

16. MAJOR ACCIDENTS AND NATURAL DISASTERS

16.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the likely significant adverse effects on the environment arising from the vulnerability of the Proposed Development as detailed in Chapter 4 to risks of major accidents and/or natural disasters, as well as the potential of the Proposed Development itself to cause potential major accidents and/or natural disasters. It has been completed in accordance with the guidance set out by the Environmental Protection Agency (EPA) in ‘*Guidelines on Information to be contained in Environmental Impact Statements*’ (EPA, 2022) and the European Commission in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU, as amended by 2014/52/EU), namely ‘*Guidance on the preparation of the Environmental Impact Assessment Report*’.

The assessment of the vulnerability of the Proposed Development to major accidents and natural disasters, as well as the risk of the Proposed Development itself causing accidents or disasters is carried out in compliance with the EIA Directive (2014/52/EU) which states the need to assess:

“the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or natural disasters which are relevant to the project concerned.”

The objective of this assessment is to ensure that appropriate precautionary actions are taken for those projects.

“because of their vulnerability to major accidents and/or natural disasters, are likely to have significant adverse effects on the environment”.

Based on the requirements of the EIA Directive, this chapter seeks to determine:

- The relevant major accidents and/or natural disasters, if any, that the Proposed Development could be vulnerable to or could cause;
- The potential for these major accidents and/or natural disasters to result in likely significant adverse environmental effect(s); and
- The measures that are in place, or need to be in place, to prevent or mitigate the likely significant adverse effects of such events on the environment.

The full description of the Proposed Development is provided in Chapter 4 of this EIAR.

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following references: ‘Proposed Development’ and ‘the site’.

16.1.1 Statement of Authority

This section of the EIAR has been prepared by Niamh McHugh and reviewed by Órla Murphy of MKO. Niamh is an Environmental Scientist who has been working with MKO since June 2021. Niamh possesses a BSc (Hons) in Environmental Science from the National University of Ireland, Galway. Niamh has been involved in the compilation and production of a number of EIARs, mainly in the field of Renewables. Órla is a Senior Environmental Scientist with over 7 years’ experience in the environmental sector where she has acted as Project Manager for a number of EIAR applications for

wind energy developments, compiling numerous chapters including. Órla holds a BSc. in Geography and MSc. in Environmental Protection and Management.

16.2 Assessment Methodology

The following sources of information and literature pertinent to the area were used in the preparation of this section:

- Census of Ireland;
- Regional Spatial Economic Strategy 2020 – 2032, published by the Southern Regional Assembly on 31st January 2020;
- Kerry County Development Plan, 2022 – 2028;
- Kerry County Council Website;
- Cork County Development Plan, 2022 – 2028,
- Fáilte Ireland
- Kerry County Council Major Emergency Plan (2015)

Major accidents or natural disasters are hazards which have the potential to affect the Proposed Development and lead to environmental effects directly and indirectly. These include accidents during construction, operation and decommissioning of the Proposed Development caused by operational failure and/or natural hazards. The assessment of the risk of major accidents and/or disaster is considered in relation to the information required to be provided in the EIAR, i.e. population and human health, biodiversity, land, soil, water, air and climate and material assets, cultural heritage and the landscape.

16.2.1 Legislative Context

16.2.1.1 Legislation

An assessment of the following key elements was undertaken in accordance with the EIA Directive (2014/52/EU) as amended:

- The vulnerability of the Proposed Development to potential accidents and disasters
- The Proposed Development's potential to cause major accidents or disasters which pose a risk to human health, cultural heritage and/or the environment.

The information relevant to major accidents and/or disasters to be included in the EIAR is set out in Section 8 of Annex IV of the EIA Directive as follows:

“(8) A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies”.

16.2.1.2 Guidance Documents

This chapter has been prepared in accordance with the following guidance:

- European Commission. (2017). *Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Reports*
- Environmental Protection Agency. (2022). *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*
- Department of Environment, Heritage and Local Government (2010) *A Guide to Risk Assessment in Major Emergency Management*
- Environmental Protection Agency (2014) *Guidance on Assessing and Costing Environmental Liabilities*
- Department of Defence (2020) *A National Risk Assessment for Ireland*

16.2.2 Categorisation of the Baseline Environment

A desk-study has been completed to establish the baseline environment for which the proposed risk assessment is being carried out. This will influence both the likelihood and the impact of a major accident or natural disaster. Local and regional context has been established prior to undertaking the risk assessment to develop an understanding of the vulnerability and resilience of the area to emergency situations.

Further detail on the baseline environment is provided in Section 16.3.

16.2.3 Impact Assessment Methodology

16.2.3.1 Introduction

A wind farm is not a recognised source of pollution. It is not subject to Industrial Emissions Directive regulation or any other Environmental Protection Agency environmental regulatory consent. Should a major accident or natural disaster occur the potential sources of pollution onsite during the construction, operational and decommissioning phases are limited and of low environmental risk. Sources of pollution with the potential to cause significant environmental pollution and associated negative effects such as bulk storage of hydrocarbons or chemicals, storage of wastes, management of flammable materials etc. are limited and so there is an inherent low level of environmental risk associated with major accident or natural disaster impacting the Proposed Development and causing environmental damage.

There is low potential for significant natural disasters to occur at the Proposed Development. Ireland is a geologically stable country with a mild temperate climate. The potential natural disasters that may occur are therefore limited to issues such as flooding and fire and are described in the Sections below.

Major industrial accidents involving dangerous substances pose a significant threat to humans and the environment; such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Proposed Development is not regulated or connected to or close to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e. SEVESO sites and so there are no potential effects from this source.

The Proposed Development has low potential to cause natural disasters or major accidents. As detailed in Chapter 8, Section 8.3.3. The Proposed Development site is overlain by acid shallow, rocky and peaty soils and blanket peat. Site investigation surveys were conducted on multiple occasions on this site, with the resulting data showing that the soils and subsoils, as mapped throughout the site, are consistent with recent and historic trial pitting and peat probing investigations. Comprehensive data and

details of the trial pitting and peat probing carried out on site can be found in Section 8.3.3 of this EIAR.

Any risks associated with flooding, impacts on infrastructure, accidents, etc. are addressed in the Sections below.

Current EIA practice already includes an assessment of some potential accidents and disaster scenarios such as pollution incidents to ground and watercourses as well as assessment of flooding events. These are described in detail in the relevant EIAR assessment chapters (Refer to Chapters 5 to 15 for further detail).

