Planning and Environmental Consultants

Environmental Impact Assessment Report (EIAR)

Proposed Cahermurphy West Wind Farm, Co. Clare

Chapter 16: Vulnerability of the Proposed Project to Major Accidents and Natural Disasters

DOCUMENT DETAILS

Client:	**FuturEnergy Ireland**
Project Title:	**Proposed Cahermurphy West Wind Farm, Co. Clare**
Project Number:	**230843**
Document Title:	**Environmental Impact Assessment Report (EIAR)**
Document File Name:	**Ch. 16 Vulnerability to Major Accidents and Natural Disasters - F - 2026.02.12 - 230843**
Prepared By:	**MKO** **Tuam Road** **Galway** **Ireland** **H91 VW84**

MKO Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
01	Draft	20/08/2025	MC	EMC
02	Draft	05/11/2025	MC	EMC
04	Draft	17/12/2025	MC	EMC
F	Final	12/02/2025	MC	EMC

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16. MAJOR ACCIDENTS AND NATURAL DISASTERS

16.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) describes the likely significant adverse effects on the environment arising from the vulnerability of the Proposed Project (Proposed Wind Farm site and Grid Connection) as detailed in Ch. 4: Description of the Proposed Project to risks of major accidents and/or natural disasters, as well as the potential of the Proposed Project 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 Assessment Reports'* (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 Project to major accidents and natural disasters, as well as the risk of the Proposed Project itself causing accidents or disasters is carried out in compliance with the EIA Directive 2011/92/EU, as amended by 2014/52/EU, which states the need to assess:

> *"the expected significant effects deriving from the vulnerability of the project to risks of major accidents and/or natural disasters which are relevant to the project concerned."*

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 Project could be vulnerable to.
- 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.

16.1.0 Statement of Authority

This chapter has been prepared by Michéal Cahill and reviewed by Natalia Stolarska and Eoin McCarthy, all of MKO.

Michéal Cahill is an Environmental Scientist with MKO. Michéal holds a first-class honours degree in Environmental Science at University of Galway and was awarded the Professor Emer Colleran Medal for his academic achievements. Michéal has 2 years previous experience in the preparation and review of Environmental Impact Assessment Reports for both offshore and onshore wind farm projects. As an environmental scientist within MKOs environmental renewables team, Michéal is involved in the preparation and revision of a variety of reports for a range of energy infrastructure projects. Natalia is a Project Environmental Scientist with MKO with over 2 years' experience in environmental consulting, having joined the company in September 2023. Natalia holds a BSc (Hons) in Earth and Ocean Science from University of Galway and an MSc in Environmental Leadership from University of Galway. Natalia's key strengths and areas of expertise are in drafting EIAR report chapters, environmental impact assessment screening reports, wind farm feasibility studies and QGIS mapping.

Eoin McCarthy is a Project Director with MKO with over 14 years' experience in environmental consultancy. Eoin has overseen some of the largest SID wind energy in Ireland in in that time and has held the role of project manager on over 550MW worth of wind energy projects.

16.2 Assessment Methodology

Major accidents or natural disasters are hazards which have the potential to affect the Proposed Project and lead to environmental effects directly and indirectly. These include accidents during construction, operation and decommissioning of the Proposed Project 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. This is addressed through determining the legislative context, categorising the baseline environment, and determining a methodology for the impact assessment of the vulnerability of the Proposed Project to risks of major accidents and/or natural disasters, as well as the potential of the Proposed Project itself to cause potential major accidents and/or natural disasters.

16.2.0 Legislative Context

16.2.0.1 Legislation

An assessment of the following key elements was undertaken in accordance with the EIA Directive 2011/92/EU, as amended by 2014/52/EU:

- The vulnerability of the Proposed Project to potential accidents and disasters.
- The Proposed Project'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 paragraph 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".*

16.2.0.2 Guidance Documents

The below guidance documents and literature pertinent to the area have been followed in the preparation of this chapter:

- 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 Protect Agency (2014) Guidance on Assessing and Costing Environmental Liabilities.
- Department of Defence (2020) A National Risk Assessment for Ireland
- Clare County Council (2018) Major Emergency Plan Public Edition

- HSE Mid-West Interim Regional Major Emergency Plan for HSE Services in counties Clare, Limerick and North Tipperary (December 2024).
- Health Service Authority advice for Health and Safety in the Renewable Sector.1
- Rialtas na hÉireann 2021-2022 National Risk Assessment: Overview of Strategic Risks2
- Department of Defence (2020) A National Risk Assessment for Ireland

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

- Census of Ireland 2016 and 2022;
- Regional Spatial and Economic Strategy (RSES) 2020-2032, published by the Southern Regional Assembly on 31st January 2020;
- Clare County Development Plan 2023 – 2029; and
- Clare County Council Website (Last accessed February 2026)

16.2.2 Impact Assessment Methodology

16.2.2.1 Introduction

A wind farm is not a recognised source of pollution. It is not subject to Industrial Emissions Directive regulation or any other EPA 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. Due to the nature of the Proposed Project, 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 Project and causing environmental damage.

