre-commencement surveys will be undertaken and include a geophysical survey to identify potential UXO targets within the OAA or the Offshore ECC. If identified, in the first instance the Offshore Export Cable(s) will be micro sited around the UXO target. If it is determined that this will be too much of a risk, the Salamander Project will determine a different course of action, including potential deflagration, to remove. Although mitigation measures will be in place there is potential for accidental explosion of UXO which could lead to a major accident and/or disaster therefore this potential hazard has been scoped into the assessment. The Offshore Development will not add any further UXO to the area. It should be noted that impacts regarding noise from this hazard have been further assessed within **Volume ER.A.3, Chapter 11 Marine Mammals**, **Volume ER.A.3, Chapter 10: Fish and Shellfish Ecology** and **Volume ER.A.4, Annex 4.1: Underwater Noise Modelling Report** of this EIAR.	
Fishing Gear/Activities	Construction, operations and maintenance, and decommissioning	Yes	It is possible that the presence of the Offshore Development could result in collision with fishing vessels (due to increased vessel traffic or the presence of infrastructure), snagging and entanglement of fishing gear leading to damage of vessels, equipment and infrastructure. There is also potential for these hazards to lead to personal injury and a delay to operations as well as reputational damage. This hazard has been further assessed within **Volume ER.A.3, Chapter 14: Shipping and Navigation**, **Volume ER.A.3, Chapter 13: Commercial Fisheries** and **Volume ER.A.4, Annex 4.1: Navigational Risk Assessment**. Therefore, this potential hazard has been scoped out of this assessment.	**Out**

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
Marine Simultaneous Operations (SIMOPS)	Construction, operations and maintenance, and decommissioning	Yes	The potential for other marine activities to be occurring within the area will be considered as this could lead to possible collision, delays in operation, damage to vessels and equipment, and reputation. Due to the increase in ScotWind and Innovation and Targeted Oil & Gas (INTOG) projects and the nature of the area that the Salamander Project is located within (i.e. within oil and gas shipping routes), the potential for SIMOPS is more likely. There is potential for interactions other marine energy projects including offshore wind farms and subsea cables. The presence of known vessels has been assessed within **Volume ER.A.3, Chapter 14: Shipping and Navigation** and **Volume ER.A.4, Annex 14.1: Navigational Risk Assessment**, however the presence of unknown vessels poses a risk to the Offshore Development and the use of Salamander vessels at all phases of the Salamander Project and therefore this potential hazard has been scoped into this assessment.	**In**
Interference/contact with subsea assets during offshore operations	Construction, operations and maintenance, and decommissioning	Yes	While carrying out offshore operations (e.g. surveys, monitoring activities, repairs) there is potential for interference/contact with subsea assets and shallow gas by carrying out works at the wrong positions. This could lead to equipment damage or delays in operation. In particular, the Fulmar to Saint Fergus pipeline that connects to St Fergus Gas Terminal intersects the Offshore ECC. Accidental damage to the pipeline could result in a leak to the surface. Therefore, this hazard is scoped into the assessment.	**In**
Equipment accidents during offshore operations	Construction, operations and maintenance, and decommissioning	Yes	While carrying out offshore operations there is potential for equipment to be dropped on subsea assets and for uncontrolled pay out of equipment. Similar to above, this could damage the equipment and cause delays in operation. The Fulmar to saint Fergus pipeline is also at risk from this hazard during operations within the Offshore ECC. Therefore, this hazard is scoped into the assessment.	**In**

Potential Hazard	Project Phase*	Pathway Identified	Justification and Credible Worst-Case Outcome of Potential Hazard	Scoped In/Out of the Risk Assessment
Launch and Recovery of equipment	Construction, operations and maintenance, and decommissioning	Yes	Throughout all phases of the Salamander Project, operations will be required that involve the Launch and recovery of equipment. There is potential for personal injury, damage of equipment, delay in operations and/or damage to third party assets should there be any problems during these activities. The potential level of damage and injury that could occur would result in a major accident, therefore this potential hazard has been scoped in.	**In**

21.7.2 Existing Environmental Baseline

21.7.2.1 Some hazards have been scoped out as they have been considered in other chapters of this EIAR. The existing environmental baselines for those hazards scoped out of this assessment have been defined and impacts assessed within the following chapters of this EIAR:

- **Volume ER.A.3, Chapter 8: Water and Sediment Quality;**
- **Volume ER.A.3, Chapter 9: Benthic and Intertidal Ecology;**
- **Volume ER.A.3, Chapter 10: Fish and Shellfish Ecology;**
- **Volume ER.A.3, Chapter 11: Marine Mammals;**
- **Volume ER.A.3, Chapter 12: Offshore and Intertidal Ornithology;**
- **Volume ER.A.3, Chapter 13: Commercial Fisheries;**
- **Volume ER.A.3, Chapter 14: Shipping and Navigation;**
- **Volume ER.A.3, Chapter 15: Aviation and Radar;**
- **Volume ER.A.3, Chapter 18: Other Users of the Marine Environment;** and
- **Volume ER.A.3, Chapter 20: Climate Change and Carbon**.

21.7.3 Future Baseline

21.7.3.1 Based on the climate change projection scenario for the Salamander Project as explained in **Volume ER.A.3, Chapter 20: Climate Change and Carbon,** the baseline environment for the Major Accidents and Disasters assessment is expected to change throughout the Salamander Project's lifecycle. Climate change is expected to alter precipitation patterns and temperatures, bring about more frequent extreme weather events and result in a rise in sea levels. These factors will influence the Major Accidents and Disasters future baseline. The full impacts of climate change are assessed in **Volume ER.A.3, Chapter 20: Climate Change and Carbon** of this EIAR.

21.7.3.2 The future baseline for the Salamander Project will also include multiple other ScotWind projects which will lead to an increase in vessel activity associated with their construction, and operation and maintenance activities. This has been considered within **Volume ER.A.3, Chapter 14: Shipping and Navigation** and **Volume ER.A.4, Annex 14.1: Navigational Risk Assessment**.

21.7.3.3 Throughout the Salamander Project's duration, it is probable that technology will progress. This could lead to increased safety and environmental protection, or it may introduce new risks through the adoption of unknown technology. The introduction of any new technologies to the Salamander Project will incorporate the appropriate risk assessment.

21.7.4 Summary of Baseline

21.7.4.1 Some hazards have been scoped out as they have been considered in other chapters of this EIAR. The relevant environmental baselines for these hazards are defined within the chapters listed in **Section 21.7.2**.

21.7.4.2 The baseline hazards that are used to inform the Major Accidents and Disasters assessment are defined using publicly available sources and the Salamander Project specific risk assessment. The key hazards that are relevant to the Offshore Development are carried into this Major Accidents and Disasters risk assessment and summarised in **Table 21-11**.

21.7.4.3 Both the environmental baseline and hazard baseline relevant to Major Accidents and Disasters have potential to change in the future and may introduce new risks to the Salamander Project.

21.8 Limitations and Assumptions

21.8.1.1 The potential impacts of the clearance of UXOs are discussed within this EIAR for completeness. However, as it is not possible at this time to precisely define the number of UXO which may require detonation, a separate Marine Licence application and EPS Licence application (with associated environmental assessments) will be submitted for the detonation of any UXO which may be identified as requiring clearance in pre-construction surveys.