16.2.3.2 Site Specific Risk Assessment Methodology

A site-specific risk assessment identifies and quantifies risks focusing on unplanned, but possible and plausible events occurring during the construction, operation and decommissioning of the Proposed Development. The approach to identifying and quantifying risks associated with the Proposed Development by means of a site-specific risk assessment is derived from the EPA ‘*Guidance on Assessing and Costing Environmental Liabilities*’ document¹. The following steps were taken as part of the site-specific risk assessment:

- Risk Identification
- Risk Classification, likelihood and consequence, and
- Risk Evaluation

16.2.3.2.1 Risk Identification

Risks have been reviewed through the identification of reasonably foreseeable risks in consultation with relevant contributors to this EIAR. The identification of risks has focused on non-standard but plausible incidents that could occur at the Proposed Development during construction, operation and decommissioning.

In accordance with the European Commission EIAR Guidance, risks are identified in respect of the projects:

1. Potential to cause accidents and/or disasters,
2. Vulnerability to potential disaster/accident

16.2.3.2.2 Risk Classification

Classification of Likelihood

The below tables have been adapted from ‘*A Guide to Risk Assessment in Major Emergency Management*’ (Department of Environment, Heritage and Local Government, 2010). After identifying the potential risks, the likelihood of occurrence of each risk has been assessed. An analysis of safety procedures and proposed environmental controls was considered when estimating likelihood of identified potential risks occurring. Table 16-1 defines the likelihood ratings that have been applied.

The approach adopted has assumed a ‘risk likelihood’ where one or more aspects of the likelihood description are met.

¹ EPA (2014) *Guidance on assessing and costing environmental liabilities*. Available at https://www.epa.ie/publications/compliance-enforcement/licensees/reporting/financial-provisions/EPA_OEE-Guidance-and-Assessing-WEB.pdf

Table 16-1 Classification of Likelihood (Source: DoEHLG, 2010)

Ranking	Classification	Likelihood
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 500 or more years.
2	Very Unlikely	Is not expected to occur; and/or no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communities; and / or little opportunity, reason or means to occur; may occur once every 100-500 years.
3	Unlikely	May occur at some time; and /or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisation's worldwide; some opportunity, reason or means to occur; may occur once per 10-100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years.
5	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

Classification of Consequence

The consequence rating assigned to each risk has assumed that all proposed mitigation measures and/or safety procedures have failed to prevent the major accident and/or disaster. Furthermore, the Kerry County Council Major Emergency Plan will work to reduce the consequence of any major accident or disaster.

The consequence of the effect if the event occurs has been assigned as described in Table 16-2.

The consequence of a risk to/from the Proposed Development has been determined where one or more aspects of the consequence description are met, i.e. risks that have no consequence have been excluded from the assessment.

Table 16-2 Classification of Impact (Source: DoEHLG, 2010)

Ranking	Classification	Impact	Description
1	Minor	Life, Health, Welfare Environment Infrastructure Social	Small number of people affected; no fatalities and small number of minor injuries with first aid treatment. No contamination, localised effects <€0.5M Minor localised disruption to community services or infrastructure (<6 hours).

Ranking	Classification	Impact	Description
2	Limited	Life, Health, Welfare Environment Infrastructure Social	<p>Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required.</p> <p>Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements.</p> <p>Simple contamination, localised effects of short duration</p> <p>€0.5-3M</p> <p>Normal community functioning with some inconvenience.</p>
3	Serious	Life, Health, Welfare Environment Infrastructure Social	<p>Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation.</p> <p>Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated.</p> <p>External resources required for personal support.</p> <p>Simple contamination, widespread effects or extended duration</p> <p>€3-10M</p> <p>Community only partially functioning, some services available.</p>
4	Very Serious	Life, Health, Welfare Environment Infrastructure Social	<p>5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated</p> <p>Heavy contamination, localised effects or extended duration</p> <p>€10-25M</p> <p>Community functioning poorly, minimal services available</p>
5	Catastrophic	Life, Health, Welfare Environment Infrastructure Social	<p>Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated.</p> <p>Very heavy contamination, widespread effects of extended duration.</p> <p>>€25M</p>

Ranking	Classification	Impact	Description
			Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

Risk Evaluation

Once classified, the likelihood and consequence ratings have been multiplied to establish a ‘risk score’ to support the evaluation of risks by means of a risk matrix.

The risk matrix sourced from the DoEHLG *Guide to Risk Assessment in Major Emergency Management* and as outlined in Table 16-3 indicates the critical nature of each risk. This risk matrix has therefore been applied to evaluate each of the risks associated with the Proposed Development. The risk matrix is colour coded to provide a broad indication of the critical nature of each risk:

- The red zone represents ‘high risk scenarios’:
- The amber zone represents ‘medium risk scenarios’, and
- The green zone represents ‘low risk scenarios’.

Table 16-3 Classification of Impact (Source: DoEHLG, 2010)

		Consequence Rating				
		1.Minor	2.Limited	3. Serious	4.Very Serious	5.Catastrophic
Likelihood Rating	5.Very Likely					
	4. Likely					
	3. Unlikely					
	2. Very Unlikely					
	1. Extremely Unlikely					

16.3

Baseline Conditions

The functional area of Kerry County Council falls under the South Major Emergency Region (MEM). The Major Emergency Plan prepared by Kerry County Council in 2015 outlines generic risks that exist in County Kerry. These hazard categories include Natural, Transportation, Technological and Civil. The hazard categories, types and subtypes, and their relevance to the Proposed Development, are listed below in Table 16-4.

Table 16-4 Kerry County Council Major Emergency Plan 2015 hazard types

Natural Hazards			
Category	Type	Subtype	Relevance to the Project
Meteorological	Storm / Gale Both coastal and inland areas can be affected by high winds	Both coastal and inland areas can be affected by high winds	Poor driving conditions Loss of infrastructure Flooding Falling Trees
	Heavy Snow	Blizzards- Poor visibility	Poor Driving conditions Loss of infrastructure
	Severe Cold / Frost extremes of Temperature	Icy Roads /Impassable Roads Hypothermia Freezing of Supply Network	Poor Driving Conditions Public Health Risk
	Thunder & Lightening Dense/ Persistent Fog Heat Wave /Drought	Road Traffic collisions	Loss of Infrastructure Poor driving conditions Public Health Risk
Hydrological	Flooding	Coastal / Inland	Potential for flooding via on-site rivers: unnamed EPA mapped streams, Thureehouma Stream and Lough Nabirria
	Heavy Rain		May lead to flooding in Low Lying areas or areas with poor drainage
Geological	Landslide		Peat Instability
	Forest / Wilderness fire - Air Pollution		Areas of the Proposed Development site and some of the surrounding area is forested.
Transportation Hazards			
Category	Type	Subtype	Project Hazard
Aviation	Aircraft Collision /Loss	Mid Air and Land	Not Applicable
Road	Multiple Road Traffic Collision		Public Roads via which construction staff and materials access the site.
	Hazmat		Fuel Transport to/from site
	Bridge		Not Applicable

