

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 Project as detailed in Chapter 4, 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 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 Project to major accidents and/or natural disasters, as well as the risk of the Proposed Project itself causing major accidents and/or natural 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 the Proposed Project

“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 Project 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.

For the purposes of this EIAR:

- The ‘**Proposed Wind Farm**’ refers to the 9 no. turbines and supporting infrastructure which is the subject of this Section 37E application.
- The ‘**Proposed Grid Connection**’ refers to the 110kV substation and supporting infrastructure which will be the subject of a separate Section 182A application.
- The ‘**Proposed Project**’ comprises the Proposed Wind Farm and the Proposed Grid Connection, all of which are located within the EIAR Study Boundary (the ‘**Site**’) and assessed together within this EIAR.

Please see section 1.1.1 of this EIAR for further details. A detailed description of the Proposed Project is provided in Chapter 4 of this EIAR.

16.1.1 Statement of Authority

This section of the EIAR, has been prepared by Karen Mulryan and reviewed by Michael Watson, of MKO. Karen is a Project Environmental Scientist with MKO with over 7 years' experience in the consultancy sector. Karen holds a BA International in Archaeology from NUI Galway and a MSc in Archaeology from the University of Edinburgh. Karen's key strengths and areas of expertise are in project management, environmental impact assessment, wind energy site selection and feasibility assessment. Since joining MKO, Karen has experience managing wind farm Environmental Impact Assessment Report applications of various scales including SID applications across Ireland. Karen has experience in report writing, including EIAR Major Accidents and Natural Disasters chapters, feasibility studies and EIA screening reports. Karen holds memberships with the Chartered Institute for Archaeologists (ACIFA) and the Institute of Archaeologists of Ireland (IAI).

Michael Watson is Director of Environment at MKO with over 20 years' experience in the environmental sector. Michael's professional experience includes managing and overseeing Environmental Impact Assessment Reports including Major Accidents and Natural Disasters reports, EPA License applications, hydrogeological assessments, environmental due diligence and general environmental assessment on behalf of clients in the wind farm, waste management, public sector, commercial and industrial sectors nationally. Michael also has a Bachelor of Arts Degree in Geography and Economics from NUI Maynooth, is a Member of IEMA, a Chartered Environmentalist (CEnv) and Professional Geologist (PGeo).

16.2 Assessment Methodology

16.2.1 General

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

- Census of Ireland 2016; 2022.
- Mid-West Regional Planning Guidelines 2010-2022;
- Regional Spatial and Economic Strategy for the Southern Region (RSES) 2020;
- 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
- Tipperary County Council – Major Emergency Plan
- 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
- Fáilte Ireland.ie

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

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>

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 and soil, hydrology and hydrogeology, air quality, climate, material assets, cultural heritage and the landscape.

16.2.2 Legislative Context

16.2.2.1 Legislation

An assessment of the following key elements was undertaken in accordance with the EIA Directive (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 (hydrology, soils, habitats, flora and fauna).

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”.

16.2.3 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.

16.2.4 Impact Assessment Methodology

16.2.4.1 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 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 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 Project has low potential to cause natural disasters or major accidents. As detailed in Section 8.3.5 in Chapter 8 Land Soil and Geology, while there are sections of peat identified within the Site on the published soils map (www.epa.ie) and published subsoils maps (www.gsi.ie), the extent of peat found at the Proposed Project footprint comprised:

- peat up 0.8m deep along the proposed access road to turbine T9
- 0.7m of peat was encountered at T9.
- Shallow peat of up to 0.2m was found along the proposed access roads to turbine locations T6 and T7, but not at the turbine locations.
- Of the 23 no. soil probes carried out along the Grid Connection and end mats, only 7 no. encountered shallow peat/peaty topsoil up to depths of between 0.2 and 0.3m.

At no location was peat of 1m or more encountered. The Site is relatively flat and is not a peatland site and so there is low/no potential for peat slides or landslides. 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).

16.2.4.2 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*’ document³. The following steps were taken as part of the site-specific risk assessment:

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

16.2.4.2.1 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 Site during construction, operation, and decommissioning.

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

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

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

16.2.4.2.2 Risk Classification

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	Likelihood	Description
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 Tipperary County Council 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.

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	Likelihood	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 Community functioning poorly, minimal services available
5	Catastrophic	Life, Health, Welfare Environment	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated.