21.8.1.2 At this stage of the EIA process, a specific construction methodology risk assessment is not available and will only be developed following detailed design post consent. Therefore, there may be future construction related hazards not considered within this assessment, however these will be included within the relevant construction risk assessments at the time and will be fully assessed and mitigated where possible.

21.8.1.3 There are no other limitations that have been identified for the Major Accidents and Disasters assessment. Assumptions have been made that other offshore infrastructure has adequate procedures and management in place to reduce overall risk, and that other mariners would not be nearby to the Offshore Development during a storm event in the interest of their own personnel and vessel safety.

21.8.2 Embedded Mitigation

21.8.2.1 The embedded mitigation relevant to the Major Accidents and Disasters assessment are presented in **Table 21-5**; these have been committed to by the Salamander Project within **Volume ER.A.4, Annex 6.1: Commitments and Mitigations Register.**

Table 21-5 Embedded Mitigation for the Major Accidents and Disasters assessment

Impact and Effect	Mitigation ID	Mitigation	Project Aspect	Project Phase
Primary				
Major industrial accidents, system failure and marine SIMOPS	Co32	Minimum spacing of one kilometre between each Wind Turbine Generator (WTG), measured from the centre of each WTG tower.	OAA	Construction, Operation and Maintenance and Decommissioning
Tertiary				
Major industrial accidents, major fires and offshore operations	Co9	Construction Environmental Management Plan (CEMP) will be developed and will include details of: - A marine pollution contingency plan (MPCP) to address the risks, methods and procedures to protect the Offshore Development Area from potential polluting events associated with the Salamander Project;	Offshore ECC and OAA	Construction

Impact and Effect	Mitigation ID	Mitigation	Project Aspect	Project Phase
		- A chemical risk review to include information regarding how and when chemicals are to be used, stored and transported in accordance with recognised best practice guidance; - A biosecurity plan (offshore) detailing how the risk of introduction and spread of invasive non-native species will be minimised; - Waste management and disposal arrangements; and - Protocol for management of Dropped Objects.		
Marine SIMOPS	Co30	A Cable Plan will be produced prior to construction of the Offshore Export Cable(s) which will include; details of cable depth of lowering; a detailed cable laying plan which ensures safe navigation is not compromised; details of cable protection for each cable crossing; and proposals for monitoring of offshore cable.	Offshore ECC	Construction, Operation and Maintenance and Decommissioning
Major industrial accidents, system failure and major fires	Co31	An Emergency Response Cooperation Plan (ERCoP) will be developed through consultation with the Maritime Coastguard Agency (MCA) which will encompass appropriate risk assessments and designated evacuation plans for site personnel in the unlikely event of a fire breaking out on board vessels supporting the Offshore Development.	Offshore ECC and OAA	construction, Operation and Maintenance and Decommissioning
All hazards within the impact assessment (**Section 21.11**)	Co47	Safe systems of work processes will be complied with including monitoring weather forecasts for suitability.	Offshore ECC and OAA	Construction, Operation and Maintenance and Decommissioning
All hazards within the impact assessment (**Section 21.11**)	Co11	A Vessel Management Plan (VMP) will be developed and include details of: - Vessel routing to and from construction sites and ports; - Vessel notifications including Notice to Mariners and Kingfisher Bulletin; and	Offshore ECC and OAA	Construction, Operation and Maintenance and Decommissioning

Impact and Effect	Mitigation ID	Mitigation	Project Aspect	Project Phase
		- Code of conduct for vessel operators including for the purpose of reducing disturbance and collision with marine fauna.		
Major industrial accidents, system failure and major fires	Co10	Operational Environmental Management Plan (OEMP) will be developed and will include details of: - A MPCP to address the risks, methods and procedures to protect the Offshore Development Area from potential polluting events associated with the Salamander Project; and - Waste management and protection of the marine environment.	Offshore ECC and OAA	Operation and Maintenance
Major industrial accident	Co28	A Decommissioning Programme will be developed and adhered to for the decommissioning phase of the Salamander Project, however the plan will be further developed and updated to reflect best practice at the time of decommissioning.	Offshore ECC and OAA	Decommissioning
Major fires, UXO presence, marine SIMOPS, geotechnical operations and sampling locations interacting with subsea assets, and launch and recovery of equipment	Co18	All vessels will comply with relevant best practice navigational safety guidance from the International Regulations for the Prevention of Collisions at Sea (COLREGs) and the International Regulations for the Safety of Life at Sea (SOLAS).	Offshore ECC and OAA	Construction, Operation and Maintenance and Decommissioning
Major industrial accident, system failure, major fires, marine SIMOPS, and launch and recovery of equipment	Co3	All Project vessels will follow the requirements set out in The International Convention for the Prevention of Pollution from Ships (MARPOL).	Offshore ECC and OAA	Construction, Operation and Maintenance and Decommissioning
Major industrial accident, system failure, major fires, UXO presence, and marine SIMOPS	Co46	Advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notifications to Mariners and Kingfisher.	Offshore ECC and OAA	Construction, Operation and Maintenance and Decommissioning

Impact and Effect	Mitigation ID	Mitigation	Project Aspect	Project Phase
UXO presence, marine SIMOPS and launch and recovery of survey equipment	Co19	Development and adherence to a Fisheries Management and Mitigation Strategy (FMMS) e.g. appointment of Fisheries Liaison Officer (FLO) and Fisheries Industry Representative (FIR), implementation of gear claim procedures and use of Guard vessels where required.	Offshore ECC and OAA	Construction, Operation and Maintenance and Decommissioning
Mooring Lines Breaking	Co55	During Construction the mooring system and attachment points will undergo Third-Party Verification (TPV) to ensure that the mooring system meets the required standards.	OAA	Construction
Mooring Lines Breaking	Co56	Continuous monitoring of each WTG through GPS or similar technology will be carried out in line with MCA and HSE guidance 'Regulatory expectations on moorings for floating wind and marine devices' (HSE and MCA, 2017). Each WTG will have an alarm system that alerts the Applicant when the floating substructure moves out of a pre-defined area.	OAA	Operation and Maintenance

21.9 Project Design Envelope Parameters

21.9.1.1 The entire Offshore Development is relevant to the Major Accidents and Disasters assessment and full details of the parameters are presented in **Volume ER.A.2, Chapter 4: Project Description** of this EIAR.

21.10 Assessment Methodology

21.10.1.1 **Volume ER.A.2, Chapter 6: EIA Methodology** of this EIAR sets out the general approach to the assessment of potential significant effects that may arise from the Salamander Project.

21.10.1.2 Whilst **Volume ER.A.2, Chapter 6: EIA Methodology** of this EIAR provides a general framework for identifying impacts and assessing the significance of their effects, in practice the approach and criteria applied across different topics varies.

21.10.1.3 The objective of the Major Accidents and Disasters assessment is to demonstrate that all potential hazards associated with the Salamander Project have been considered and that the safety and environmental risks will be adequately managed in future phases.