Water	Inland Water ways	Pleasure Craft/Cruises Pollution from above	Not Applicable
	Coastal	Car Ferry/ passenger Ferries	Not Applicable
Technological Hazards			
Category	Type	Subtype	Project Hazard
Industrial Accidents	Explosions		Damage to Infrastructure Personal Injuries/ fatalities
	Petrochemical Fires		Personal Injuries, severe burns/ fatalities Air Pollution
	Industrial Fires	LPG Tank Fire	Not Applicable
	Gas Emission		Not applicable
	Fluid/ Fuel Emission		Refuelling on site
Explosions	Domestic	Natural Gas explosion	Not Applicable
	Bomb		Not Applicable
	LPG		Not Applicable
	Pipeline		Not Applicable
Fires			Air Pollution
Building Collapse			Not Applicable
Hazardous substance		Accident at site	Not Applicable
		Transportation accident	Hazmat on roads
		Weapons	Not Applicable
	Biological	Leak/Weapons	Not Applicable
	Radiological	“Dirty Bomb”	Not Applicable
		Industrial Accident	Damage to Infrastructure Personal Injuries/ fatalities

		Health facilities	Not Applicable
Pollution/Contamination	Air/Water Pollution		Fire Sediment-laden Water Run Off Fuel/hydrocarbon spill/leak
Civil Hazards			
Category	Type	Subtype	Project Hazard
Major Crowd Safety	(Movement, crushing etc.)	Pop Concerts Sports Events Fireworks displays Air shows	Not Applicable
Loss of Critical Infrastructure	Energy and Power Supply	Electricity	Connection to national grid
		Natural Gas	Not Applicable
		Fuel Oil	Not Applicable
		Communications	Telecom operators, mobile phone networks
Food Situation Crisis		Food Contamination Drought	Not Applicable
Water Supply		Shortage/ Contamination Freezing /Flooding	Not Applicable
Epidemics and pandemic		Communicable diseases	Not Applicable
Animal Disease		Foot & Mouth Avian Influenza	Not Applicable
Terrorism	Bombs	Car-bombs	Not Applicable
		Bombs in buildings	Not Applicable
		Fire-bombing	Not Applicable
	CBRNE		Not Applicable
	Disruption	Bomb scares	Not Applicable

The risks which are most relevant to the Proposed Development assessment are described in the sections that follow.

16.3.2 Meteorological

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Proposed Development site in east Kerry, approximately 15.5 km northeast of the Atlantic Coastline at its closest point. The dominant influence on Ireland's climate is the Atlantic Ocean. As a consequence, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude. The hills and mountains, many of which are near the coasts, provide shelter from strong winds and from the direct oceanic influence.

The Met Éireann weather station at Cork Airport is the nearest weather and climate monitoring station to the Proposed Development site that has meteorological data recorded for the 30-year period from 1981 – 2010. The monitoring station is located approximately 60km east of the Proposed Development site. The wettest months are October and December, and April is usually the driest. July is the warmest month with an average temperature of 15.3°C. The mean annual temperature recorded at Cork Airport was 9.9°C.

The windier part of the year lasts for 6 months, from October to March, with average monthly wind speeds of more than 19.4 kilometres per hour. The windiest month of the year in Cork Airport is February, with an average monthly wind speed of 20.4 kilometres per hour. The calmer time of year lasts for 6 months, from April to September. The calmest month of the year in Cork Airport is July, with an average monthly wind speed of 15.7 kilometres per hour.

The works programme for the construction stage of the Proposed Development will take account of weather forecasts and work will be suspended in the case of extreme weather events.

The following forecasting and weather warning systems are available and will be used on a daily basis at the site to direct proposed construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates;
- Weather Warning or Advisories: Met Éireann's main suite of warnings are issued by the duty forecaster between 10am and midday and are updated as necessary as new information becomes available. In general, warnings will not be issued more than 60-hours ahead of the expected adverse weather but advisories on potential hazards are issued up to a week in advance. The three warning categories are:
 - Yellow: Not unusual weather. Localised danger.
 - Orange: Infrequent. Dangerous/disruptive.
 - Red: Rare. Extremely dangerous/destructive.
- MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale;
- 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events;
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and,
- Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.

16.3.3 Hydrological

A Flood Risk Assessment for the Proposed Development site is included as Appendix -9-1 of this EIAR.

OPW's flood risk maps (<https://www.floodinfo.ie/map/floodmaps/>) and OSI's historical 6-inch sheets and 25-inch basemaps were consulted to identify if any part of the Proposed Development site may be at risk of fluvial flooding.

The National Indicative Fluvial flood risk map shows a "medium probability" of fluvial flooding downstream and outside of the Proposed Development site. Based on the accompanying text to the flood risk map, the "Medium probability" extent of flooding is a "modelled extent of land that might be flooded by rivers (fluvial flooding) during a theoretical or 'design' flood event with an estimated probability of occurrence, rather than information for actual floods that have occurred in the past." In this instance, the probability of occurrence is 100:1, i.e., a 100-year return period event, noting that it does not account for possible effects of climate change.

Historical OSI 6- or 25-inch sheets for the Proposed Development site do not identify any lands that are "liable to flood". GSI's groundwater flooding probability maps also do not indicate a groundwater flood risk within or downgradient of the site.

All Proposed Development infrastructure is located outside and above the mapped 1,000-year flood level and, therefore, all infrastructure is located in Flood Zone C (Low Risk).

There are no recorded recurring flood events specifically within the Proposed Development site, and similarly, the locally available 6" and 25" mapping does not identify any lands that are 'liable to flood'. Within the Dunmanus-Bantry-Kenmare catchment the closest mapped recurring flood event is located at Insheese, ~2.35km southeast and upstream of the Proposed Development site. Here a section of the roadway was washed away by floods in 1991. There are no recurring or historic fluvial flood events recorded downstream of the Proposed Development site on the Roughty River. Robust drainage measures on the site will include interceptor drains, vee drains and diversion drains, as well as swales, silt traps, check dams, settlement ponds and buffered outfalls. Please refer to Chapter 9 of this EIAR for further details in relation to the hydrological mitigation measures.

16.3.4 Peat Stability

A comprehensive and robust Peat Stability Risk Assessment was undertaken for the Proposed Development and used to inform the design process including the siting of all proposed main infrastructure locations and drainage control measures. The Peat Stability Risk Assessment was informed by the Scottish Government's 2017 guidance document, *Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments*. Intrusive ground investigation works were carried out as part of the peat stability assessment including peat depth probing, shear strength testing, ground auguring/coring and trial pitting. The extensive suite of ground investigations, the robust peat stability assessment and the lessons learned from previous peat slide events on this site and similar sites will ensure that the risk of such an event, occurring during the construction, operation or decommissioning of the Proposed Development site is minimised.