There is low potential for significant natural disasters to occur at the Proposed Project. 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 Project is not regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e., SEVESO sites, however, the Proposed Grid Connection does connect into the Moneypoint ESB Generating Station, an Upper Tier Seveso site. An assessment of any potential interaction between the Proposed Project is discussed in Section 16.3.6 below.

The Proposed Project has low potential to cause natural disasters or major accidents. As detailed in the Geotechnical and Peat Stability Report included in Appendix 8-1, the ground conditions on the Proposed Wind Farm site comprises mainly of shallow to deep peat overlying glacial till overlying bedrock. The surrounding landscape is predominately rolling topography with land-use comprising forestry, renewable energy and blanket peatland. Peat depths recorded at the Site had an average depth

[1] *Health Service Authority advice for Health and Safety in the Renewable Sector https://www.hsa.ie/eng/your_industry/renewable_energy/*
[2] *Rialtas na hÉireann 2021-2022 National Risk Assessment: Overview of Strategic Risks. https://www.gov.ie/pdf/?file=https://assets.gov.ie/220847/1291534a-9b27-4c05-92ed-d3bd21adc89a.pdf#page=null*

of 0.7m, and depths are typically well below 1.0m around the proposed infrastructure (See Appendix 8-1 for details). The findings of the peat stability assessment, which followed the principles in Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (PLHRAG, Scottish Government, 2017), showed that the Proposed Project has an acceptable margin of safety, is suitable for the Proposed Wind Farm development and is considered to be at low risk of peat failure provided appropriate mitigation measures, such as implementing and maintaining an appropriate drainage system are implemented. The proposed underground electrical cabling route is located predominantly within the public road network. According to GSI mapping, the soil types along the proposed Grid Connection route include Cut Peat, Blanket Peat, Acid brown Earths and Brown podzolic, Glaciofluvial sands and gravels, Bedrock outcrops, Alluvium and till derived from Namurian rocks.

Any risks associated with flooding, impacts on infrastructure, accidents etc are addressed in the Section 16.4 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 below and in the relevant EIAR assessment chapters (Refer to Chapters 5 to 15 for further detail).

16.2.2.2 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 Project. The approach to identifying and quantifying risks associated with the Proposed Project by means of a site-specific risk assessment is derived from the EPA '*Guidance on Assessing and Costing Environmental Liabilities'* document[3]. The following steps were taken as part of the site-specific risk assessment, in accordance with the aforementioned EPA guidance:

- Risk identification
- Risk classification, likelihood and consequence: and
- Risk evaluation

16.2.2.2.1 *Risk identification*

Risks have been reviewed through the identification of reasonably foreseeable risks in consultation with relevant contributors to this EIAR (refer to *Statements of Authority* in Chapters 5 to 15 of this EIAR). The identification of risks has focused on non-standard but plausible incidents that could occur at or as a result of the Proposed Project during construction, operation and decommissioning.

In accordance with the European Commission EIAR Guidance[4], risks are identified in respect of the Proposed Project:

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

16.2.2.2.2 *Risk Classification*

[3] *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*
[4] *European Commission (2017). Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Reports*

Classification of Likelihood

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.

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 HSE Emergency Management: Area 3 Crisis Management Team Major Emergency Plan will work to reduce the consequence of any major accident or disaster. The consequence of the impact if the event occurs has been assigned as described in Table 16-2, which is used to position all the identified hazards on the risk matrix described below.

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

Ranking	Classification	Impact	Description
			Community functioning poorly, minimal services available
5	Catastrophic	Life, Health, Welfare Environment Infrastructure Social	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. Very heavy contamination, widespread effects of extended duration. >€25M 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 rankings have been multiplied to establish a 'risk score' to support the evaluation of risks within the Risk Matrix Zone.

The Risk Matrix Zone 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 Zone has therefore been applied to evaluate each of the risks associated with the Proposed Project. The Risk Matrix Zone 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: Risk Matrix Zone (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 Proposed Project Hazard Analysis

The *HSE Emergency Management: Area 3 Crisis Management Team Major Emergency Plan*[5] outlines several hazard categories which may have the potential to lead to a major emergency in Area 3 – Clare, Limerick and North Tipperary. The hazard categories include Natural, Transportation, Technological and Civil. The hazard categories, types and subtypes, and their relevance to the Proposed Project during all stages (i.e., construction, operation and decommissioning stage), prior to the implementation of mitigation measures, are listed below in Table 16-4.