21.10.1.4 The Major Accidents and Disasters assessment identifies the credible worst-case consequence of each potential hazard on human health and the environment based on its potential severity and duration of harm. However, all major accidents and disasters related hazards have potential to result in some form of serious damage and therefore this assessment considers the likelihood of a significant hazard occurring. Hazards with a high probability of occurring, and which are high-consequence events, are deemed high risk and unacceptable for any development; therefore, they are designed out (e.g. infrastructure that fails to comply with design codes, resulting in a major failure). Such high-risk scenarios fall outside the scope of this assessment. Conversely, events with low impact are not considered major accidents or disasters and are also

excluded from the assessment's scope. Consequently, this assessment will primarily focus on events with a low likelihood of occurrence but with the potential for significant consequences, as outlined in **Table 21-4**.

21.10.1.5 There is no standard EIA assessment methodology to assess Major Accidents and Disasters, however IEMA published guidance providing a risk-based approach is considered best practice (IEMA (2020) Guidance: Major Accidents and Disasters in EIA: A Primer). The proposed approach to the Major Accidents and Disasters assessment that has been addressed in the EIA is outlined below.

21.10.1.6 The risk assessment has been undertaken on the hazards which have been scoped in for assessment, as detailed in **Table 21-4** above. The following steps are used to determine the significance of the risks identified:

- Step 1 – Hazard identification – Identify sources, pathways and receptors e.g. the worst-case relevant hazards that form the baseline in **Section 21.7**;
- Step 2 – Develop 'credible worst-case' outcome from the hazards and confirm which will be scoped into the risk assessment (see **Table 21-4**);
- Step 3 – Evaluate and define potential impacts that may occur from risks based on likelihood and consequence with embedded mitigations in place;
- Step 4 – If risk is deemed significant in EIA terms, identify additional mitigation measures; and
- Step 5 – Confirm if residual significance of risk is left and assign a significance in EIA terms. If risk is still deemed significant, then more detailed assessment of residual risk is required in order to eliminate or reduce risk to acceptable levels.

21.10.2 Assessment Criteria

21.10.2.1 To determine if potential adverse effects are 'significant', the IEMA guidance (IEMA, 2020) has been followed and the following factors are considered:

- The geographic extent of the effects: effects beyond the Salamander Project boundaries are more likely to be considered significant;
- The duration of the effects: effects which are permanent (i.e. irreversible) or long lasting are considered significant;
- The severity of the effects in terms of number, degree of harm to those affected and the response effort required: effects which trigger the mobilisation of substantial civil emergency response effort are likely to be considered significant;
- The sensitivity of the identified receptors: if a receptor has low tolerance, adaptability or ability to recover the effect is likely to be considered significant; and
- The effort required to restore the affected environment: effects requiring substantial clean-up or restoration efforts are likely to be considered significant.

21.10.2.2 This assessment has used a risk matrix adapted from an energy institute publication 'HSE 004 Risk Assessment Matrix: Bringing it to Life' (Heart and Minds, 2016) as presented in **Table 21-8** to rank the likelihood and consequences. It should be noted that this adaptation has been informed by professional opinion.

21.10.2.3 The likelihood of the potential hazard occurring is determined by the likelihood of the cause considering the source-pathway-receptor linkage and **Table 21-6** defines the likelihood levels. The severity of the

consequence of a potential hazard is determined by the reasonably foreseeable worst-case environmental and safety effects of the event, the consequence levels are defined in **Table 21-7**.

Table 21-6 Likelihood of Risk

Likelihood	Frequency
5 – Frequent	Yearly
4 – Likely	One per one to ten years
3 – Possible	One per ten to 100 years
2 – Unlikely	One per 100 to 10,000 years
1 – very unlikely	Less than one occurrence per 10,000 years

Table 21-7 Consequence of Risk

Consequence	Description		
	People	*Environment*	*Offshore Development and other material assets*
5 – Extreme	More than three fatalities	Massive widespread impact with irreversible harm	Massive damage with total loss of Offshore Development or asset
4 – Major	Life-changing injury or up to three fatalities	Major impact requiring substantial clean-up or restoration efforts	Major damage
3 – Moderate	Major injury or health effect	Moderate impact to local area and reversible harm	Moderate damage
2 – Minor	Minor injury or health effect	Minor impact to small area	Minor damage
1 – Slight	Slight injury or health effect	Slight effect with no lasting effect	Slight damage
0 – Negligible	No injury or health effect	No effect	No damage

21.10.2.4 The potential of the risk is determined by the combination of the likelihood (i.e. frequency of occurrence) and severity of consequence. **Table 21-8** presents the significance matrix used to determine the significance of effect based on a risk's likelihood and consequence levels.

Table 21-8 Significance Matrix for Risk Assessment

Significance of Risk		Likelihood				
		1	*2*	*3*	*4*	*5*
Consequence	*0*	Negligible	Negligible	Negligible	Negligible	Negligible
	1	Negligible	Negligible	Minor	Minor	Minor
	2	Negligible	Minor	Minor	Moderate	Moderate
	3	Minor	Minor	Moderate	Moderate	Major
	4	Minor	Moderate	Moderate	Major	Major
	5	Moderate	Moderate	Major	Major	Major

21.10.2.5 **Table 21-9** defines the risk levels (with mitigation measures in place) that will be assigned to the identified potential hazards carried through into this assessment. These definitions have been formed from professional opinion and are aligned with the As Low As Reasonably Practicable (ALARP) principle[1].

Table 21-9 Risk Levels with embedded mitigation measures in place

Risk Level	Definition
Major	Unacceptable (high risk) with embedded mitigation. Additional mitigating measures must be implemented.
Moderate	Tolerable (intermediate risk) with embedded or embedded and additional mitigation measures.
Minor	Broadly acceptable (low risk). Mitigation measures shall be identified based on the ALARP principle.
Negligible	Risks are tolerable and actions are unlikely to be required.

[1] Ensuring the correct design principals are applied to allow hazards to be eliminated where possible and mitigated to a level considered As Low As Reasonably Practicable (ALARP) where elimination is not possible.

21.10.2.6 It should be noted that this assessment does not provide a formal ALARP demonstration and any connection implied between the ALARP regions[2] and the asserted risk levels is purely indicative, due to the early stage of design, but also the adoption of a worst-case approach.

21.10.2.7 An overall risk is considered significant based on the derived risk level from the risk matrix in line with EIA regulations. **Table 21-10** presents the risk categorisation that will be followed in this assessment.

Table 21-10 Risk Categorisation

Risk Level	Tolerance	Significance of Risk	Significance in EIA Terms
Major	Intolerable	Significant	Significant
Moderate	Tolerable with embedded or embedded and additional mitigation	Not significant	Not significant
Minor	Tolerable if ALARP	Not significant	Not significant
Negligible	Broadly Acceptable	Not significant	Not significant

21.10.2.8 Risk Levels of 'Major' that are categorised as 'Intolerable' are considered to have a significant risk to the Salamander Project. Risk levels of 'Moderate', 'Minor' and 'Negligible' that are categorised as 'Tolerable with embedded or embedded and additional mitigation', 'Tolerable if ALARP' and 'Broadly Acceptable' respectively, are not considered to have a significant risk to the Salamander Project.