Ranking	Likelihood	Impact	Description
		Infrastructure Social	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 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 Project. 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					

Baseline Conditions

The functional areas of Tipperary County Councils fall under the Mid-West Major Emergency Region (MWEM). The Major Emergency Plans prepared by Tipperary County Council (2014) outlines the following potential major emergency scenarios in the county:

1. **Urban Flooding/ Flooding:** Applicable to urban areas within the functional areas of Tipperary County Council.
2. **Aircraft Collision/Loss:** Relevant to all air strips or aircraft within the functional area of Tipperary County Council.
3. **Water Contamination:** Tipperary County Council Functional Areas.
4. **Credible scenario incidents at Merck Sharp & Dohme:** Applicable to Ballydine area Co. Tipperary.
5. **Fire/Major Crowd Safety and Civil Disorder:** Tipperary County Council Functional Areas.
6. **Major Road Traffic Accident/ Hazardous Material (Hazmat):** M7 Motorway, National Primary Routes –N62, Iarnród Eireann.
7. **Natural Gas Explosion along the main Cork-Dublin Gas Line:** Applicable to sections of the line that reach Co. Tipperary.
8. **Loss of Critical IT Infrastructure:** Tipperary County Council Functional Area.
9. **Rail Incident:** Applicable to Irish Rail infrastructure such as the Cork to Dublin Line within Tipperary County Council Functional Area.

The risks which are most relevant to this assessment are described below:

Flooding/ Urban Flooding

The Site is not located within an urban area; therefore, the urban flooding scenario is not applicable.

As detailed in Chapter 9 and the accompanying Appendix 9-1 Stage III Flood Risk Assessment (FRA), detailed site-specific flood modelling was carried out at the Site. Based on the information gained through the flood modelling, the areas of the Site at risk of flooding were identified.

Through an iterative process of flood modelling and the design of the infrastructure locations around the modelled flood zones, the layout of the Site has been optimised. In order to mitigate flood risk, the proposed turbine hard stands will be constructed with a finished floor/ground level at a height greater than 1000-year flood flow including climate change +0.5m. The finished level of site roads will be the same as the existing ground levels of the of the site in order to avoid disturbance of natural (existing) flood flow paths.

The proposed underground grid connection route falls within a mapped flood zones at one location, namely at watercourse crossing on the L-7039. Due to the depth of the underground electrical cabling route, this will have no impact during the operational phase of the Proposed Project. During the construction phase, works at this one location route may have to be postponed following heavy rainfall events which could cause flooding in these areas.

Furthermore, the Proposed Project will be constructed with its own drainage system which will provide additional surface water attenuation. The overall risk of flooding posed at the proposed site is assessed to be low. Please refer to the Chapter 9 Water of this EIAR for further details.

Aircraft Collision/ Loss

The Site is located within MOA5 as illustrated in the Irish Air Corps Tall Structures Paper. Proposals for the construction of tall structures in MOA5 requires the applicant to contact the Department of Defence so they can perform an internal aviation assessment. A scoping request was submitted to the Department of Defence however, no comments were returned to date. Please see Chapter 15 of this EIAR: Material Assets for details.

The Proposed Project will not utilise air strips or aircraft for the delivery of turbine components. Delivery of turbines and their associated components will be via the national and local road network.

A scoping response from the Irish Aviation Authority (IAA) set out lighting requirements for turbines. They also requested a data share pertaining to the constructed turbine coordinates and dimensions. Both lighting and data share requests will be complied with.

Water and Soil Contamination

The Proposed Project has the potential to cause contamination and pollution of soil and ground and surface water from potential release of hydrocarbons, earthworks and excavations during the construction phase. These impacts are addressed in detail in Chapter 8 Land Soil and Geology and Chapter 9 Hydrology and Hydrogeology of this EIAR and are not related to either the vulnerability of the Proposed Project to natural disasters or major accidents nor the potential for the Proposed Project to cause natural disasters or accidents. Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a pollution risk. The accumulation of small spills of fuels and lubricants during routine plant use can also be a significant pollution risk. Large spills or leaks have the potential to result in significant effects (i.e., contamination of subsoils and pollution of the underlying aquifer) on the geological and water environment. Best practise measures pertaining to hydrocarbon use and storage as detailed in Chapter 8 and the CEMP (Appendix 4-3) will minimise the potential for these impacts to occur. The release of wastewater at the Site could pose a risk to down gradient groundwater wells, groundwater quality and surface water quality. Proven and effective methods to mitigate against these potential impacts are detailed in Chapter 9 hydrology and Hydrogeology and best practise measures during all phases of the development (CEMP Appendix 4-3), which minimise the potential for leaks and will break the potential pathways between any source and receptor therefore resulting in no residual effects. Indirect impacts associated with major accidents and / or natural disasters on contamination are considered further in Section 16.4.1.