The findings of the peat assessment showed that the site has a low to negligible risk of peat failure and is suitable for the Proposed Development. The findings include recommendations and control measures for construction work in peat lands, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety.

The site is typically covered in abundant protruding ridges of bedrock outcrop, separating localised pockets of peat. The site is also characterised by areas of coniferous forestry, transitional woodland scrub and open upland blanket bog. Peat thicknesses recorded during the site walkovers from 530

probes ranged from 0.1 to 6.5m with an average depth of 0.8m. The localised areas of deeper peat have been avoided by optimising the layout of the Proposed Development.

A Peat Stability Risk Assessment (included as Appendix 8-1) was carried out in order to determine the stability, i.e. the Factor of Safety (FoS). The site was found to have both acceptable factors of safety and levels of risk against peat instability, with the exception of Turbine 6, where a small area of FoS <1 was identified at the turbine foundation location. Three areas, referred to as *safety buffers*, have been highlighted and will have restricted construction activities and should not be used for the storage of peat or soil. In addition, four peat stockpile restrictions (PSR) are proposed and presented in Appendix L of the Peat Stability Risk Assessment (PSRA).

An analysis of peat sliding was carried out at the main infrastructure locations across the Proposed Development site for both the undrained and drained conditions. The purpose of the analysis was to determine the Factor of Safety (FoS) of the peat slopes.

An undrained analysis was carried out, which applies in the short-term during construction. At almost every turbine location and construction compound, the assessment exhibits a FoS > 1.3 (green: stable and safe). An isolated small section of the hardstand area for T4 shows a FoS value between 1 and 1.3 (yellow: stable but not safe). This risk area is caused by local factors which have been examined in more detail in the PSRA (Appendix 8-1).

A drained analysis was also carried out, which examined the effect of in particular, rainfall on the existing stability of the natural peat slopes on site. The assessment showed almost all areas to be stable and safe (FoS > 1.3), but there are some small areas along access roads and, within or beside the hardstands of T1, T2, T5, and T7, which show a FoS value between 1 and 1.3 (stable but not safe), while T4, T6 T8, and T10 show a FoS of <1 (unstable). A small area of FoS <1 (unstable) is calculated at the T6 turbine location, however the average FoS across the T6 foundation is >1. These low FoS areas are caused by localised factors which have been examined in more detail in Section the PRSA. Where required, additional mitigation, including exclusion zone and peat storage restriction areas have been scheduled which the designer and contractor must adhere to at the construction stage.

The peat stability risk assessment at each infrastructure location, along access roads, in peat placement areas and at settlement pond locations identified a number of mitigation/control measures to reduce the potential risk of peat failure. See Appendix 8-1 of this EIAR for details of the required mitigation/control measures for each infrastructure element.

In summary, the findings of the peat assessment showed that the Proposed Development has an acceptable margin of safety, is suitable for the Proposed Development and is considered to be at low to negligible risk of peat failure provided appropriate mitigation measures, such as implementing and maintaining an appropriate drainage system are implemented. The findings include recommendations and mitigation/control measures for construction work in peat lands, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety.

Please see Chapter 8 Geology and Soils and Appendix 8-1 Peat Stability Risk Assessment for more details.

16.3.5 Traffic

The Proposed Development will utilise the existing local road network during the construction phase. Construction related traffic will originate from the delivery of materials to site, removal of the existing turbine components, removal of surplus excavated material from site and transport of employees to, from and throughout the site. The localised traffic disruptions will be mitigated through the use of industry standard traffic management measures. Please see Chapter 15 Material Assets for details.

Chapter 15, Section 15.1 provides project-specific details relating to traffic management. Prior to the commencement of the construction phase of the Proposed Development a detailed Traffic Management

Plan will be prepared by the Contractor for agreement with the relevant local authorities and An Garda Síochána. The Traffic Management Plan will include requirements for the following:

- > Traffic Management Coordinator
- > Delivery Programme
- > Information to locals
- > A Pre and Post Construction Condition Survey
- > Liaison with the relevant local authority
- > Implementation of temporary alterations to road network at critical locations
- > Identification of delivery routes
- > Delivery times of large turbine components
- > Travel plan for construction workers
- > Additional measures
- > Re-instatement works

Please see Chapter 15 - Material Assets for details.

16.3.6 Industrial Accident

The Proposed Development is not connected to or in close proximity of any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations (SEVESO sites), therefore no significant effects associated with major industrial accidents involving dangerous substances are anticipated. Petrochemical fires and fires from fuel emissions, leakages and spillages could occur causing personal injury, structural damage and forest fires.

16.3.7 Loss of Critical Infrastructure

EirGrid operates and develops Ireland's electricity grid. This includes interconnecting to neighbouring grids and running the wholesale electricity market. The grid safely brings power from generators such as wind farms to the ESB network that supplies homes and business in Ireland. It also brings power directly to large energy users. There are two types of electricity generation: synchronous generation and non-synchronous generation. Synchronous generation produces the same amount of electricity all the time e.g. fossil fuels. Non-synchronous generation produces a varying amount of electricity depending on the energy available. Eirgrid operate the grid from National Control Centres (NCCs) in Dublin and Belfast, matching electricity production to customer demand, switching from synchronous to non-synchronous where required to ensure no power outages. Therefore, any technical fault at the Proposed Development would not impact the local or national energy supply.

The Proposed Development will connect into the existing onsite 110kV Coomagearahy substation.

There are no Gas Networks Ireland (GNI) pipelines within the Proposed Development site. Therefore, there is no potential for the loss of critical GNI infrastructure due to the Proposed Development.

16.3.8 Contamination

The Proposed Development has the potential to cause contamination and pollution of groundwater and surface water from potential release of hydrocarbons and lubricants, earthworks and excavations on site. A Construction Environment Management Plan (CEMP) included as Appendix 4-3 has been prepared in conjunction with the Environmental Impact Assessment Report (EIAR) and the Natura Impact Statement (NIS) which accompanies the planning application for the Proposed Development.

Section 3 of the CEMP sets out details of the environmental controls to be implemented on site. The CEMP provided details on site drainage measures, peat stability monitoring measures, waste management and pollution prevention measures for refuelling and managing hazardous materials and

cement-based products. The CEMP also sets out the Emergency Response Procedure to be adopted in the event of an emergency including contamination, health and safety and environmental protection. The CEMP provides details on all mitigation and monitoring measures to be actioned prior to construction, during the construction, operation and decommissioning phase. The CEMP will be subject to ongoing review through regular environmental auditing and site inspections during the construction phase. This will confirm the efficacy and implementation of all mitigation measures and commitments identified in the application documentation.