21.10.3 Assessment Process

Step 1: Identify Sources, Pathways and Receptors

21.10.3.1 Sources are the cause of a potential hazard that may cause harm and those that have potential to cause significant harm were identified. Pathways are the route that allows a source to reach the receptor and a receptor is any physical, biological or anthropogenic element of the environment that may be affected or impacted by the Salamander Project. Receptors can include natural features such as the seabed and wildlife habitats as well as man-made features like fishing vessels and cultural heritage sites. The relevant pathways and receptors were determined.

21.10.3.2 Within this assessment, the following receptors will be considered:

- People i.e. site personnel, local community, mariners, the wider population;
- Environment e.g. biodiversity, climate, air, water, cultural heritage and seascape; and
- Offshore Development and other marine assets and infrastructure e.g. cables, pipelines and vessels.

21.10.3.3 During Step 1, screening was undertaken to assess if any source or pathway could result in a significant hazard and therefore determined whether it would be carried into this Major Accidents and Disasters assessment to be assessed further (**Table 21-4**). Where it was found that there was no potential for a

[2] The ALARP regions refer to risk levels between intolerable major risk level and acceptable negligible risk level.

significant hazard or if the hazard is assessed elsewhere in this EIAR, the assessment was stopped with no risk assessment.

21.10.3.4 Based on the experience of technical safety consultants, the Major Accidents and Disasters hazards were identified by reviewing the data sources outlined in **Table 21-3**.

Step 2: Develop 'credible worst-case' Outcomes

21.10.3.5 The 'credible worst-case' outcomes of the undesirable event were evaluated and recorded.

Step 3: Identify Relevant Mitigation Measures

21.10.3.6 Embedded mitigations which the Salamander Project has committed to were documented for the identified sources and 'credible worst-case' outcomes. Embedded mitigations are shown in **Table 21-5**.

Step 4: Risk Ranking with Embedded Mitigation Considered

21.10.3.7 Risk ranking was carried out considering embedded mitigation. Where risk was deemed significant in EIA terms even with embedded mitigations in place, then additional mitigations would be required.

Step 5: Confirm Residual Significance of Risk

21.10.3.8 Where it was identified that a hazard has residual significant risk to the Salamander Project, further assessment would need to be developed in the subsequent phases of the Salamander Project and these would be documented as recommendations for later phases.

21.11 Risk Assessment

21.11.1 Construction

Major Industrial Accidents

Explosion, Electrical Fault, or Fire at the Offshore Development

21.11.1.1 An explosion or fire, or an electrical fault has the potential to cause a major accident at the Offshore Development. The receptors that may be impacted include people, the Offshore Development and the environment. People and the Offshore Development are the most sensitive receptors to this hazard as site personnel will be working within the Offshore Development Area and other mariners could be nearby out at sea. Furthermore, this hazard could result in the loss of key components of the Offshore Development i.e. damage to a turbine blade. The consequence of this hazard could lead to life-changing injury to people or up to three fatalities, major damage of the Offshore Development and moderate impact with reversible harm to the environment.

21.11.1.2 The Salamander Project has committed to embedded mitigations that have been outlined in **Table 21-5**. It should be noted that the Offshore Development will have fire suppression systems in place and will be compliant with recognised design standards which will reduce the potential for this hazard to occur. Additionally, this hazard is less likely to occur with the correct embedded mitigation measures in place such as having an ERCoP and minimum spacing between WTGs which will reduce the potential for this hazard to cause impacts across the OAA.

21.11.1.3 The potential for a major industrial accident at the Offshore Development is reduced due to the robust procedures in place that will be followed by personnel such as those described in the ERCoP and CEMP and the safety procedures in place including the appropriate storage of lubricants, fuels and cleaning equipment in adherence with regulations and policy design guidance as well as the fire suppression systems which will reduce any impacts by controlling and extinguishing fires in the unlikely event a major accident did occur. For a significant amount of time the Offshore Development will be unmanned which further reduces the likelihood of this hazard impacting people. A VMP will be in place that ensures vessel notifications, including Notice to Mariners and Kingfisher Bulletin, are used, and advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notifications to Mariners and Kingfisher. This will reduce potential for nearby mariners to be impacted by this hazard, therefore, the likelihood of this hazard for people is **1 – Very Unlikely** and **2 – Unlikely** for the Offshore Development and environment.

21.11.1.4 Although the likelihood is low for this hazard, a major industrial accident leading to an explosion, electrical fault or fire at the Offshore Development has potential to result in life-changing injury or up to 3 fatalities of personnel as well as major damage to Offshore Development. The consequence to the environment could result in moderate impact as the damaged parts of the WTG may fall into and pollute the water, however any harm caused would be reversible. A CEMP will include details of a MPCP to address the risks, methods and procedures to protect the Offshore Development Area from potential polluting events associated with the Salamander Project as well as detailing the protocol for management of Dropped Objects. Similarly, all vessels will adhere with MARPOL requirements to ensure that the potential for release of pollutants is minimised. Therefore, the consequence for people and the Offshore Development is **4 – Major** and for the environment, **3 – Moderate**.

21.11.1.5 Overall, when assessing the receptors people and environment, this hazard presents a **Minor** risk level that is 'Tolerable if ALARP' and therefore is deemed to not cause a significant risk. When assessing the receptor

the Offshore Development, this hazard presents a **Moderate** risk level that is 'Tolerable with embedded mitigation' and is therefore deemed **Not Significant** in EIA terms.

Major Fires

Lightning Strike

21.11.1.6 An external source such as a lightning strike may damage the WTG which could lead to a major fire, explosion or fault. This potential hazard could affect receptors such as people, the Offshore Development, and the environment. People and the Offshore Development are more sensitive to this hazard due to the direct impact it could cause, whereas the environment is less sensitive. Although it would be rare for a strike to hit a WTG it is still possible and with more climate change related storms, the likelihood of this may increase. It should be noted that the Offshore Development will have fire suppression systems in place and will be compliant with recognised design standards which will reduce the potential risk from this hazard. The consequence of this hazard could lead to life-changing injury to people or up to three fatalities, major damage of the Offshore Development and moderate impact with reversible harm to the environment.

21.11.1.7 The Salamander Project has committed to embedded mitigation that have been outlined in **Table 21-5**. Adverse impacts as a result of this hazard could be reduced with the correct embedded mitigation measures in place such as having an ERCoP and ensuring all vessels follow best practice guidance from SOLAS to anticipate adverse weather which will reduce the potential risk of this hazard.

21.11.1.8 The overall design of the WTG will take into consideration lightning and surge protection such as grounding or earthing, this will minimise the impact of any lightning strike and all internationally recognised design standards will be complied with. A CEMP will be developed and will include details of a chemical risk review to include information regarding how and when chemicals are to be used, stored and transported in accordance with recognised best practice guidance, this will help to reduce the impacts from a lightning strike should a major fire or explosion occur. All vessels will comply with SOLAS following the best practice safety of navigation guidance and they will avoid dangerous situations relating to adverse weather. As site personnel will be complying with safe systems of work processes including monitoring weather forecasts for suitability, it is expected that people will be at a reduced risk from this hazard due to their lack of presence at the Offshore Development during a storm. A VMP will be in place that ensures vessel notifications, including Notice to Mariners and Kingfisher Bulletin, are used, and advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notifications to Mariners and Kingfisher. This will reduce potential for nearby mariners to be impacted by any major fire that might occur due to a lightning strike and for adverse weather to be highlighted early to allow personnel/mariners to come to shore or move away from the OAA. Therefore, the likelihood of this hazard occurring and impacting the environment and Offshore Development with mitigation in place is **2 – Unlikely** and for people **1 – Very Unlikely**.