Credible scenario incidents at Merck Sharp & Dohme

The European Communities Control of Major Accident Hazards Involving Dangerous Substance Regulations, 2000, applies to sites where certain quantities of specified dangerous substances are present. These sites (SEVESO Sites) are classified as upper tier and lower tier. At present, there is one upper tier SEVESO Site within County Tipperary and no lower tier site. The upper tier site is Merck Sharp & Dohme located at Ballydine, Co. Tipperary, approximately 54km south of the Site. This site develops and supplies the active ingredients and final formulated product for a range of medicines. Given the separation distance, it is considered that neither the Proposed Project nor the SVESO site have the opportunity to negatively impact the other.

Fire / Major Crowd Safety and Civil Disorder

The likelihood of fire occurring at the Proposed Project is low. The likelihood of fire occurring will be further lowered by the implementation of good site management practices during the construction, operational and decommissioning phases.

During construction of the Proposed Project, 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.

Major crowd safety and civil disorder are not relevant to the Site. Access will be to authorised personnel only during the construction, operational and decommissioning phases.

Major Road Traffic Accident/ Hazardous Material (Hazmat)

The Proposed Project will utilise the existing road network during the construction phase. Construction related traffic will comprise both turbine component and construction materials delivery and the subsequent return of empty vehicles, and daily construction staff movements to and from work the Site.

It is proposed that large wind turbine components will be delivered to the site of the Proposed Project, under Garda escort and mainly at night.

Potential impacts that may occur on the identified road networks could be caused by an accident during the delivery of the turbines, collisions onsite and offsite with vehicles involved in construction and operation of Proposed Project, and damage to critical transport infrastructure caused by extreme weather i.e., periods of heavy rainfall, taking into account climate change and strong winds. As detailed in Section 15.1 of this EIAR: Material Assets, the localised traffic disruptions due to other proposed works will be mitigated using industry standard traffic management measures. These traffic management measures will be designed in accordance with the Department of Transport's '*Guidance for the Control and Management of Traffic at Roadworks – Second Edition (2010)*'.

As discussed above, there is potential for hazardous materials in the form of hydrocarbons to be transported to and used on site. Mitigation measures as best practise as detailed in Chapter 9 Hydrology and Hydrogeology and the CEMP (Appendix 4-3), respectively, will minimise the potential for leaks and will break the potential pathways between any source and receptor therefore resulting in no residual effects. The removal of hazardous materials will be done so by licenced operators for disposal at licensed waste facilities. There is limited potential for hazardous material release during the operational phase of the Proposed Project, On occasion, operational maintenance crew may need to dispose of hydrocarbon waste such as oil that may be required during turbine maintenance procedures. The CEMP includes a Waste Management Plan which outlines the best practice procedures during the decommissioning phases of the project. The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of decommission of the Proposed Project. Disposal of waste will be seen as a last resort. Please see the CEMP (Appendix 4-3) for best practise measures to prevent the creation of waste which During the decommissioning phase. Please see Appendix 4-4 for the Decommissioning Plan.

Natural Gas Explosion along the main Cork-Dublin Gas Line

The Cork to Dublin Gas line runs from Cork to Waterford, Carlow, Kildare and terminates in Dublin. Offshoots of the line from Cork northwards to Mitchelstown and into Tipperary town, Cahir and Cashel, all of which are between 31km and 42km from the Site. As such, it is considered that neither the Proposed Project nor the gas line have the opportunity to negatively impact the other.

Loss of Critical IT Infrastructure

National Grid Communications

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 Project would not impact the local or national energy supply.

Electromagnetic Interference on Railway Communications

The nearest proposed turbine is approximately 1.3km north of the Cork-to-Dublin railway line. While the potential for electromagnetic interference from turbines on railway antennae that may be sited along a railway is low, a French Study highlighted by Irish Rail states that 95% of cases are settled amicably with the installation of a rebroadcaster by the wind developer⁴. Furthermore, the 2006 WEDGs and the 2019 draft WEDGS acknowledge that *electromagnetic interference can be overcome* by the use of divertor relay links.

A scoping response from Irish Rail was received on the 13th of April 2023 highlight the potential for '*High power cables parallel to the track are particularly liable to cause electromagnetic interference with signalling cables parallel to the track (this is why we normally require cables to cross the railway at right angles as they are less likely to cause electromagnetic interference)*'. Please see Chapter 15 Material Assets for the full scoping response. 'The proposed underground grid connection cables will not cross the railway line infrastructure but instead, will run underground approx. 20m away from the railway line. The ESB report '*EMF and You: Information about Electric & Magnetic Fields and the electricity network in Ireland*'⁵, illustrates the potential for electromagnetic interference on a receptor from 110kV infrastructure. As illustrated, at distances of 5m from the 110kV overhead line or underground cable, the electromagnetic frequency drops considerably from 4µT to 0.5 µT. As the proposed underground cable route is approximately 20m from the railway line, it is unlikely to cause an impact on Irish Rail communications.