Table 16-4 HSE Emergency Plan hazard identification (Area 3 Crisis Management Team Major Emergency Plan)

Natural Hazards			
Category	**Type**	**Subtype**	**Relevant Hazard to the Proposed 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 Flooding Falling Trees
	Heavy Snow	Blizzards- Poor visibility	Poor Driving conditions Ice falling from turbine blades
	Severe Cold / Frost extremes of Temperature	Icy Roads /Impassable Roads Hypothermia Freezing of Supply Network	Poor Driving Conditions Public Health Risk Lack of Road Grit
	Thunder & Lightning Dense/ Persistent Fog Heat Wave /Drought	Road Traffic collisions	Loss of Infrastructure Poor driving conditions Public Health Risk Water Shortage
Hydrological	Flooding	Coastal / Inland	The risk of flooding at the Proposed Wind Farm site is low due to the elevated and sloping nature of the site and the presence of streams which flow rapidly downslope. The Proposed Grid Connection is generally at a low risk of flooding. Refer to Appendix 9-1 of this EIAR for a site specific flood risk assessment.
	Heavy Rain		As noted in Section above, risk of flooding at the Proposed

[5] *https://www.hse.ie/eng/services/list/3/emergencymanangement/area-mep/hse-emergency-management-area-3-emergency-plan.pdf*

			Wind Farm site and Proposed Grid Connection is low. Furthermore, based on the CFRAM rainfall (pluvial) flood mapping, surface water ponding/flooding is not a notable issue at the Proposed Wind Farm site. Please see Section 9.3.2 of Ch. 9: Water and Appendix 9-1 for further detail.
Geological	Landslide		Peat Instability – The Proposed Wind Farm site has an acceptable margin of safety regarding peat stability, with a low likelihood of a peat slide occurring on site.
	Forest / Wilderness fire - Air Pollution		Majority of the Proposed Wind Farm site and some of surrounding area is forested. Potential for mechanical fire within turbine. With mitigation measures in place the risk of a forest fire at the Proposed Wind Farm site and the Proposed Grid Connection is not significant.
Transportation Hazards			
Category	**Type**	**Subtype**	**Relevant Hazard to the Proposed Project**
Aviation	Aircraft Collision /Loss	Mid Air and Land	Shannon Airport – Approximately 29km from the Site. The Site is located outside the Public Safety Zone (PSZ). Shannon Airport confirmed that the Proposed Wind Farm site is located c.6km from their Safeguarding boundary on the 8th February 2026. All turbines will be fitted with Aviation warning lights
Rail	Mainline		Not Applicable
	Bridge		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		24 no. watercourse crossings on Proposed Grid Connection route.
Water	Inland Water ways	Pleasure Craft/Cruises Pollution from above	Potential for pollution to waterways during transportation of material to the Proposed Wind Farm site and along the Proposed Grid Connection.
	Coastal	Car Ferry/ passenger Ferries	Not Applicable
Technological Hazards			
Category	**Type**	**Subtype**	**Relevant Hazard to the Proposed Project**
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		Controlled blasting at Borrow Pit locations
	LPG		Not Applicable
	Pipeline		Not Applicable
Fires			Air Pollution
Building Collapse			Collapse of substation building.
Hazardous substance		Accident at site	Release of hydrocarbons on-site

		Transportation accident	Hazmat on roads
		Weapons	Not Applicable
	Biological	Leak/Weapons	Not Applicable
	Radiological	"Dirty Bomb"	Not Applicable
		Industrial Accident	Not Applicable
		Health facilities	Not Applicable
Pollution/Contamination	Air/Water Pollution		Fire Sediment-laden Water Run Off Fuel/hydrocarbon spill/leak.
	Extractive Mining Sites	Category A Extractive Sites	Not Applicable
Civil Hazards			
Category	**Type**	**Subtype**	**Relevant Hazard to the Proposed Project**
Civil Disorder / Disturbance	Protest Rioting		Not Applicable
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 hazards which are most relevant to this assessment from Table 16-4 above are described in the Sections that follow, under the following hazard categories:

- Meteorological
- Hydrological
- Peat Stability
- Traffic
- Industrial Accident
- Loss of Critical Infrastructure
- Contamination
- Health and Safety
- Turbine Safety
- Electromagnetic Interference

These hazards will be described in detail before mitigation measures to minimise the risk from relevant hazards are addressed in Section 16.4 below.

16.3.2 Meteorological

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. 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 Shannon Airport which is located approximately 29 kilometres to the southeast of the Proposed Project, is the nearest weather and climate monitoring station to the Site that has meteorological data recorded for the 30-year period from 1991-2020. Meteorological data recorded at Shannon Airport over the 30-year period from 1991-2020 is shown in Table 11-4 of Ch. 11 Climate. The wettest months are November and December, and April and May are usually the driest. July is the warmest month with a mean daily temperature of 16° Celsius.