21.11.1.9 Although, the likelihood of this hazard is low, impacts from a lightning strike on the WTG that has overcome the embedded mitigations in place would have potential to result in life-changing injury to people or up three fatalities of personnel as well as major damage to the Offshore Development. The consequence to the environment would be moderate as the damaged parts of the WTG may fall into and pollute the water, however any harm caused would be reversible. A CEMP will include details of a MPCP to address the risks, methods and procedures to protect the Offshore Development Area from potential polluting events associated with the Salamander Project as well as detailing the protocol for management of Dropped Objects. Similarly, all vessels will adhere with MARPOL requirements to ensure that the potential for release

of pollutants is minimised. Therefore, the consequence for people and the Offshore Development is **4 – Major**. The consequence to the environment is **3 – Moderate**.

21.11.1.10 Overall, when assessing the receptors people and the environment, this hazard presents a **Minor** risk level that is 'Tolerable if ALARP' and therefore is deemed **Not Significant** in EIA terms. When assessing the Offshore Development, this hazard presents a **Moderate** risk level that is 'Tolerable with embedded mitigation'.

Unexploded Ordnance Presence

21.11.1.11 The potential impacts of the clearance of UXOs are discussed within this EIAR for completeness. However, as it is not possible at this time to precisely define the number of UXO which may require detonation, a separate Marine Licence application and EPS Licence application (with associated environmental assessments) will be submitted for the detonation of any UXO which may be identified as requiring clearance in pre-construction surveys.

Accidental Unexploded Ordnance Detonation

21.11.1.12 Prior to any construction works a geophysical survey will be undertaken which will inform the Salamander Project of any UXO presence. However, there is a possibility that in the process of UXO removal, accidental detonation may occur impacting the receptors people, the Offshore Development and the environment. This hazard could result in more than three fatalities, massive damage to survey equipment and vessel(s) and major impact to the environment requiring substantial clean-up or restoration efforts.

21.11.1.13 The Salamander Project has committed to embedded mitigations that have been outlined in **Table 21-5**.

21.11.1.14 During the pre-construction surveys, protocol will be followed in the event that UXO is discovered including micro siting or possible deflagration. The likelihood of this hazard occurring and impacting receptors can be greatly reduced with embedded mitigation measures in place. For example, advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notifications to Mariners and Kingfisher. Similarly, a VMP will be developed which further ensures the safety of site personnel and nearby mariners. In line with the Fisheries Management and Mitigation Strategy (FMMS) that will be developed, a Fisheries Liaison Officer (FLO) will be appointed to communicate with mariners, and guard vessels will be used where required. Furthermore, all vessels will comply with relevant best practice navigational safety guidance from COLREGs and SOLAS. Alongside these embedded mitigation measures, standard procedures will be followed including the monitoring of survey equipment at all times and there will be access to geophysical and magnetometer data onboard throughout the survey. With this in consideration the likelihood of this hazard is **1 – Very Unlikely** for all receptors.

21.11.1.15 Although the likelihood is low for this hazard, the accidental detonation of UXO would have extreme consequence for people and the Offshore Development that could result in more than three fatalities and massive damage with a total loss of vessel and survey equipment. The consequence on the environment would result in major damage with irreversible effects. It should be noted that the level of impact would be determined by the specific UXO properties however these consequence levels are based on a worst-case scenario. Therefore, the consequence for people and the Offshore Development is **5 – Extreme** and **4 – Major** for the environment.

21.11.1.16 Overall, this hazard presents a **Moderate** risk level for people and the Offshore Development which is 'Tolerable with embedded mitigation'. When assessing the environment as a receptor this hazard is a **Minor** risk and is 'Tolerable if ALARP' and therefore does cause a significant risk.

Marine Simultaneous Operations

Increase in Vessels

21.11.1.17 An increase in marine SIMOPS will increase vessel presence in the area, and therefore the potential for collisions of Salamander Project vessels. The receptor that is vulnerable to this hazard is the Offshore Development and components such as vessels and equipment. Vessels will be present throughout all phases of the Salamander Project but the number of vessels present will be higher during the construction and decommissioning phases. This hazard could result in massive damage to the vessel and/or survey equipment with the potential loss of assets.

21.11.1.18 The Salamander Project has committed to embedded mitigations that have been outlined in **Table 21-5**.

21.11.1.19 There is expected to be more vessel presence with the Salamander Project vessels and due to an increase in offshore wind projects and other marine operations nearby. It should be noted that appropriate analysis has been undertaken within **Volume ER.A.4, Annex 14.1 Navigational Risk Assessment** to predict the number and type of vessels that we expect to see within the Offshore Development Area. Embedded mitigation measures will greatly reduce the risk of this hazard. These include a VMP that will be developed and include details of vessel routing and vessel notifications, associated Safety Zones and advisory passing distances. Details will be given via Notice to Mariners and Kingfisher Bulletin, as well as advance warning and accurate location details of construction, maintenance and decommissioning operations. These mitigation measures ensure mariners are aware of the Salamander Project and associated vessels. Furthermore, all vessels will comply with relevant best practice navigational safety guidance from COLREGs and SOLAS. With this embedded mitigation in place the likelihood of this hazard is reduced to **2 – Unlikely**.

21.11.1.20 The consequence of this hazard is also reduced with the embedded mitigation as described above in place. Through the VMP, and importantly notifications of Salamander Project vessel activity and liaison with other marine operators, it is expected that in order to reduce the risk of costly damage, high value vessel activity will not be arranged to occur simultaneously between marine operators. Therefore, should the unfortunate event of a collision occur, it is expected that the damage would be reduced and minimised. Therefore, the consequence for the Offshore development for this hazard is **3 – Moderate**.

21.11.1.21 Overall, this hazard presents a **Minor** risk level for the Offshore Development that is 'Tolerable if ALARP' and therefore is deemed **Not Significant** in EIA terms.

Offshore Operations

Subsea Assets

21.11.1.22 During offshore operations including surveys, monitoring works, or repairs, two potential hazards have been considered regarding subsea assets, this includes the potential for interference/contact with subsea assets or shallow gas by carrying out works at the wrong locations as well as dropping equipment on subsea assets or uncontrolled pay out of equipment. All these undesired events could lead to impacts on the Offshore Development and other marine assets and infrastructure through damage to vessels and equipment, as well as potential damage to the Fulmar to Saint Fergus pipeline that intersects the Offshore ECC. This hazard could result in moderate damage to the subsea assets and the vessel and/or equipment.