⁴ French Renewables 2002 Wind Turbines, Radars and Waves. Available at: <https://fee.asso.fr/comprendre-leolien/les-eoliennes-les-radars-et-les-ondes/#:~:text=La%20r%C3%A9flexion%20et%20la%20diffraction%20des%20ondes%20%C3%A9lectromagn%C3%A9tiques,fait%20%E2%80%99objet%20de%20nombreuses%20%C3%A9tudes%20dans%20plusieurs%20pays>

⁵ ESB 2017 EMF and 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

THE EFFECT OF DISTANCE ON MAGNETIC FIELDS

Both AC and DC technologies produce magnetic fields and both decrease with distance as you move away from the line or cable.

See graph below:

AC LINES AND CABLES

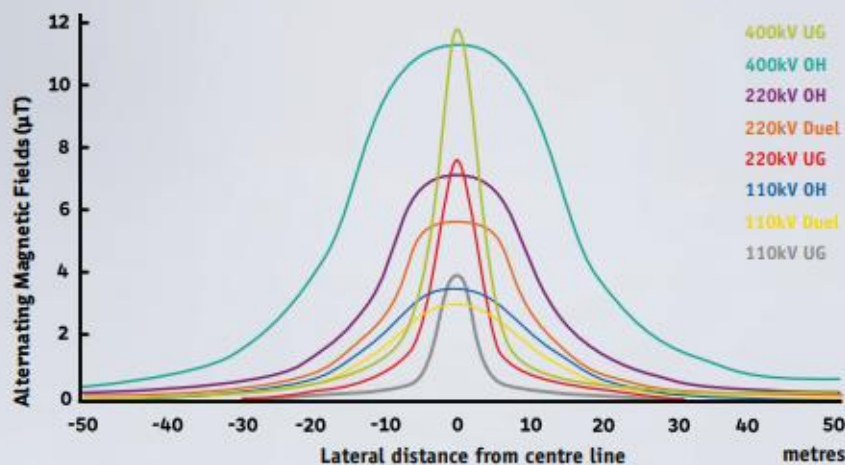


Figure C illustrates the magnetic field from overhead AC lines operating in Ireland. The field strength decreases with distance. The fields from these AC lines are far below the 1998 ICNIRP Guidelines for exposure to AC magnetic fields (100µT). In 2010 ICNIRP updated its ELF-EMF guidelines, which included the recommendation for a 200µT reference level for exposure for the general public, but these have not yet been adopted by the European Union.

Figure 16-1 illustrates the magnetic field from overhead AC lines operating in Ireland.

Rail Incident

The Cork-to-Dublin rail line runs approximately 20m south of the Proposed Grid Connection in a northeast to southwest orientation. The Proposed Grid Connection does not physically interact with the railway infrastructure. Works relating to the construction of the Proposed Grid Connection which will be confined to a minimum 20m set back from the railway line will not interfere with the track, track drainage or embankment. Nonetheless, during the construction phase, the requirements for third parties as set out in 'CCE Department Technical Guidance Document CCE-TMS-310 Guidance on Third Party Works' and 'CCE Departmental and Multidisciplinary Standard I-DEP-0121 Third Party Works: Additional Details of Railway Safety Requirements' will be adhered to. Furthermore, contact will be made to IEDR 30 days prior to the works that will take place at a minimum of 20m northwest of CIE infrastructure.

16.4 Risk Assessment

This section outlines the possible risks associated with the Proposed Project for the construction, operational 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 above, 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 Project were not to proceed, the existing uses for the Site of small-scale agricultural farming practices, forestry and public road corridor along the grid route would continue.

If the Proposed Project were not to proceed, the opportunity to capture part of Tipperary's valuable renewable energy resource would be lost, as would the opportunity to 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.

If the Proposed Project were not to proceed, the opportunity to restore a segment of the Eastwood River by improving channel stability, instream habitat and establishing a natural wooded riparian buffer would be lost. Please see Appendix 6-4 Biodiversity Management and Enhancement Plan for details.

16.4.1.2 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 Project. Seven risks specific to the construction of the Proposed Project have been identified and are presented in Table 16-4.