Wind speeds at Shannon Airport are greater than 16.7 kilometres per hour (9 knots), from November to April. The windiest month of the year at Shannon Airport is February, with an average monthly wind speed of 18.7 kilometres per hour (10.1 knots). The months of May to October tend to be more

settled on average. The calmest month of the year in Shannon Airport is August, with an average monthly wind speed of 15.4 kilometres per hour (8.3 knots).

Turbine blades are manufactured of glass reinforced plastic which prevent any likelihood of an increase in lightning strikes within the Proposed Wind Farm site or the local area. Lightning conduction cables, encased in protection conduits, follow the electrical cable run from the nacelle to the base of the turbine.

The works programme for the construction, operational and decommissioning phases of the Proposed Project 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 Éireann 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 Éireann 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 Éireann 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

As detailed in Ch. 9: Water, fluvial flood zones are also mapped along the Proposed Grid Connection cable route at watercourse crossings over the Creegh River and the Doonbeg River, but this potential flooding has no consequence for the Proposed Project due to the underground nature of the Proposed Grid Connection. No recurring, nor historic flooding incidents have occurred within the Proposed Wind Farm site.

The closest mapped flood event occurred on the 01/01/2014 at the N67 national road, c.1.1km from the Proposed Grid Connection. The Proposed Grid Connection similarly does not cross any rivers with an associated low, medium or high probability of flooding. As such, based on the flood risk assessment findings (please see Appendix 9-1), the proposed Grid Connection has low risk of flooding with no mitigation being required.

The main risk of flooding within the Proposed Wind Farm site is via pluvial flooding. This risk is limited given the topography of the Proposed Wind Farm site. As such, ponding or Pluvial flooding would therefore likely be confined to the flat areas on the Site and would be further mitigated using drainage measures outlined in Ch. 9: Water of the EIAR and Appendix 4-7, 'Surface Water Management Plan. The Proposed Project has been designed and includes drainage measures to ensure that there is low risk of flooding on-site. Appropriate mitigation measures will be applied as outlined in Section 9.5.2 of Ch. 9: Water to ensure that any flood incidents will not occur due to the Proposed Project.

16.3.4 Peat Stability

Given the upland nature of the Proposed Project site and the presence of peat, geotechnical and peat stability considerations have been central to the design phase of the Proposed Project.

A comprehensive and robust Geotechnical & Peat Stability Assessment was undertaken for the Proposed Project and used to inform the design process including the siting of all proposed main infrastructure locations and drainage control measures. The Geotechnical & Peat Stability 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,* which is considered best practice guidance in Ireland. Intrusive ground investigation works were carried out as part of the peat stability assessment including peat depth probing, shear strength testing, trial pitting and rotary boreholes. The extensive suite of ground investigations and the robust peat stability assessment will ensure that the risk of such an event, occurring during the construction, operation or decommissioning of the Proposed Project site is minimised. Please see Ch. 8: Land, Soils & Geology and Appendix 8-1 Geotechnical & Peat Stability Assessment for more details. In summary, the Proposed Wind Farm site has an acceptable margin of safety and is considered to be at low risk of peat failure providing appropriate mitigation measures and construction controls are implemented and is suitable for wind farm development. Please see Appendix 8-1 for further information on this assessment.

16.3.5 Traffic

The Proposed Project (Proposed Wind Farm site and Grid Connection) will utilise the surrounding road network during the construction, operational and decommissioning phases of the development. Construction related traffic will originate from the delivery of materials to site, 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 Ch. 15: Material Assets and Appendix 15-2: Traffic Management Plan for details.

Appendix 15-2: Traffic Management Plan (TMP) provides specifying details relating to traffic management. Prior to the commencement of the construction phase of the Proposed Project a detailed Traffic Management Plan will be prepared by the Contractor for agreement with the relevant local authorities and An Garda Síochána. The TMP submitted with this application includes recommendations 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 Ch. 15: Material Assets and Appendix 15-2 Traffic Management Plan for details.

16.3.6 Industrial Accident

The Proposed Grid Connection Route connects into ESB Moneypoint 110kV GIS substation, a site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations (SEVESO sites). No significant effects associated with major industrial accidents involving dangerous substances are anticipated given the Proposed Grid Connection infrastructure does not directly interact with any of the waste management elements of the Moneypoint complex. Petrochemical fires and fires from fuel emissions, leakages and spillages have potential to occur (albeit very low) during construction and connection of the Proposed Grid Connection to Moneypoint. A range of mitigation measures relating to the release hydrocarbons are outlined in Ch. 9: Water of this EIAR, which will ensure that the chances of this occurring or any likely significant potential effects will not be significant

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. Should a loss of critical infrastructure occur, there would be a loss of electricity to businesses and households, among other infrastructure, potentially across the county to national level. Such an event may have the possibility to endanger lives and in a wider sense the national economy.