21.11.1.23 The Salamander Project has committed to embedded mitigation that have been outlined in **Table 21-5.**

21.11.1.24 To reduce the likelihood of interference/contact with subsea assets or shallow gas by carrying out works at the wrong locations, dropping equipment on subsea assets or uncontrolled pay out of equipment embedded mitigation will be in place. For example, a VMP will be developed, and all vessels will comply with relevant

best practice navigational safety guidance from COLREGs and SOLAS. Alongside the mitigation measures, standard practices will be carried out by appropriately trained and qualified site personnel such as ensuring that the vessel and equipment is in good working order. Operation locations will be pre-defined before the works commence and all equipment will be secured when not being used. Therefore, the likelihood of these hazards occurring is **2 – Unlikely**.

21.11.1.25 The level of damage to vessels, equipment or pipeline may vary depending on the properties of the subsea asset that is involved. However, a worst-case credible outcome will have a consequence of **3** causing **Moderate** damage to the Offshore Development or other material assets.

21.11.1.26 Overall, this hazard presents a **Minor** risk level that is 'Tolerable if ALARP' and therefore is deemed **Not Significant** in EIA terms.

Launch and Recovery of Equipment

Hazardous Works during Offshore Operations

21.11.1.27 The launch and recovery of equipment exposes site personnel to hazardous situations on deck while operating and manoeuvring equipment. During the launch and recovery of equipment there is also a higher risk of damaging the equipment and vessel. The vessel is at an increased risk of collision causing damage to third-party assets during launch and recovery due to the reduced manoeuvrability of the vessel, posing a potential risk to other mariners as well as the personnel on board. For this hazard the key receptors are people and the Offshore Development and other material assets and infrastructure. This hazard could result in major injury or health effect to personnel and moderate damage to equipment or other material assets.

21.11.1.28 The Salamander Project has committed to embedded mitigation that have been outlined in **Table 21-5,** therefore the assessment of this hazard with mitigation in place is shown below.

21.11.1.29 The launch and recovery of equipment is a hazardous activity as it results in reduced manoeuvrability, site personnel working on an open deck and potential damage to equipment that may arise during works. The likelihood of collision with third-party assets, damage to equipment and injury to people during launch and recovery of survey equipment can be reduced with embedded mitigations in place. In particular a VMP will be developed, and all vessels will comply with relevant best practice navigational safety guidance from COLREGs and SOLAS. Similarly, advance warning and accurate location details of construction, maintenance and decommissioning operations, associated Safety Zones and advisory passing distances will be given via Notifications to Mariners and Kingfisher. In addition to the embedded mitigation measures, standard procedures will be followed including only having trained key personnel on deck to carry out the launch and recovery of equipment. Site personnel will use a harness reel when the deck is open and appropriate life vests will be worn. Therefore, the likelihood of this hazard occurring is **2 – Unlikely**.

21.11.1.30 There is potential for major injury or health effect to people and moderate damage to equipment and vessel during launch and recovery of equipment. Therefore, the consequence for this hazard is **3 – Moderate**.

21.11.1.31 Overall, this hazard presents a **Minor** risk level for both people and the Offshore Development that is 'Tolerable if ALARP' and therefore is deemed **Not Significant** in EIA terms.

21.11.2 Operation and Maintenance

Major Industrial Accidents

Explosion, Electrical Fault, or Fire at Offshore Development

21.11.2.1 This hazard, receptors and risk assessment outcome is the same as described in **Section 21.11.1**. Embedded Mitigation that will be implemented specific to the operation and maintenance phase includes the development of an OEMP that will include details of a MPCP to address the risks, methods and procedures to protect the Offshore Development Area from potential polluting events associated with the Salamander Project.

System Failure

Explosion, Electrical Fault, or Fire

21.11.2.2 A system failure during the operational and maintenance phases such as an electrical failure leading to an explosion and/or fire may lead to a major accident and/or disaster. The main receptors are people, environment and the Offshore Development. This hazard could lead to the loss of key components of the Offshore Development that can cause damage to the WTG and there is potential for the loss of a blade that may pollute the environment. People present at the Offshore Development during operation and maintenance are most at risk to this hazard as well as other mariners nearby in the worst-case scenario of a fire or explosion. The consequence of this hazard could lead to life-changing injury to people or up to three fatalities, major damage of the Offshore Development and moderate impact with reversible harm to the environment.

21.11.2.3 The Salamander Project has committed to embedded mitigation that have been outlined in **Table 21-5**.

21.11.2.4 To reduce the likelihood of this hazard occurring several embedded mitigations will be in place. The ERCoP will encompass appropriate risk assessments and outline the procedures to take in the event of a fire to reduce the impact that may be caused. A VMP will be developed which will ensure that vessel notifications, including Notice to Mariners and Kingfisher Bulletin, are implemented. These will include advance warning and accurate location details of maintenance operations, associated Safety Zones and advisory passing distances which will reduce the likelihood of nearby mariners being impacted by this hazard. All vessels will adhere to MARPOL and in the event of a fire/explosion that leads to the loss of a component such as a blade into the environment, pollution will be minimised. As there will be a minimum spacing of one kilometre between the WTGS from the centre of the tower, the potential for fire to spread is reduced. Further to the mitigation measures in place, standard safety practices will be followed, and fire suppression systems will be in place and any potential flammable lubricants, fuels, cleaning equipment will be stored and handled appropriately. Safe systems of work will be followed including the isolation of energy sources during maintenance and the Offshore Development will be designed in line with good engineering practices. With all these appropriate measures taken the likelihood of this hazard occurring for all receptors is **2 – Unlikely**.

21.11.2.5 Although the likelihood is low for this hazard, a system failure during operation and maintenance that leads to an explosion, fire or electrical fault has potential to result in life-changing injury or up to 3 fatalities of people as well as major damage to the Offshore Development. It is possible for this hazard to cause moderate damage to the environment however this will be a localised and reversible impact. Therefore, the consequence for people and the Offshore Development is **4 – Major** and for the environment, **3 – Moderate**.

21.11.2.6 Overall, when assessing the receptors people and the Offshore Development, this hazard presents a **Moderate** risk level that is 'Tolerable with embedded mitigation' and therefore with the embedded mitigation in place it is deemed to not cause a significant risk. When assessing the receptor of the

environment, this hazard presents a **Minor** risk level that is 'Tolerable if ALARP' and therefore is deemed **Not Significant** in EIA terms.

Major Fires

Lightning Strike

21.11.2.7 This hazard, receptors and risk assessment outcome is the same as described in **Section 21.11.1**. Embedded mitigation that will be implemented that is specific to the operation and maintenance phase is the development of an OEMP that will include details of a MPCP to address the risks, methods and procedures to protect the Offshore Development Area from potential polluting events associated with the Salamander Project.

Marine Simultaneous Operations

Increase in Vessels

21.11.2.8 This hazard, receptors and risk assessment outcome are the same as described in **Section 21.11.1**.

Offshore Operations

Subsea Assets

21.11.2.9 This hazard, receptors and risk assessment outcome are the same as described in **Section 21.11.1**.

Launch and Recovery of Equipment

Hazardous Works during Offshore Operations

21.11.2.10 This hazard, receptors and risk assessment outcome are the same as described in **Section 21.11.1**.

Mooring Lines Breaking

Damage to Inter-array Cable(s)

21.11.2.11 If one or more mooring lines were to break, it could lead to potential offsets greater than those in the design of the Offshore Development resulting in damage to the Inter-array Cable(s). During operation and maintenance, the Offshore Development is most at risk of this hazard and the consequence would be moderate damage.