Please see Chapter 4 Description and Appendix 4-3 CEMP for details.

16.3.9 Health and Safety

During construction of the Proposed Development, all staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan. An Emergency Response Plan (ERP) which will be prepared prior to the construction phase and implemented and adhered to on site. The ERP provides details of procedures to be adopted in the event of an emergency in terms of site health and safety and environmental protection.

Please see Chapter 4 Description and Appendix 4-3 CEMP for details.

16.3.10 Turbine Safety

Turbines pose no threat to the health and safety of the general public. The Department of the Environment, Heritage and Local Government (DoEHLG)'s 'Wind Energy Development Guidelines for Planning Authorities 2006' (the Guidelines) state that there are no specific safety considerations in relation to the operation of wind turbines. Fencing or other restrictions are not necessary for safety considerations. People or animals can safely walk up to the base of the turbines.

The Guidelines state that there is a very remote possibility of injury to people from flying fragments of ice or from a damaged blade. However, most blades are composite structures with no bolts or separate components and the danger is therefore minimised. The build-up of ice on turbines is unlikely to present problems. The wind turbines will be fitted with anti-vibration sensors, which will detect any imbalance caused by icing of the blades. The sensors will cause the turbine to wait until the blades have been de-iced prior to beginning operation.

Turbine blades are manufactured of glass reinforced plastic which will prevent any likelihood of an increase in lightning strikes within the site of the Proposed Development or the local area. Lightning protection conduits will be integral to the construction of the turbines. Lightning conduction cables, encased in protection conduits, will follow the electrical cable run, from the nacelle to the base of the turbine. The conduction cables will be earthed adjacent to the turbine base. The earthing system will be installed during the construction of the turbine foundations.

16.3.11 Electromagnetic Interference

The provision of underground electric cables of the capacity proposed is common practice throughout the country and installation to the required specification does not give rise to any specific health concerns.

The extremely low frequency (ELF) electric and magnetic fields (EMF) associated with the operation of the proposed cables fully comply with the international guidelines for ELF-EMF set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a formal advisory agency to the World Health Organisation, as well as the EU guidelines for human exposure to EMF. Accordingly, there will

be no operational impact on sensitive receptors (residential or other uses), construction staff, operational & maintenance staff or recreational users of the site as the ICNIRP guidelines will not be exceeded at any distances even directly above the cables.

The ESB document 'EMF & You' (ESB, 2017)² provides further practical information on EMF. Further details on the potential impacts of electromagnetic interference to telecommunications and aviation are presented in Chapter 15 Material Assets of this EIAR.

16.4 Risk Assessment

This section outlines the possible risks associated with the Proposed Development for the construction, operation and decommissioning phases.

These risks have been assessed in accordance with the relevant classification as outlined in Table 16-1 and 16-2.

As outlined in Section 16.2.3.2.2, the consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster, i.e. pre-mitigation.

16.4.1 Likely Significant Effects

16.4.1.1 Do-Nothing Scenario

If the Proposed Development were not to proceed, the existing uses for the site of wind energy, low intensity agriculture and small-scale forestry would continue.

If the Proposed Development were not to proceed, the opportunity to continue to make use of County Kerry's valuable wind resource would be reduced and eventually lost, as, in accordance with their respective planning conditions, 11 no. turbines would be decommissioned in 2029. The remaining 17 no. turbines would also eventually break down and need to be decommissioned. The opportunity to contribute to meeting Government's and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

The opportunity to generate local employment and investment would also be lost. It is likely that the trends of population decline and rural deprivation that have been recorded within the study area would continue in the absence of investment.

16.4.1.1.1 Identification of Effects During Construction

A risk register has been developed which contains all potentially relevant risks identified during the construction phase of the Proposed Development. Seven risks specific to the construction of the Proposed Development have been identified and are presented in Table 16-5.

² *EMF & You: Information about Electric & Magnetic Fields and the electricity network in Ireland Available at: https://esb.ie/docs/default-source/default-document-library/emf-public-information_booklet_v9.pdf?sfvrsn=0*

Table 16-5 Risk Register - Construction Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
A	Critical Infrastructure Emergencies Risk of delivery of turbines and infrastructure to site.	Traffic accident during turbine delivery and removal or extreme weather periods of heavy rainfall, taking into account climate change and strong winds
B	Severe Weather Risk to construction activity on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
C	Flooding Risk of flooding in areas surrounding the site impacting the construction phase and leading to environmental emissions	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
Potential to cause accidents and / or disasters.		
D	Peat Stability Risk of peat movement on site	Peat failure during the construction phase, possibility of landslide, surface water contamination, damage to property.
E	Traffic Incident Collisions onsite and offsite with vehicles involved in construction of Proposed Development	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented
F	Contamination Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater.	Accidental fuel spillage during delivery to site. Accidental spillage of lubricants and other substances upon dismantling and removal of turbines Failure of fuel storage tank or tanks in plant and machinery and vehicles leading to uncontrolled emissions. Drainage and seepage water resulting from accident during infrastructure excavation; Stockpiled excavated material becoming unstable and providing a point source of exposed sediment;

Risk ID	Potential Risk	Possible Cause
		Excavation works during the construction of the Proposed Development which may result in entrainment of sediment from the excavations during construction; and,
G	Fire / Gas Explosion	Equipment or infrastructure failure; Electrical problems; and Employee negligence.

16.4.1.1.2 Identification of Effect During Operation

Six risks specific to the operation of the Proposed Development have been identified and are presented in Table 16-6.

Table 16-6 Risk Register – Operational Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
H	Severe Weather Risk to operation of turbines	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
I	Contamination Discharge or spillage of fuel, chemical solvents, sewage or wastewater into watercourse or percolated to groundwater	A vehicular incident on the public road involving fuel, wastewater or sewage transportation in the operational phase.
Potential to cause accidents and / or disasters.		
J	Industrial Accident - Fire / Gas Explosion	Equipment or infrastructure failure; Electrical problems; and Employee negligence.
K	Collapse/ damage to structures	Earthquakes; and Vehicular collisions due to driver negligence on public roads.

Risk ID	Potential Risk	Possible Cause
L	Traffic Incident Collisions onsite and offsite with vehicles involved in operation of Project	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented
M	Loss of Critical Infrastructure	Electrical fault at substation bay

16.4.1.1.3 Identification of Effect During Decommissioning

Six risks specific to the decommissioning of the Proposed Development have been identified and are presented in Table 16-7.