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 varying amounts 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 during the operational phase at the Proposed Project will not impact the local or national energy supply. There are no Gas Network Ireland (GNI) Pipelines within the Proposed Wind Farm site nor the Proposed Grid Connection.

16.3.8 Contamination

The Proposed Project has the potential to cause contamination and pollution of groundwater and surface water from potential release of hydrocarbons, earthworks and excavations on site without the implementation of appropriate mitigation measures. A Construction Environment Management Plan (CEMP) and Surface Water Management Plan (SWMP) have 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 Project.

Section 3 of the CEMP sets out details of the environmental controls to be implemented on site. The CEMP provides details of peat stability monitoring measures, waste management and pollution prevention measures for refuelling and managing hazardous materials and cement-based products. The SWMP further provide details on the Proposed Drainage measures and mitigation measures relating to such. 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 Ch. 4: Description of the Proposed Project and Appendix 4-4 CEMP for details.

16.3.9 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*' 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, the 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 ice 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 Proposed Wind Farm site 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.

16.3.10 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 properties (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)[6] provides further practical information on EMF. Further details on the potential impacts of electromagnetic interference to telecommunications and aviation are presented in Ch. 15: Material Assets of this EIAR.

16.4 Risk Assessment

This Section outlines the possible risks associated with the Proposed Project 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 Table 16-2.

[6] *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.*

As outlined in Section 16.2, the consequence rating assigned to each potential risk assumes that all proposed pre-mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

16.4.1 Likely Significant Effects

16.4.1.1 Do-Nothing Scenario

If the Proposed Project was not developed, the Site will continue to function as it does at present, with no changes made to the current land-use. The impact of this is considered neutral in the context of the EIAR. While the potential for the disasters listed in this chapter would not arise, if the Proposed Project were not to proceed, the opportunity to capture an even greater part of County Clare's valuable renewable energy resource would be lost, as would the opportunity to further contribute to meeting Government 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 and to diversify the local economy would also be lost.

16.4.1.2 Assessment of Effects During Construction

A risk register has been developed which contains all potentially relevant risks identified during the construction phase of the Proposed Project, as guided by Table 16-4 above. Seven risks specific to the construction of the Proposed Project have been identified and are presented in Table 16-5.

Table 16-5 Risk Register - Construction Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
A	**Severe Weather** Risk to construction activity on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.
B	**Flooding** High levels of surface water on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.
C	**Landslide/Peat Stability** Movement of peat within the site during construction	Mismanagement of excavated material on site. Severe weather conditions- storm, flooding.
Potential to cause accidents and / or disasters.		

D	**Utility emergencies** Risk of construction activity along the Grid Connection underground electrical cabling route	Construction activity along grid and road network impacting on local services and utilities.
E	**Traffic Incident** Collisions onsite and offsite with vehicles involved in construction of Proposed Project	Driver negligence or failure of vehicular operations on site roads. Traffic Management Plan not implemented.
F	**Contamination** Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater. Discharge due to horizontal directional drilling (HDD) frack out on Proposed Grid Connection works area.	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles. Drainage and seepage water resulting from infrastructure excavation. Stockpiled excavated material providing a point source of exposed sediment. Construction of the Proposed Project cable trench resulting in entrainment of sediment from the excavations during construction, and Erosion of sediment from emplaced site drainage channels.
G	**Fire / Explosion**	Controlled blasting at Borrow Pits; Equipment or infrastructure failure; Electrical problems; and Employee negligence.

16.4.1.3 Assessment of Effect During Operation

Seven risks specific to the operation of the Proposed Project 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 operational activity on site, blade or turbine damage.	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.
I	**Flooding** Risk of flooding in areas surrounding the Site impacting the operational phase and leading to environmental emissions	Extreme weather- periods of heavy rainfall and snow, taking into account climate change and strong winds
Potential to cause accidents and / or disasters.		
J	**Fire / 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.
L	**Traffic Incident** Collisions onsite and offsite with vehicles involved in operation of Proposed 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
N	**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. Spill or leak of oil during operational maintenance

16.4.1.4 Assessment of Effect During Decommissioning

Six risks specific to the decommissioning of the Proposed Project 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		
O	**Severe Weather** Risk to decommissioning activity on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
P	**Flooding of site** Risk of flooding in areas surrounding the Site impacting the decommissioning.	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
Q	**Landslide/Peat Stability** **Movement of peat within the site during decommissioning**	Disturbance of peat on removal of turbines Severe weather
Potential to cause accidents and / or disasters.		
RR	**Traffic Incident** Collisions onsite and offsite with vehicles involved in construction of Proposed Project	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented
SS	**Contamination** Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles. Drainage and seepage water resulting from infrastructure excavation. Erosion of sediment from emplaced site drainage channels.
TT	**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 Project. As outlined in Section 16.2.2.2.2, 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.