21.11.2.12 The Salamander Project has committed to embedded mitigation that has been outlined in **Table 21-5**.

21.11.2.13 To reduce the likelihood of this hazard occurring the design of the mooring lines will consider the potential of failure of the mooring system and will be constructed to high design standards using best practice procedures. This will include using materials that have high durability and are resistant to wear. During construction the mooring system and attachment points will be under strict management and TPV will be carried out to ensure that the mooring system meets the required standards. The ERCoP will include appropriate risk assessments and as will be outlined in the VMP, Notice to Mariners and Kingfisher Bulletin will be used to share alerts should the Inter-array Cable(s) become damaged and/or the floating substructure moves due to broken mooring lines, creating a danger to other material assets. In line with MCA and HSE guidance 'Regulatory expectations on moorings for floating wind and marine devices' (HSE and MCA, 2017), continuous monitoring of each WTG through GPS or similar technology will be carried out ensuring that the WTG can be tracked via AIS should the mooring system fail. Similarly, an alarm system for each WTG will also be in place to ensure that if any floating substructure moves out of a predefined area the Applicant will be aware, the structure can be tracked, and emergency procedures can be carried out. This will help to reduce the potential for Inter-array Cable(s) to become damaged in the event that the mooring lines break and the

floating substructures move because the alarm will allow the Applicant to take action. With all these appropriate measures taken the likelihood of this hazard occurring for all receptors is **2 – Unlikely.**

21.11.2.14 Although the likelihood of this hazard is low with the embedded mitigations in place, the consequence could be major damage to the Offshore Development should the systems and procedures in place be overcome. Therefore, the consequence assigned is **4 – Major**.

21.11.2.15 Overall, when assessing the receptor the Offshore Development, this hazard presents a **Moderate** risk level that is 'Tolerable with embedded mitigation' and therefore with the embedded mitigation in place it is deemed as **Not Significant** in EIA terms.

21.11.3 Decommissioning

Major Industrial Accidents

Explosion, Electrical Fault, or Fire at Offshore Development

21.11.3.1 This hazard, receptors and risk assessment outcome is the same as described in **Section 21.11.1**. Mitigation will be implemented where relevant at the decommissioning phase. Prior to decommissioning, a final Decommissioning Programme will be developed for approval including where relevant, best practice methodologies and guidance available at the time.

Marine Simultaneous Operations

Increase in Vessels

21.11.3.2 This hazard, receptors and risk assessment outcome is the same as described in **Section 21.11.1**.

Unexploded Ordnance Presence

Accidental Unexploded Ordnance detonation

21.11.3.3 This hazard, receptors and risk assessment outcome is the same as described in **Section 21.11.1**.

Offshore Operations

Subsea Assets

21.11.3.4 This hazard, receptors and risk assessment outcome are the same as described in **Section 21.11.1**.

Launch and Recovery of Equipment

Hazardous Works during Offshore Operations

21.11.3.5 This hazard, receptors and risk assessment outcome are the same as described in **Section 21.11.1**.

21.11.4 Summary of Risk Assessment

21.11.4.1 A summary of the impacts and effects identified for the Major Accidents and Disasters assessment is outlined in **Table 21-11**.

21.11.4.2 **Table 21-11** presents the assessment of hazards with embedded mitigation measures considered and confirms any residual significance of risk.

Table 21-11 Summary of Impacts and Effects for Major Accidents and Disasters

Group Risk Event	Source and/or pathway(s)	Receptor	Reasonable worst consequence if event did occur	Embedded Mitigation	Risk Ranking *			Additional Mitigation	Risk Ranking After Additional Mitigation			Residual Significance of Risk	Significance of Effect in EIA Terms
					L	*C*	*S*		*L*	*C*	*S*		
Construction, Operation, Maintenance and Decommissioning - Major Industrial Accidents	Explosion, electrical malfunction, or fire at the Offshore Development	People including site personnel and mariners at sea	Any explosion, electrical malfunction or fire at the Offshore Development could lead to injury or death of personnel on site or nearby mariners at sea	Co31, Co11, Co9, Co28, Co32, Co47 and Co46	1	4		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	1	4		Minor	Not Significant
	Explosion, electrical malfunction, or fire at the Offshore Development	Environment	Any explosion, electrical malfunction or fire at the Offshore Development could result in the loss of components into the sea which could lead to the environment being polluted and	Co9, Co10, Co47 and Co3	2	3		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	2	3		Minor	Not Significant

Group Risk Event	Source and/or pathway(s)	Receptor	Reasonable worst consequence if event did occur	Embedded Mitigation	Risk Ranking *			Additional Mitigation	Risk Ranking After Additional Mitigation			Residual Significance of Risk	Significance of Effect in EIA Terms
					L	*C*	*S*		*L*	*C*	*S*		
			biodiversity being impacted										
	Explosion, electrical malfunction, or fire at the Offshore Development	Offshore Development components	Any explosion, electrical malfunction or fire at the Offshore Development could result in damage leading to the loss of components such as a turbine blade stopping all operations.	Co31, Co9, Co28, Co47 and Co32	2	4		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	2	4		Moderate	Not Significant
Operation and Maintenance - System Failure	A system failure leading to an electrical fault, explosion or fire	People including site personnel and mariners at sea	If there is a system failure that results in an electrical failure, explosion or fire this could directly result in injury or death of site personnel working on the Offshore Development as well as cause damage to	Co31, Co10, Co32, Co11, Co46, Co47 and Co3	2	4		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	2	4		Moderate	Not Significant

Group Risk Event	Source and/or pathway(s)	Receptor	Reasonable worst consequence if event did occur	Embedded Mitigation	Risk Ranking *			Additional Mitigation	Risk Ranking After Additional Mitigation			Residual Significance of Risk	Significance of Effect in EIA Terms
					L	*C*	*S*		*L*	*C*	*S*		
			the components that could impact people.										
	A system failure leading to an electrical fault, explosion or fire	Environment	If there is a system failure that results in an electrical failure, explosion or fire could result in the loss of components such as a turbine blade into the marine environment possibly polluting the habitat and impacting the biodiversity	Co10, Co47 and Co3	2	3		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	2	3		Minor	Not Significant
	A system failure leading to an electrical fault, explosion or fire	Offshore Development components	If there is a system failure that results in an electrical failure, explosion or fire, the Offshore Development and other material assets could be damaged, and	Co31, Co10, Co47 and Co32	2	4		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the	2	4		Moderate	Not Significant