Table 16-7 Risk Register – Decommissioning Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
N	Severe Weather Risk to decommissioning activity on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
O	Flooding of site High levels of surface water on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
Potential to cause accidents and / or disasters.		
P	Traffic Incident Collisions onsite and offsite with vehicles involved in decommissioning of Project	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented
Q	Contamination Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater	Fuel spillage during delivery to site. Accidental spillage of lubricants and other substances upon dismantling and removal of turbines. Failure of fuel storage tank or tanks in plant and machinery and vehicles. Drainage and seepage water resulting from infrastructure excavation;

Risk ID	Potential Risk	Possible Cause
		Erosion of sediment from emplaced site drainage channels.
R	Industrial Accident - Fire/Gas explosion	Petrochemical Fires causing personal injury, structural damage and forest fires.

These risks have been assessed in accordance with the relevant classification (Refer to Table 16-1 and Table 16-2) and the resulting risk analysis is given in Table 16-8.

The risk register is based upon possible risks associated with the Proposed Development. As outlined in Section 16.2.3.2, the consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

16.4.1.2 Assessment of Effect – Summary

Table 16-8 Risk Assessment

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Construction Phase								
A	Critical Infrastructure Emergencies	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Damage to habitats and homes/businesses	1	The risk of traffic accident during turbine delivery due to severe weather conditions impacting the identified road network is unlikely when considering the assessment in Chapter 11 (weather conditions recorded over the last 30 years within the area) and Chapter 15.1 – Traffic Assessment (turbine delivery occurring during the night, Garda patrolled, etc) The risk of the loss of grid connection infrastructure, could occur due to severe weather such as strong winds.	1	The risk of a traffic accident due to severe weather conditions during the construction phase will result in a minor consequence in that ‘small number of people would be affected’ should a severe weather occur, with ‘no fatalities and a small number of minor injuries with first aid treatment’. The risk of the loss of grid connection infrastructure will result in a minor consequence in that a ‘small number of people would be affected’ with no fatalities and any minor injuries being treated with first aid treatment.	1

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
B	Severe Weather	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Damage to, or depletion of aquatic habitats and species;	2	The risk of severe weather is unlikely when considering the assessment in Chapter 11 and weather conditions recorded over the last 30 years within the area. The works programme for the groundworks part of the construction phase of the Proposed Development will take account of weather forecasts and predicted rainfall in particular and construction will be paused if required.	1	The risk of severe weather conditions during the construction phase will result in a minor consequence in that ‘small number of people would be affected’ should a severe weather occur, with ‘no fatalities and a small number of minor injuries with first aid treatment’. Severe weather may cause increased mobilisation of sediment which will be controlled via the Proposed Development design and mitigation measures.	2
C	Flooding	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Groundwater Flooding Flooding to surrounding properties;	2	As detailed in Appendix 9-1, a flood risk identification study was undertaken to identify existing potential flood risks associated with the Proposed Development. From this study, it was determined that no instances of	1	The risk of flooding during the construction phase will result in a minor consequence in that a ‘small number of people would be affected’ should a severe weather occur, with ‘no fatalities and a small	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
			Damage to, or depletion of aquatic habitats and species;		recurring flooding or historical flooding were identified on OPW mapping. The Proposed Development is also not located within any CFRAM Flood Zones. The main risk of flooding in relation to the Proposed Development site relate to pluvial flooding in the flatter areas.		number of minor injuries with first aid treatment' Flooding has the potential to cause increased sediment mobilisation however flooding is not anticipated and should any flooding occur it would be localised.	
D	Peat Stability	Mismanagement of excavated material onsite Extreme weather conditions	Movement of peat within the site; Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species;	2	The Proposed Development has been designed to minimise the potential for peat instability and failure. Refer to Appendix 8-1: Peat Stability Risk Assessment Report	2	The risk of peat instability during the construction phase will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration'. The PRSA, included as Appendix 8-1 to this EIAR, concluded that the risk of peat failure due to instability was 'low to negligible'. Contamination of environment (e.g.	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							watercourses), localised effects of short duration.	
E	Traffic Incident	<p>Driver negligence or failure of vehicular operations on internal access roads.</p> <p>Traffic Management not implemented</p>	Injury or loss of life.	3	<p>A limited number of vehicles will be permitted on the site as part of the construction phase.</p> <p>As such, it can be determined that there is some ‘opportunity, reason or means’ for a vehicle collision to occur on site, ‘at some time.’ An unlikely risk is therefore predicted.</p>	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a ‘small number of people would be affected’ should a vehicular collision occur, with ‘no fatalities and small number of minor injuries with first aid treatment.’	3
F	<p>Contamination – Fuel storage and handling</p> <p>-General Construction</p>	<p>Fuel spillage during delivery to site.</p> <p>Failure of fuel storage tank or tanks in plant and machinery and vehicles.</p> <p>Drainage and seepage water resulting from</p>	<p>Release of suspended solids to groundwater.</p> <p>Contamination of local drinking water supplies and groundwater aquifers.</p>	2	<p>As outlined in Chapter 4, fuel will be stored on-the Proposed Development site but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the site.</p> <p>Setback distances from sensitive hydrological</p>	2	The risk of a fuel spillage or impact on surround drainage during the construction will result in a limited consequence in that there would be ‘a limited number of people affected’ with ‘localised effects of short duration’ on environmental receptors through the use of bunded containment areas during construction.	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		<p>infrastructure excavation;</p> <p>Stockpiled excavated material providing a point source of exposed sediment;</p>	<p>Groundwater and surface water emissions from construction activities including trench excavations)</p>		<p>features means that adequate room is maintained for the proposed drainage mitigation measures as detailed in Chapter 8 and Chapter 9.</p>		<p>The risk of the spillage of lubricants and associated effect on local surface water features and soils has the potential to result in localised water pollution and contamination to soils, posing a risk to humans and sensitive habitats alike. Mitigation measures as set out in Chapter 7: Aquatic Ecology, Chapter 8: Soils and Geology and Chapter 9: Hydrology and Hydrogeology will ensure that there is no contamination to hydrological or geological receptors due to the removal of the existing turbines.</p> <p>The potential residual environmental effects are described in detail in Chapter 8 which concludes that there will be no</p>	