Table 16-4 Risk Register - Construction Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
A	<p>Critical Infrastructure Emergencies</p> <p>Risk of delivery of turbines and infrastructure to site.</p>	<p>Traffic accident during turbine delivery or extreme weather periods of heavy rainfall, taking into account climate change and strong winds</p>
B	<p>Severe Weather</p> <p>Risk to construction activity on site</p>	<p>Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds</p>
C	<p>Flooding</p> <p>Risk of flooding in the Site impacting the construction phase and leading to environmental emissions</p>	<p>Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds</p>
Potential to cause accidents and / or disasters.		
D	<p>Utility emergencies</p> <p>Risk of construction activity along the Grid Connection underground electrical cabling route</p> <p>Risk to interference/breakage of 38kV overhead line that traverses the edge of the Site or interference/breakage to 110kV overhead line.</p>	<p>Construction activity along grid and road network impacting on local services and utilities.</p> <p>Construction activities in vicinity of/under 38kV line impacting on local services and utilities.</p> <p>Construction activities in vicinity of/under 110kV line during grid connection works impacting on local services and utilities</p>
E	<p>Traffic Incident</p> <p>Collisions onsite and offsite with vehicles involved in construction of Proposed Project</p>	<p>Driver negligence or failure of vehicular operations on site roads.</p> <p>Traffic Management not implemented</p>
F	<p>Contamination</p> <p>Discharge or spillage of fuel, chemical solvents onto subsoils and into watercourse or percolated to groundwater.</p> <p>Excavated materials may give rise to run off sedimentation</p>	<p>Accidental fuel spillage during delivery to site.</p> <p>Failure of fuel storage tank or tanks in plant and machinery and vehicles leading to uncontrolled emissions.</p> <p>Drainage and seepage water resulting from accident during infrastructure excavation;</p> <p>Stockpiled excavated material becoming unstable and providing a point source of exposed sediment;</p>

		Excavation works during the construction of the Proposed Project 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.

16.4.1.3 Identification of Effect During Operation

Four risks specific to the operation of the Proposed Project have been identified and are presented in Table 16-5.

Table 16-5 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	Contamination Discharge or spillage of fuel, chemical solvents, sewage or wastewater onto subsoils and 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.
Potential to cause accidents and / or disasters.		
J	Fire / Gas Explosion	Equipment or infrastructure failure; Electrical problems; and Employee negligence.
K	Collapse / damage to structures	Earthquake, extreme weather events; 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

16.4.1.4 Identification of Effect During Decommissioning

Four risks specific to the decommissioning of the Proposed Project have been identified and are presented in Table 16-6.

Table 16-6 Risk Register – Decommissioning Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
M	<p>Severe Weather</p> <p>Risk to decommissioning activity on Site leading to environmental emissions</p>	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.
N	<p>Flooding of site</p> <p>Risk of flooding in the Site impacting the decommissioning phase and leading to environmental emissions</p>	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.
Potential to cause accidents and / or disasters.		
O	<p>Traffic Incident</p> <p>Collisions onsite and offsite with vehicles involved in construction of Proposed Project</p>	<p>Driver negligence or failure of vehicular operations on site roads.</p> <p>Traffic Management not implemented.</p>
P	<p>Contamination</p> <p>Discharge or spillage of fuel, chemical solvents onto subsoils and into watercourse or percolated to groundwater</p>	<p>Accidental fuel spillage during delivery to site.</p> <p>Failure of fuel storage tank or tanks in plant and machinery and vehicles leading to uncontrolled emissions.</p>

16.4.2 Risk Assessment Summary

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 16-7.

The risk register is based upon possible risks associated the Proposed Project. As outlined in Section 16.2.4.2, 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. A summary of the findings can be found in Table 16-8.