16.4.1.5 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	Severe Weather	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species;	2	The risk of severe weather is very unlikely when considering the assessment in Ch.11: Climate and weather conditions recorded over the last 30 years within the area. The construction period will be scheduled in the near-term, in a climate similar to the present-day.	1	The risk of severe weather conditions 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 number of minor injuries with first aid treatment'. No contamination, localised effects.	2
B	Flooding	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse	2	The risk of flooding is considered very unlikely when taking into account the baseline assessment in Ch. 9: Water of the EIAR and	1	The risk of flooding during the construction phase will result in a minor consequence in that 'small number of people would be	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;		due to no recurring or historic flood incidents being recorded within the Proposed Wind Farm site or along the Proposed Grid Connection route.		affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment' No contamination of environment (e.g. watercourses), localised effects.	
C	Landslide/ Peat Stability	Mismanagement of excavated material on site Extreme weather conditions	Movement of peat within the site; Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species;	1	The Proposed Project has been designed to minimise the potential for peat instability and failure. Refer to Appendix 8-1: Geotechnical and Peat Stability 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'. Contamination of environment (e.g. watercourses), localised effects of short duration.	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
D	Utility emergencies	Construction activity along road network during grid connection installation impacting on local services and utilities	Illness or loss of life; Disruption to services	2	Confirmatory surveys will be carried out by the Contractor to ensure that the Grid Connection is designed to take into consideration any services and utilities with the road network.	1	The risk of impact on utilities and services during the construction phase will result in a minor consequence in that 'small number of people would be affected, with 'no fatalities and a small number of minor injuries with first aid treatment'.	2
E	Traffic Incident	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented or not adhered	Injury or loss of life.	2	A limited number of vehicles will be permitted on the site as part of the construction phase. As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on site or off site, 'at some time.' An unlikely risk is therefore predicted.	2	A limited consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'limited number of people would be affected'	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
F	Contamination	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles. Drainage and seepage water resulting from infrastructure excavation; Stockpiled excavated material providing a point source of exposed sediment; Construction of the Proposed Project resulting in entrainment of sediment from the	Release of suspended solids to groundwater. Contamination of local drinking water supplies and groundwater aquifers. Groundwater and surface water emissions from construction activities including trench excavations and HDD .	2	As outlined in Ch. 4: Description of the Proposed Project and the CEMP Appendix 4-5, fuel will be stored on-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. Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures as detailed in Ch. 9: Water.	2	The risk of a fuel spillage or impact on surrounding 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' through the use of bunded containment areas and proposed drainage mitigation measures during construction. Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. On-site refuelling of machinery will be carried out at designated refuelling areas within the temporary 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)
		excavations during construction; and, Erosion of sediment from emplaced site drainage channels.					compound. Only designated trained and competent operatives will be authorised to refuel plant on-site. HDD is planned for a limited number of locations and will be controlled to prevent significant environmental effects	
G	Fire/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 Ch. 4: Description of the Proposed Project and Appendix 4-5 CEMP, fuel will be stored on-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.	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' due to the nature of the project and the lack of infrastructure or fuel storage during operation that would result in any such	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					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 will assist in the identification of any major risks of fire on site.		incident. There will be 'normal community functioning' in the area with 'some inconvenience'. Simple contamination of environment (e.g. watercourses), localised effects of short duration.	
Operational Phase								
H	Severe Weather	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life;	2	The risk of severe weather is unlikely when considering the assessment in Ch. 11: Climate and weather conditions recorded over the last 30 years within the area.	1	The risk of severe weather conditions during the operational 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'.	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
I	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 and	2	The risk of flooding is considered very unlikely within the Proposed Wind Farm site when taking into account the Flood Risk Assessment in Ch. 9: Water of the EIAR	1	The risk of severe weather conditions during the operational 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'.	2
J	Fire/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	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	2	Should a fire/explosion occur at the site, a limited consequence is expected in that there would be 'a limited number of people affected' with 'localised effects of short duration' due to the nature of the project and the lack of fuel storage during the operation that would result in any such	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					will assist in the identification of any major risks of fire on site.		incident. There will be 'normal community functioning' in the area with 'some inconvenience'. Simple contamination of environment (e.g. watercourses), localised effects of short duration.	
K	Collapse/ damage to structures	Landslide/ Earthquake; and Extreme weather conditions such as flooding and storms. Vehicular collisions due to driver negligence Mismanagement of excavated material on site	Injury or loss of life. Movement of peat within the Proposed Wind Farm site; Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species;	1	Having regard to public speed limits within the site, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse.	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)
L	Traffic Incident	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented	Injury or loss of life.	2	A limited number of vehicles will be permitted on the Proposed Wind Farm site as part of the operation phase. With on-site speed limits of 15km/h in place within the Proposed Wind Farm site. As such, it can be determined that there is little 'opportunity, reason or means' for a vehicle collision to occur A very 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.'	2
M	Loss of Critical Infrastructure	Equipment or infrastructure failure; Electrical problems; and Employee negligence	Injury or loss of life.	1	EirGrid operate the grid from National Control Centres matching electricity production to customer demand, switching from synchronous to non-synchronous where	2	Should a power failure occur within the Proposed Grid Connection or proposed 110kV on-site substation, it will result in a limited number of people being affected	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Landslide/ Earthquake; and Extreme weather conditions such as flooding and storms.			required to ensure no power outages. The Proposed Grid Connection will originate from the proposed onsite 110kV electrical substation via an underground cable to Moneypoint 110kV Electrical Substation. Any shortages or failures along this grid connection route will not impact other connections to the same substation.		by localised effects of a short duration.	
N	Contamination	Mismanagement of hazardous materials e.g. oil during turbine maintenance Mismanagement of general waste and welfare facilities waste	Damage to, or depletion of aquatic habitats and species Contamination of local drinking water supplies and groundwater aquifers.	1	All hazardous wastes, if any, from the maintenance of the turbines and substation (including transformers) will be stored securely in bunded containers/areas before being collected by an authorised waste contractor and brought	2	The risk of a fuel spillage or impact on surrounding drainage features during the operational phase will result in a limited consequence in that there would be 'limited number of people affected' with 'localised effects of short	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
			Accidental spillage during refuelling onto subsoils		to an EPA licensed waste facility. The wastewater holding tank at the substation will be emptied when required by a licenced contractor. Mitigation measures to be employed that will reduce the likelihood of contamination risks are outlined in Ch. 8: Lands, Soils & Geology and Ch. 9: Water.		duration' through the use of bunded containment areas and off-site refuelling during operation. 'Contamination' of the environment would occur with 'localised effects of short duration'	
Decommissioning Phase								
O	Severe Weather	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species;	2	The risk of severe weather is unlikely when considering the assessment in Ch 11: Climate and weather conditions recorded over the last 30 years within the area.	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,	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							with 'no fatalities and a small number of minor injuries with first aid treatment'. No contamination of environment (e.g. watercourses), localised effects.	
P	Flooding	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species;	2	The risk of flooding is considered very unlikely when taking into account the baseline assessment in Ch. 9 Water of the EIAR and due to no recurring or historic flood incidents are recorded within the Proposed Wind Farm site or along the Proposed Grid Connection route.	1	The risk of flooding 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'. No contamination of environment (e.g. watercourses), localised effects.	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Q	Peat Stability/ Landslide	Extreme weather conditions	Movement of peat within the site; Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species;	1	The Proposed Project has been designed to minimise the potential for peat instability and failure. Refer to Appendix 8-1 Geotechnical and Peat Stability Assessment Report It is proposed to leave turbine foundations in place underground and to cover them with soil and reseed as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option as excavation works will be avoided. As a result there is no peatslide risk at the Site.	2	Should a peat stability failure occur during the decommissioning of the Proposed Wind Farm, it will result in a limited number of people affected with localised effects of short duration. Contamination of environment (e.g. watercourses), localised effects of short duration.	2
R	Traffic Incident	Driver negligence or failure of vehicular	Injury or loss of life.	3	A limited number of vehicles will be permitted on the	1	A minor consequence is predicted. Having regard to on-site speed	3