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							significant environmental effects.	
G	Fire / Gas Explosion	Equipment or infrastructure failure; Fuel spillage/storage Electrical problems; and Employee negligence	Illness or loss of life; Damage to, or depletion of habitats and species; and Impacts on ambient air quality.	2	As outlined in Chapter 4, fuel will not be stored on-site post construction therefore fuel is not considered to be a significant fire risk. In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site, and mitigation of the same during operation.	2	Should a fire/explosion occur at the site, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' on people and environmental receptors due to the nature of the Proposed Development and the lack of infrastructure or fuel storage during operation that would result in any such incident.	4
Operational Phase								
H	Severe Weather	Extreme weather-periods of heavy rainfall, taking into account	Illness or loss of life;	2	The risk of severe weather is unlikely when considering the assessment in Chapter 11 and weather	1	The risk of severe weather conditions during the decommissioning phase will result in a minor	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		climate change and strong winds			conditions recorded over the last 30 years within the area.		consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'.	
I	Contamination	A vehicular incident on the public road or internal access road network involving fuel, wastewater or sewage transportation in the operational phase.	Damage to, or depletion of aquatic habitats and species. Contamination of local drinking water supplies and groundwater aquifers.	2	As outlined in Chapter 4, fuel will not be stored on-the Proposed Development site during the operational phase, therefore the risk of contamination due to hydrocarbons is not considered to be a significant risk.	1	As outlined in Chapter 4, fuel will not be stored on-the Proposed Development site during the operational phase, therefore the risk of contamination due to hydrocarbons is not considered to be a significant risk.	2
J	Fire / Gas Explosion	Equipment or infrastructure failure; Fuel spillage/storage.	Illness or loss of life; Damage to, or depletion of habitats and species; and	2	As outlined in Chapter 4, fuel will not be stored on-site post construction therefore fuel is not considered to be a significant fire risk.	2	Should a fire/explosion occur at the site, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' on people and environmental receptors	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Electrical problems; and Employee negligence	Impacts on ambient air quality.		In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the Proposed Development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site, and mitigation of the same during operation.		due to the nature of the Proposed Development and the lack of infrastructure or fuel storage during operation that would result in any such incident.	
K	Collapse/ damage to structures	Earthquakes, extreme weather events; and Vehicular collisions due to driver negligence on public roads.	Injury or loss of life.	1	According to the Irish National Seismic Network (INSN), earthquakes measuring ~2 on the Richter Scale are “normal” in terms of seismicity in Ireland. These are known as microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. As such, buildings in Ireland are extremely unlikely to be	1	The risk of infrastructure collapse during the operational phase will result in a minor consequence in that ‘small number of people would be affected’ and no real likelihood of any impact on any environmental receptors.	1

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					<p>damaged or collapse due to seismic activity.</p> <p>Having regard to speed limits within the Proposed Development site, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse.</p>			
L	Traffic Incident	<p>Driver negligence or failure of vehicular operations on internal access roads.</p> <p>Traffic Management not implemented</p>	Injury or loss of life.	3	<p>A limited number of vehicles will be permitted on the Proposed Development site as part of the operational phase.</p> <p>As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on the Proposed Development site, 'at some time.' An unlikely risk is therefore predicted.</p>	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.'	3

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
M	Loss of Critical Infrastructure	<p>Equipment or infrastructure failure;</p> <p>Electrical problems; and</p> <p>Employee negligence</p> <p>Landslide/ Earthquake; and</p> <p>Extreme weather conditions such as flooding and storms.</p>	Injury or loss of life	1	<p>Eirgrid operate the grid from National Control Centres matching electricity production to customer demand, switching from synchronous to non-synchronous where required to ensure no power outages.</p> <p>The Proposed Development will be connected to the existing onsite 110kV Coomagearlahy substation and any shortages or failures will not impact other connections to the same substation or the existing 110kv Clonkeen substation.</p>	2	Should a power failure occur at the existing 110kV Clonkeen substation, it will result in a limited number of people affected- localised effects of short duration	2
Decommissioning Phase								

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
N	Severe Weather	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Damage to, or depletion of aquatic habitats and species;	2	The risk of severe weather is unlikely when considering the assessment in Chapter 11 and weather conditions recorded over the last 30 years within the area. Decommissioning works will be paused should a Status Red weather warning alert be issued by Met Eireann as is standard practice	1	The risk of severe weather conditions during the decommissioning phase will result in a minor consequence in that ‘small number of people would be affected’ should a severe weather occur, with ‘no fatalities and a small number of minor injuries with first aid treatment’. Decommissioning will not require significant excavations works. There is no real likelihood of any impact on any environmental receptors	2
O	Flooding	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Groundwater Flooding Flooding to surrounding properties.	2	As detailed in Appendix 9-1, a flood risk identification study was undertaken to identify existing potential flood risks associated with the Proposed Development. From this study, it was determined that no instances of	1	The risk of flooding during the decommissioning phase will result in a minor consequence in that a ‘small number of people would be affected’ should a severe weather occur, with ‘no fatalities and a small	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
			Damage to, or depletion of aquatic habitats and species;		recurring flooding or historical flooding were identified on OPW mapping. The Proposed Development is also not located within any CFRAM Flood Zones. The main risk of flooding in relation to the Proposed Development site relate to pluvial flooding in the flatter areas..		number of minor injuries with first aid treatment’.	
P	Traffic Incident	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented.	Injury or loss of life.	3	A limited number of vehicles will be permitted on the Proposed Development site as part of the decommissioning phase. As such, it can be determined that there is some ‘opportunity, reason or means’ for a vehicle collision to occur on site, ‘at some time.’ An unlikely risk is therefore predicted.	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a ‘small number of people would be affected’ should a vehicular collision occur, with ‘no fatalities and small number of minor injuries with first aid treatment.’	3

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Q	Contamination	<p>Fuel spillage during delivery to site.</p> <p>Failure of fuel storage tank or tanks in plant and machinery and vehicles.</p>	<p>Damage to, or depletion of aquatic habitats and species.</p> <p>Discharge to groundwater</p>	2	<p>As outlined in Chapter 4, fuel will be stored on-the Proposed Development site but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the site.</p> <p>Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage measures as detailed in Chapter 9</p>	2	<p>The risk of a fuel spillage or impact on surrounding drainage during the decommissioning stage will result in a limited consequence in that there would be ‘a limited number of people affected’ with ‘localised effects of short duration’ through the use of bunded containment areas during decommissioning.</p> <p>The risk of the spillage of lubricants and associated effect on local surface water features and soils has the potential to result in localised water pollution and contamination to soils, posing a risk to humans and sensitive habitats alike. Mitigation measures as set out in Chapter 7: Aquatic Ecology, Chapter 8: Soils and Geology and Chapter 9: Hydrology and Hydrogeology will ensure</p>	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							<p>that there is no contamination to hydrological or geological receptors due to the removal of the proposed turbines.</p> <p>The potential residual environmental effects are described in detail in Chapter 9 which concludes that there will be no significant environmental effects.</p>	
R	Industrial Accident-Fire/gas explosion	<p>Equipment or infrastructure failure;</p> <p>Fuel spillage/storage.</p> <p>Electrical problems; and</p> <p>Employee negligence</p>	<p>Injury or loss of life</p> <p>Structural damage</p> <p>Forest fires</p> <p>Air Pollution</p> <p>Damage to, or depletion of habitats and species.</p>	2	<p>As outlined in Chapter 4, any fuel stored on the Proposed Development site during the Decommissioning phase will be stored in appropriately banded tanks or bowsers, outside of any hydrological buffer areas.</p> <p>In accordance with Chapter 19 of the Safety, Health and Welfare at</p>	2	<p>Should a fire/explosion occur at the site, a limited consequence in that there would be ‘a limited number of people affected’ with ‘localised effects of short duration’ due to the nature of the Proposed Development and the lack of infrastructure or fuel storage during operation that would result in any such incident. There will be ‘normal community</p>	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
			Contamination		Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site.		functioning' in the area with 'some inconvenience'. Simple contamination of environment (e.g. watercourses), localised effects of short duration	