16.4.2.1 Assessment of Effect – Summary

Table 16-7 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;	1	The risk of traffic accident during turbine delivery severe weather conditions impacting the identified road network is unlikely when considering the assessment in Chapter 11: Climate (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)	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 event occur, with ‘no fatalities and a small number of minor injuries with first aid treatment’.	1
B	Severe Weather	Extreme weather-periods of heavy rainfall, taking into	Illness or loss of life;	2	The risk of severe weather is unlikely when considering	1	The risk of severe weather conditions during the	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		account climate change and strong winds	Damage to, or depletion of aquatic habitats and species;		<p>the assessment in Chapter 11: Climate and weather conditions recorded over the last 30 years within the area.</p> <p>The works programme for the groundworks part of the construction phase of the Proposed Project will take account of weather forecasts and predicted rainfall and construction will be paused if required.</p>		construction phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather event 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 Project design and mitigation measures.	
C	Flooding	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	<p>Illness or loss of life;</p> <p>Groundwater Flooding</p>	2	The risk of flooding is considered very unlikely when taking into account the assessment in Chapter 9 of the EIAR, the raising	1	The risk of flooding during the construction phase will result in a minor consequence in that 'small number of people would be affected' should	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
			<p>Flooding to surrounding properties</p> <p>Damage to, or depletion of aquatic habitats and species;</p>		of infrastructure in flood zones to above flood zone level and the implementation of a bespoke drainage design plan for the project.		<p>a severe weather event occur, with 'no fatalities and a small number of minor injuries with first aid treatment'.</p> <p>Flooding has the potential to cause increased sediment mobilisation however flooding is not anticipated and should any flooding occur, it would be localised.</p>	
D	Utility emergencies	<p>Construction activity along road network during grid connection installation impacting on local services and utilities</p> <p>Construction activities in vicinity of 38kV overhead line.</p>	<p>Illness or loss of life;</p> <p>Disruption to services</p>	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	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Connecting the Proposed Project to the national grid at the 110kV overhead line.					minor injuries with first aid treatment'.	
E	Traffic Incident	<p>Driver negligence or failure of vehicular operations on Site roads (Proposed Project access roads and public road network in which Grid Connection underground cable route is proposed).</p> <p>Driver negligence or failure of vehicular operations on public road network (turbine component deliveries/ other infrastructure deliveries/ staff vehicles) Traffic</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 the Site or public roads, 'at some time.' An unlikely risk is therefore predicted.</p> <p>Traffic Management Plan will be in place for turbine</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)
		Management not implemented			<p>component deliveries.</p> <p>Staff will be trained/toolbox talks highlighting construction entrances and proper access and egress procedures.</p>			
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 infrastructure excavation;</p> <p>Stockpiled excavated material providing a point source of exposed sediment;</p>	<p>Release of suspended solids to groundwater.</p> <p>Contamination of local drinking water supplies and groundwater aquifers.</p> <p>Groundwater and surface water emissions from construction activities including trench excavations</p> <p>Accidental spillage during refuelling onto subsoils</p>	2	<p>As outlined in Chapter 4, vehicles will be refuelled off-site where possible. Where required, on-site refuelling of machinery will be carried out at designated refuelling areas by mobile double skinned fuel bowser. Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and</p>	2	<p>The risk of a fuel spillage or impact on surround drainage during the construction is extremely low taking all and best practise measures proposed into account.</p> <p>The grid connection route is located within approx. 870m of local road and 1.2km of agricultural land, both of which have a low value</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>Works during the construction phase which may result in entrainment of sediment from the excavations during construction; and,</p> <p>Erosion of sediment from emplaced site drainage channels</p>			<p>organised basis. All refuelling will be carried out outside designated watercourse buffer zones. Only designated trained and competent operatives will be authorised to refuel plant on-site. Mobile measures such as drip trays and fuel absorbent mats will used during refuelling operations as required. All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage.</p> <p>Setback distances from sensitive hydrological features means that adequate room is maintained for the</p>		<p>environmental receptor.</p> <p>The potential residual environmental effects are described in detail in Chapter 8 Land Soil and Geology and Chapter 9 Hydrology and Hydrogeology which concludes that there will be no significant environmental effects.</p>	

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					<p>proposed drainage mitigation measures as detailed in Chapter 9.</p> <p>Detailed mitigation measures and methodologies for the control of emissions from grid connection works as described in the EIAR. Standard and specific mitigation to prevent accidents and indirect effects of accidents are included in the Proposed Project design and will be implemented.</p>			
G	Fire / Gas Explosion	<p>Equipment or infrastructure failure;</p> <p>Fuel spillage/storage</p>	<p>Illness or loss of life;</p> <p>Damage to, or depletion of</p>	2	As outlined in Chapter 4 and the CEMP Appendix 4-3, fuel will not be stored on-site therefore fuel is	2	Should a fire/explosion occur at the Site, a limited consequence in that there would	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>Electrical problems; and</p> <p>Employee negligence</p>	<p>habitats and species; and</p> <p>Impacts on ambient air quality.</p>		<p>not considered to be a significant fire risk.</p> <p>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.</p>		<p>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 Project and the lack of infrastructure or fuel storage during operation that would result in any such incident.</p> <p>There will be 'normal community functioning' in the area with 'some inconvenience'</p> <p>The 'generic command, control & co-ordination systems' as well as the 'common elements of response' detailed in the Tipperary Major Emergency Plans will work to</p>	