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		operations on site roads. Traffic Management not implemented			Proposed Wind Farm site as part of the decommissioning phase. An agreed speed limit will be enforced on the Site during all decommissioning works A limited number of vehicles will be involved in the removal of turbines from the Proposed Wind Farm site. As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on site or off site, 'at some time.' An unlikely risk is therefore predicted.		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.'	
S	Contamination	Fuel spillage during delivery to site.	Damage to, or depletion of aquatic habitats and species.	2	As outlined in Ch. 4: Description of the Proposed Project, fuel will be stored on-site but	2	The risk of a fuel spillage or impact on surrounding drainage during the	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Failure of fuel storage tank or tanks in plant and machinery and vehicles. Drainage and seepage water resulting from infrastructure removal; Erosion of sediment from site drainage channels.	Release of suspended solids to surface watercourses and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies.		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. Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage measures as detailed in Ch. 9 Water.		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 operation. Simple contamination of environment (e.g. watercourses), localised effects of short duration.	
T	Fire/explosion	Equipment or infrastructure failure; Fuel spillage/storage Electrical problems; and	Injury or loss of life Structural damage Forest fires Air Pollution Damage to, or depletion of habitats and species	2	As outlined in Ch. 4: Description of the Proposed Project, 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,	2	Should a fire/explosion occur at the Proposed Wind Farm site, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of a short duration' due to the nature of the decommissioning	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Employee negligence	Contamination		Health and Welfare at Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which will assist in the identification of any major risks of fire on Site.		works. There will be 'normal community 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 16-9 which provides their 'risk score.' A corresponding risk matrix is provided in Table 16-10, which is colour coded in order to provide an indication of the critical nature of each risk. 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	Severe Weather	2	1	2
B	Flooding	2	1	2
C	Landslide / Peat Stability	1	2	2
D	Utility company emergencies	2	1	2
E	Traffic Incident	2	1	2
F	Contamination	2	2	4
G	Fire/Gas explosion	2	2	4
Operational Phase				
H	Severe Weather	2	1	2
I	Flooding	2	1	2
J	Fire/Gas explosion	2	2	4
K	Collapse/ damage to structures	1	1	1
L	Traffic Incident	2	1	2
M	Loss of Critical Infrastructure	1	2	2
N	Contamination	1	2	2
Decommissioning Phase				
O	Severe Weather	2	1	2
P	Flooding	2	1	2
Q	Landslide/ Peat Stability	1	2	2
R	Traffic Incident	3	1	3
S	Contamination	2	2	4