The risk assessment for each of the potential risks identified are consolidated in Table 16-8 which provides their ‘risk score.’ A corresponding risk matrix is provided in Table 16-9. As outlined in Section 16.2.3.2, the red zone represents ‘high risk’ scenarios’, the amber zone represents ‘medium risk scenarios’ and the green zone represents ‘low risk scenarios’.

Table 16-9 Risk Scores

Risk ID	Potential Risk	Likelihood Rating	Consequence Rating	Risk Score
Construction Phase				
A	Critical Infrastructure Emergency	1	1	1
B	Severe Weather	2	1	2
C	Flooding	2	1	2
D	Peat Stability	2	2	4
E	Traffic Incident	3	1	3
F	Contamination	2	2	4
G	Fire/Gas Explosion	2	2	4
Operational Phase				
H	Severe Weather	2	1	2
I	Contamination	2	1	2
J	Fire/Gas Explosion	2	2	4
K	Collapse/damage to structures	1	1	1
L	Traffic Incident	3	1	3
M	Loss of Critical Infrastructure	1	2	2
Decommissioning Phase				
N	Severe Weather	2	1	2
O	Flooding	2	1	2
P	Traffic Incident	3	1	3
Q	Contamination	2	2	4
R	Industrial Accident, Fire/Gas Explosion	2	2	4

Table 16-10 Risk Matrix

		Consequence Rating				
		1.Minor	2.Limited	3. Serious	4.Very Serious	5.Catastrophic
Likelihood Rating	5.Very Likely					
	4. Likely	L				
	3. Unlikely	E,P				
	2. Very Unlikely	B,C,H,I,N,O	D,F,G,J,P,Q,R			
	1. Extremely Unlikely	A,K	M			

Table 16-10 presents the potential risks identified during the construction, operation and decommissioning of the Proposed Development all of which can be classified as ‘low risk’ scenarios.

The scenario with the highest risk score in terms of a major accident and/or natural disaster during the construction, operation and decommissioning phase of the Proposed Development is identified below.

Peat Stability During Construction (D)

There is a potential risk of peat instability during the construction of the Proposed Development. The risk of peat instability was given a risk score of 4. The risk of peat instability has been minimised through the careful design of the Proposed Development and will be further limited through the implementation of the best practice construction control measures outlined in Appendix 8-1 of the EIAR.

The risk of peat instability is ‘very unlikely’ to occur and will have ‘limited’ consequences should it do so, representing a ‘low-risk scenario’ during the construction phase.

Contamination During Construction, Operation and Decommissioning (F, I, Q)

There is a potential risk of contamination from site activities during the construction, operation and decommissioning phases from potential release of hydrocarbons. The risk of contamination was given a risk score of 4. However, as outlined in Chapter 4 Section 4.3.10, measures are proposed and will be implemented to reduce the risk of accidental spillage and contamination of pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology.

The risk of contamination is ‘very unlikely’ to occur and will have ‘limited’ consequences should it do so, representing a ‘low-risk scenario’ during the construction, operation and decommissioning phases.

Industrial Accident-Fire/Gas Explosion During Construction, Operation and Decommissioning (G, J, R)

There is a potential risk of fire/explosion at the Proposed Development site. However, as outlined in Section 16.2.1, the scope of this assessment has been based on the understanding that the Proposed Development will be designed, built and operated in line with current best practice.

Further, in accordance with Chapter 19 of the Safety, Health and Welfare at Work Acts 2005 (as amended), the Proposed Development shall be subject to a fire safety risk assessment which will assist in the identification of any major risks of fire on site.

Therefore, the risk of fire/explosion occurring at the Proposed Development resulting in a major accident and/or disaster was given a risk score of 4. This indicates a scenario that is 'very unlikely' to occur and having 'limited' consequences should it do so, representing a 'low-risk scenario' during the operational phase.

16.4.2 Mitigation Measures

As outlined in Section 16.4.1, the scenario with the highest risk score in terms of the occurrence of major accident and/or disaster was identified as 'Contamination', 'Peat Stability' of the Proposed Development site and risk of 'Industrial Accident- Fire/Gas Explosion' during the construction, operation and decommissioning phases.

The Proposed Development has been designed and built in accordance with the best practice measures set out in this EIAR and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design.

As discussed, the application for the Proposed Development is accompanied by a CEMP which sets out details of the environmental controls to be implemented on site. The CEMP sets out the Emergency Response Procedure to be adopted in the event of an emergency including contamination, health and safety and environmental protection. The CEMP provides details on all mitigation and monitoring measures to be actioned prior to construction, during the construction, operation and decommissioning phase. The CEMP will be subject to ongoing review through regular environmental auditing and site inspections. This will confirm the efficacy and implementation of all mitigation measures and commitments identified in the application documentation.

The CEMP includes an Emergency Response Plan (ERP). It provides details of procedures to be adopted in the event of an emergency relating to health & safety or environmental protection. The site ERP includes details on the response required and the responsibilities of all personnel in the event of an emergency. Please see Chapter 4 and Appendix 4-3 of the EIAR for details.

16.4.3 Residual Effects

The risk of a major accident and/or disaster during the construction of the Proposed Development is considered 'low' in accordance with the '*Guide to Risk Assessment in Major Emergency Management*' (DoEHLG, 2010).

It is considered that when the above mitigation is implemented, and all mitigation detailed in the EIAR is implemented, there will not be significant residual effect(s) associated with the construction, operation and decommissioning of the Proposed Development.

16.4.4 Assessment of Cumulative Effects

16.4.4.1 Cumulative Impact Assessment

A search in relation to projects that may have the potential to result in a cumulative impact with the Proposed Development on the environment was carried out as part of the EIAR. The Proposed Development has been considered, cumulatively with the projects set out in Chapter 2, Section 2.8 of the EIAR.



Following a detailed assessment of the potential for any further impact when considered cumulatively with any or all of the projects, the Proposed Development, with mitigation measures in place, was found to have no potential for significant cumulative effects and therefore no increase in the vulnerability of the Proposed Development to major accidents and/or natural disasters.