Group Risk Event	Source and/or pathway(s)	Receptor	Reasonable worst consequence if event did occur	Embedded Mitigation	Risk Ranking *			Additional Mitigation	Risk Ranking After Additional Mitigation			Residual Significance of Risk	Significance of Effect in EIA Terms
					L	*C*	*S*		*L*	*C*	*S*		
			operations could be stopped temporarily or permanently					effect was **Not Significant.**					
Construction, Operation, and Maintenance - Major Fires	External source i.e. lightning strike on a WTG	People including site personnel and mariners at sea	A lightning strike can damage the WTG resulting in an electrical failure or explosion leading to a major fire, this could directly cause injury and/or death of site personnel and mariners nearby.	Co9, Co31, Co11, Co46, Co47 and Co18	1	4		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	1	4		Minor	Not Significant
	External source i.e. lightning strike on a WTG	Environment	A lightning strike can damage the WTG resulting in an electrical failure or explosion resulting in the loss of components such as a turbine blade into the	Co9, Co10, Co47 and Co3	2	3		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the	2	3		Minor	Not Significant

Group Risk Event	Source and/or pathway(s)	Receptor	Reasonable worst consequence if event did occur	Embedded Mitigation	Risk Ranking *			Additional Mitigation	Risk Ranking After Additional Mitigation			Residual Significance of Risk	Significance of Effect in EIA Terms
					L	*C*	*S*		*L*	*C*	*S*		
			marine environment possibly polluting the habitat and impacting the biodiversity					effect was **Not Significant.**					
	External source i.e. lightning strike on a WTG	Offshore Development components	A lightning strike can damage the Offshore Development components resulting in an electrical failure or explosion directly damaging the components and/or nearby other material assets. This would lead to operations could be stopped temporarily or permanently	Co9, Co47 and Co31	2	4		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	2	4		Moderate	Not Significant
Construction and decommissioning - UXO Presence	Accidental Detonation	People including site personnel	Accidental detonation of UXO could result in injury of site personnel	Co11, Co18, Co46, Co47 and Co19	1	5		No additional mitigation measures have been identified for this effect above and beyond the	1	5		Moderate	Not Significant

Group Risk Event	Source and/or pathway(s)	Receptor	Reasonable worst consequence if event did occur	Embedded Mitigation	Risk Ranking *			Additional Mitigation	Risk Ranking After Additional Mitigation			Residual Significance of Risk	Significance of Effect in EIA Terms
					L	*C*	*S*		*L*	*C*	*S*		
		and mariners at sea	or other mariners nearby.					embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**					
	Accidental Detonation	Environment	Accidental detonation of UXO could lead to damage of the seabed and harm to nearby marine animals	Co11, Co18, Co46, Co47 and Co19	1	4		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	1	4		Minor	Not Significant
	Accidental Detonation	Offshore Development components	Accidental detonation of UXO could lead to damage of survey equipment and vessel	Co11, Co18, Co46, Co47 and Co19	1	5		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the	1	5		Moderate	Not Significant

Group Risk Event	Source and/or pathway(s)	Receptor	Reasonable worst consequence if event did occur	Embedded Mitigation	Risk Ranking *			Additional Mitigation	Risk Ranking After Additional Mitigation			Residual Significance of Risk	Significance of Effect in EIA Terms
					L	*C*	*S*		*L*	*C*	*S*		
								effect was **Not Significant.**					
Construction, Operation and Maintenance, Decommissioning - Marine SIMOPS	An increased potential for collision of Salamander Project vessels	Offshore Development component	Damage to vessels and equipment and delays in construction activities.	Co30, Co32, Co18, Co3, Co11, Co46, Co47 and Co19	2	3		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	2	3		Minor	Not Significant
Construction, Operation and Maintenance, Decommissioning - Interference/ contact with subsea assets during offshore operations	carrying out works at the wrong locations leading to interference/cont act with subsea assets and shallow gas	Offshore Development and other marine assets and infrastructure	Any interference/contact with subsea assets during offshore operations has potential to cause equipment damage, delays in operation and damage to charted pipelines	Co11, Co18, Co47 and Co19	2	3		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	2	3		Minor	Not Significant

Group Risk Event	Source and/or pathway(s)	Receptor	Reasonable worst consequence if event did occur	Embedded Mitigation	Risk Ranking *			Additional Mitigation	Risk Ranking After Additional Mitigation			Residual Significance of Risk	Significance of Effect in EIA Terms
					L	*C*	*S*		*L*	*C*	*S*		
			within the Offshore ECC.										
Construction - Equipment accidents during offshore operations	Dropping equipment on subsea assets and uncontrolled pay out of equipment	Offshore Development and other marine assets and infrastructure	Dropping equipment on subsea assets and uncontrolled pay out of equipment has potential cause equipment damage, delays in operation and damage to charted pipelines within the Offshore ECC.	Co11, Co18, C09, Co47 and Co19	2	3		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	2	3		Minor	Not Significant
Construction, Operation and Maintenance, Decommissioning - Launch and recovery of equipment	Launch and recovery of equipment exposing site personnel to potential dangerous situations and	People including site personnel and mariners at sea	Activities involving the launch and recovery of equipment could lead to accidents resulting in injury to site personnel, man overboard when the deck is open and	Co11, Co18, Co46, Co47 and Co19	2	3		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the	2	3		Minor	Not Significant

Group Risk Event	Source and/or pathway(s)	Receptor	Reasonable worst consequence if event did occur	Embedded Mitigation	Risk Ranking *			Additional Mitigation	Risk Ranking After Additional Mitigation			Residual Significance of Risk	Significance of Effect in EIA Terms
					L	*C*	*S*		*L*	*C*	*S*		
	increased collision risk due to reduced manoeuvrability		reduced manoeuvrability for the vessel increasing collision risk potentially inuring other mariners					effect was **Not Significant.**					
	Mishandling of equipment and increased collision risk due to reduced manoeuvrability during launch and recovery of equipment	Offshore Development components	Activities involving the launch and recovery of survey equipment could lead to damage to equipment, delay in operations and damage to third party assets.	Co11, Co18, Co46, Co19 and Co47	2	3		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it was concluded that the effect was **Not Significant.**	2	3		Minor	Not Significant
Operation and Maintenance – Mooring Lines Breaking	One or more mooring lines breaking damaging the	Offshore Development components	The broken mooring lines leads to an engineering offset that is greater than designed for the Offshore	Co31, Co11, Co47, Co55 and Co56	2	4		No additional mitigation measures have been identified for this effect above and beyond the embedded mitigation listed in **Table 21-5** as it	2	4		Moderate	Not Significant

Group Risk Event	Source and/or pathway(s)	Receptor	Reasonable worst consequence if event did occur	Embedded Mitigation	Risk Ranking *			Additional Mitigation	Risk Ranking After Additional Mitigation			Residual Significance of Risk	Significance of Effect in EIA Terms
					L	*C*	*S*		*L*	*C*	*S*		
	Inter-array Cable(s)		Development, resulting in damage to the Inter-array Cable(s)					was concluded that the effect was **Not Significant.**					

* **L – Likelihood, C – Consequence and S - Significance**

21.12 Conclusion and Summary

21.12.1.1 The Major Accidents and Disasters assessment follows the guidance published by IEMA (IEMA, 2020) and highlights the relevant hazards that are specific to the Offshore Development, people and the environment. Using likelihood and consequence ratings for each risk, an overall significance can be assigned to determine if the risk will lead to a major accident and/or a disaster. With the mitigation measures and management plans in place as outlined in **Section 21.8.2**, the risk of the potential hazards is ALARP and therefore no further mitigation can be applied, and no residual effects are expected.

21.13 References

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