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							reduce the consequence (both on people and the environment) of potential fire/explosions at the Site.	
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 Chapter 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 event occur, with 'no fatalities and a small number of minor injuries with first aid treatment'.	2
I	Contamination	Mismanagement of hazardous materials e.g. oil by turbine maintenance and	Damage to, or depletion of aquatic habitats and species	2	General waste produced at welfare facilities will be removed from site by	1	The risk of a fuel spillage or impact on surround drainage during the operational	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		<p>Eirgrid maintenance crew.</p> <p>Mismanagement of general waste and welfare facilities waste.</p>	<p>Contamination of local drinking water supplies and groundwater aquifers.</p> <p>Accidental spillage during refuelling onto subsoils</p>		<p>maintenance personnel for disposal at Eirgrid and Developer headquarters.</p> <p>All hazardous wastes from the maintenance of the turbines and substation (including transformers) will be stored securely in bundled containers/areas before being collected by an authorised waste contractor and brought to an EPA licensed waste facility.</p> <p>The wastewater holding tank at the substation will be emptied when required by a licenced contractor.</p>		<p>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 bundled containment areas during operation. The potential residual environmental effects are described in detail in Chapter 8 which concludes that there will be no significant environmental effects.</p>	

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
J	Fire / Gas Explosion	<p>Equipment or infrastructure failure;</p> <p>Fuel spillage/storage</p> <p>Electrical problems; and</p> <p>Employee negligence</p>	<p>Illness or loss of life;</p> <p>Damage to, or depletion of habitats and species; and</p> <p>Impacts on ambient air quality.</p>	2	<p>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.</p> <p>In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the Proposed Project 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.</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' on people and environmental receptors due to the nature of the Proposed Project and the lack of infrastructure or fuel storage during operational stage that would result in any such incident. There will be 'normal community functioning' in the area with 'some inconvenience' The 'generic command, control & co-ordination systems' as well as</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)
							the 'common elements of response' detailed in the Tipperary Major Emergency Plans will work to reduce the consequence (both on people and the environment) of potential fire/explosions at the site.	
K	Collapse/ damage to structures	Earthquakes, extreme weather events; and Vehicular collisions due to driver negligence.	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	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>Ireland are extremely unlikely to be damaged or collapse due to seismic activity.</p> <p>Having regard to public speed limits within the Proposed Project, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse.</p>			
L	Traffic Incident	Driver negligence or failure of vehicular operations on Proposed Project roads.	Injury or loss of life.	2	<p>A limited number of vehicles will be permitted on the Proposed Project 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</p>	1	<p>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</p>	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					on the Proposed Project, 'at some time.' An unlikely risk is therefore predicted.		injuries with first aid treatment.'	
Decommissioning Phase								
M	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: Climate 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 event 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	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							environmental receptors	
N	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 Damage to, or depletion of aquatic habitats and species.	2	The risk of flooding is considered very unlikely when taking into account the assessment in Chapter 9 of the EIAR.	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 event occur, with 'no fatalities and a small number of minor injuries with first aid treatment'.	2
O	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 Project as part of the decommissioning phase. As such, it can be determined that there is some 'opportunity,	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	3

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					reason or means' for a vehicle collision to occur on site, 'at some time.' An unlikely risk is therefore predicted.		fatalities and small number of minor injuries with first aid treatment.'	
P	Contamination	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles.	Damage to, or depletion of aquatic habitats and species Discharge to groundwater Accidental spillage during refuelling onto subsoils	2	As outlined in Chapter 4 and the CEMP Appendix 4-3, fuel will be stored on-the 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 Proposed Project. Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage	2	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. The potential residual environmental effects are described in detail	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					measures as detailed in Chapter 9		in Chapter 9 which concludes that there will be no significant environmental effects.	

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, which is colour coded in order to provide an indication of the critical nature of each risk. As outlined in Section 16.2.4.2 above, the red zone represents 'high risk' scenarios, the amber zone represents 'medium risk scenarios and the green zone represents 'low risk scenarios.

Table 16-8 Risk Scores

Risk ID	Potential Risk	Likelihood Rating	Consequence Rating	Risk Score
Construction Phase				
A	Critical Infrastructure Emergencies	1	1	1
B	Severe Weather	2	1	2
C	Flooding	2	1	2
D	Utility company emergencies	2	1	2
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	2	1	2
Decommissioning Phase				
M	Severe Weather	2	1	2
N	Flooding	2	1	2
O	Traffic Incident	3	1	3
P	Contamination	2	2	4

Table 16-9 Risk Matrix

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

Table 16-9 presents the potential risks identified during the construction, operation and decommissioning of the Proposed Project 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 Project is identified below.

16.4.2.2 Contamination During Construction, Operation and Decommissioning

There is a potential risk of contamination from site activities during the construction, operational and decommissioning phases from potential release of hydrocarbons. The risk of contamination was given a risk score of 4 on a very precautionary basis. However, as outlined in Chapter 8 Land, Soil and Geology and Chapter 9 Hydrology and Hydrogeology, measures will be put in place to reduce the risk of accidental spillage and contamination of pollution risk to subsoils, 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 and decommissioning phases.