T	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					
	3. Unlikely	R				
	2. Very Unlikely	A, B, D, E, H, I, L, O,	F, G, J, S, T			
	1. Extremely Unlikely	K	C, N, Q, M			

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

The scenarios 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 Project (i.e., F, G, J, S, T in Table 16-10 are identified below:

16.4.1.5.1 *Contamination During Construction, Operation and Decommissioning (F, S)*

There is a potential risk of contamination from site activities during the construction and decommissioning phases from potential release of hydrocarbons. The risk of contamination was given a risk score of 4. However, as outlined in Ch. 4: Description of the Proposed Project, and Ch. 9: Water, mitigation and drainage measures are proposed and will be put in place to reduce the risk of accidental spillage and contamination of pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology.

16.4.1.5.2 *Fire/Explosion During Construction, Operation and Decommissioning (G, J, T)*

There is a potential risk of fire/explosion at the Proposed Project site. However, as outlined in Section 16.2.1, the scope of this assessment has been based on the understanding that the Proposed Project 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 to 2014, the Proposed Project 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 Project 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 construction, operational and decommissioning phases.

16.4.2 Mitigation Measures

As outlined in Section 16.4.1.5, the scenario with the highest risk score in terms of the occurrence of major accident and/or disaster was identified as, 'Contamination' during the construction and

decommissioning phases and risk of 'Fire/ Explosion' during the construction, operation and decommissioning phases.

The Proposed Project 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 Project 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 Ch. 4: Description of the Proposed Project and Appendix 4-5 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 Project is considered 'low' in accordance with the '*Guide to Risk Assessment in Major Emergency Management*' (DoEHLG, 2010).

It is considered that when the mitigation and monitoring measures outlined in the CEMP are implemented and adhered to there will not be significant residual effect(s) associated with the construction, operation and decommissioning of the Proposed Project

16.4.4 Assessment of Cumulative Effects

16.4.4.1 Cumulative Impact Assessment

A search in relation to plans and projects that may have the potential to result in a cumulative impact with the Proposed Project on the environment was carried out as part of the EIAR. The Proposed Project has been considered, in combination with existing, permitted and proposed projects and plans (wind energy or otherwise), as set out in Section 2.8 in Ch. 2: Background to the Proposed Project of this EIAR.

All elements of the Proposed Project were assessed to identify any cumulative effects. A wind farm including all its various components including the grid connection works, substation, roads, turbines etc 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.

There is low potential for significant natural disasters to occur at the Proposed Project site. Ireland is a geologically stable country with a mild temperate climate. The potential natural disasters that may occur

are therefore limited and these have been assessed in the context of the Proposed Project, cumulatively in this chapter and in the wider EIAR.

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 Project is not regulated, but is connected to Moneypoint ESB, a site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e., Seveso sites. There are no expected potential effects from this site. There is no real likelihood of significant environmental effects cumulatively associated with major accidents.

The Proposed Project has low potential to cause natural disasters or major accidents. The likelihood of a peat slide occurring on site is low. Any risks associated with flooding, impacts on infrastructure, accidents etc are addressed in the Sections above. There is no real likelihood of significant environmental effects cumulatively associated with the Proposed Project's potential to cause accidents or natural disasters.

Following a detailed assessment of the potential for any further impact when considered in combination with any or all of the plans and projects set out in set out in Ch. 2: Background to the Proposed Project, Section 2.6, the Proposed Project, with mitigation measures in place, was found to have no potential for significant in-combination or cumulative effects associated with the potential for the project to be impacted by major accidents and/ or natural disasters or the Proposed Projects potential to cause major accidents and/ or natural disasters. This is based on the low risk associated with the Proposed Project described in this Chapter of the EIAR and a review of the nature of the surrounding land uses and projects existing or intended in the surrounding area. Therefore, the cumulative residual effect of the Proposed Project to cause or be impacted by major accidents and natural disasters is not significant.