The conclusions in the relevant chapters of the EIAR conclude that there will be no significant residual effects associated with this potential impact.

16.4.2.3 Fire/Explosion During Construction, Operation and Decommissioning

There is a potential risk of fire/explosion at the 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, and mitigation of the same during operation.

16.4.3 Mitigation Measures

Please refer to chapter 18 Schedule of Mitigation and Monitoring Measures which details all proposed mitigation and monitoring measures for the construction, operation and decommissioning of the Proposed Project.

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 during construction is identified as ‘Contamination’ of the Site and risk of ‘Fire/Explosion’ during operation.

The Proposed Project will be designed and built in line with current best practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design. In accordance with the provision of the European Commission ‘*Guidance on the preparation of Environmental Impact Assessment Reports*’2017, a Risk Management Plan will be prepared and implemented on site to ensure an effective response to disasters or the risk of accidents. The plan will include sufficient preparedness and emergency planning measures.

16.4.3.1 Mitigation – Contamination During Construction, Operation and Decommissioning

Potential effects associated with contamination during construction, operation and decommissioning are addressed fully in Chapter 8 Land Soil and Geology and Chapter 9 Hydrology and Hydrogeology of this EIAR. The mitigation measures outlined therein to protect environmental receptors as well as the procedures and measures described in the Construction and Environmental Management Plan (CEMP) will ensure that the risk from these sources is low.

A CEMP has been prepared for the Proposed Project and is included in Appendix 4-3 of this EIAR. Upon a grant of planning permission for the Proposed Project, the CEMP will be updated prior to the commencement of the development. The CEMP will be a live document maintained by the contractor that will work to ensure that potential risks of major accident and/or disaster are identified, avoided and mitigated, as necessary. Refer to Appendix 4-3 for the CEMP that sets out the minimum standards to be employed by the contractor.

16.4.3.2 Mitigation – Fire/Explosion During Operation

The Proposed Project will also be subject to a fire safety risk assessment in accordance with Chapter 19 of the Safety, Health and Welfare at Work Acts 2005 to 2014, which will assist in the identification of any major risks of fire on site, and mitigation of the same during operation.

A CEMP will be prepared prior to the commencement of any works. The CEMP will be a live document maintained by the contractor that will work to ensure that potential risks of major accident and/or disaster are identified, avoided and mitigated, as necessary. Refer to Appendix 4-3 for the CEMP that sets out the minimum standards to be employed by the contractor.

16.4.4 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).

When the above mitigation is implemented, and all mitigation detailed in the EIAR is implemented, the residual effect(s) associated with the construction, operation and decommissioning of the Proposed Project are not significant.

16.4.5 **Monitoring**

Please refer to Chapter 18 Schedule of Mitigation and Monitoring Measures which details all proposed mitigation and monitoring measures for the construction, operation and decommissioning of the Proposed Project.

16.4.5.1 **Monitoring During Construction**

A CEMP will be prepared prior to the commencement of any works. The CEMP will be a live document maintained by the contractor that will work to ensure that potential risks of major accident and/or disaster are identified, avoided and mitigated, as necessary. Refer to Appendix 4-3 for the CEMP that sets out the minimum standards to be employed by the contractor.

16.4.5.2 **Monitoring During Operation**

The operator of the Proposed Project will continue to assess the risk of major accidents and/or disasters on site on an on-going basis during operation.

The maintenance programme, record of reported incidents, as well as general site activities will be monitored on an on-going basis to ensure risk of major accidents does not increase over time.

16.4.5.3 **Monitoring During Decommissioning**

A Decommissioning Plan has been prepared (Appendix 4-4) the final detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time. The Decommissioning Plan includes mitigation and monitoring measures that will be in place during the decommissioning phase. These can also be found in a Chapter 18 Schedule of Mitigation and Monitoring Measures which sets out all proposed Mitigation and Monitoring Measures for all three phases of the Proposed Project.

16.4.6 **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 Appendix 2-1 of this EIAR. Please see section 2.8 for the cumulative assessment methodology.

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 Appendix 2-1, 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 or natural disasters or the Proposed Project's potential to cause major accidents 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.

16.4.7 Assessment of Cumulative Effects and In Combination Impacts

16.4.7.1 Cumulative Impact Assessment

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 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. 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 site is relatively flat so there is low/no potential for peat slides or landslides. 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. Therefore, the cumulative residual effect of the Proposed Project to cause or be impacted by major accidents and natural disasters is not significant.