17. MAJOR ACCIDENTS AND NATURAL DISASTERS

17.1 INTRODUCTION

This chapter assesses the likely significant effects of the proposed project deriving from its vulnerability to risk of Major Accidents and/or Natural Disasters, as well as the potential of the proposed project itself to cause Major Accidents and/or Natural Disasters during the construction, operation and decommissioning phases.

The assessment is carried out in compliance with the European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU) ("the EIA Directive"), 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."

Recital 15 of the EIA Directive states that for projects:

"It is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment."

Annex IV of the EIA Directive states, where appropriate, the assessment 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."

This chapter has also been carried out in compliance with Schedule 6 paragraph 2(h) of the Planning and Development Regulations 2001 (as amended) which requires:

"a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment 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, emergencies arising from such events."

The structure and assessment methodology of this chapter is guided by current best practice by the Institute of Environmental Management and Assessment (EMA) (now known as ISEP) 'Major Accidents and Disasters in EIA: A Primer' guidance (IEMA, 2020). The IEMA guidance defines a major accident as:

"An event (for instance, train derailment or major road traffic accident) that threatens immediate or delayed serious environmental effects to human health, welfare and/or the environment and requires the use of resources beyond those of the client or its appointed representatives (i.e. contractors) to manage."

The IEMA guidance defines the likely significant effects (in relation to a major accident and/or natural disasters assessment) as something that:

'...could include the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration.'

17.1.1 Statement of Authority

This chapter was prepared by Oonagh Fleming and Brian McDonnell of TOBIN. Oonagh Fleming is an Assistant Project Manager in TOBIN. Oonagh holds a B.A. in Geography and Sociology. She has over two years' experience as an environmental consultant and has considerable experience in carrying out environmental impact assessments including in relation to major accidents and natural disasters. Brian McDonnell is an Assistant Project Manager/Environmental Scientist in TOBIN. Brian has more than four years' experience in environmental consulting including environmental impact assessment. Brian has considerable experience in the preparation of various environmental impact assessment chapters. Brian has a Bachelor of Civil Law and an MSc in Environmental Science from Trinity College Dublin.

This chapter was reviewed by Orla Fitzpatrick, Technical Director in TOBIN. Orla has twenty years' experience working in the delivery of EIA projects in environmental consultancy. She is a Chartered Environmentalist and has considerable experience as technical approver of environmental deliverables for major infrastructure projects including wind farms.

17.1.2 Legislation, Policy and Guidance

The legislation, policy and guidance that was used to inform the assessment of risk of major accidents and natural disasters is listed below.

Legislation

- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) (as amended);
- Safety, Health and Welfare at Work (General Application) Regulations 2007 (as amended)
- Safety, Health and Welfare at Work Act 2005 (as amended) SI No. 10 of 2005;
- Climate Action and Low Carbon Development Act 2015 (as amended), SI No. 46 of 2015;
- S.I. No. 209 of 2015 - Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (the "COMAH Regulations").

Policy

- Leitrim County Development Plan 2023 – 2029;
- HSE Emergency Management Area 1 (Counties Donegal, Sligo, Leitrim, Cavan and Monaghan) Crisis Management Team Major Emergency Plan, July 2023.

Guidance

- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- IEMA 2020 (now known as ISEP) Major Accidents and Disasters in EIA: A Primer;
- Department of Housing, Local Government and Heritage (2010) A Guide to Risk Assessment in Major Emergency Management;
- Department of Defence (2020) A National Risk Assessment for Ireland;

- Department of Climate, Energy and the Environment, Government (DCEE), (August 2018); Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment).

17.1.3 EIA Directive

The assessment is carried out in compliance with the European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU) (the "EIA Directive"),

Recital 15 of the EIA Directive states that for projects:

"It is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment."

Annex IV of the EIA Directive states, where appropriate, the assessment 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."

17.1.4 Planning and Development Regulations 2001 (as amended)

This chapter has also been carried out in compliance with Schedule 6 paragraph 2(h) of the Planning and Development Regulations 2001 (as amended) which requires:

"a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment 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, emergencies arising from such events."

17.1.5 European Commission Guidance

The European Commission (2017) Guidance on the preparation of Environmental Impact Assessment Reports identifies the following key considerations relating to the risk assessment of a project to/from major accidents and natural disasters:

- What can go wrong with a Project?
- What adverse consequences might occur to human health and to the environment?
- What is the range of magnitude of adverse consequences?
- How likely are these consequences?
- What is the Project's state of preparedness in case of an accident/disaster?
- Is there a plan for an emergency situation?

This chapter has considered each of the above points as outlined in Table 17-1.

Table 17-1: Key Considerations as Described in EIA Directive

Key Considerations	Location Within this Chapter
What can go wrong with a Project?	Risk assessment of all potential major accidents and natural disasters is carried out in Section 17.4. Risks that are described and assessed elsewhere in the EIAR are discussed in Section 17.4.
What adverse consequences might occur to human health and to the environment?	Potential adverse consequences discussed in Table 17-5.
What is the range of magnitude of adverse consequences?	Section 17.5.2 classifies and assesses each of the risks considered within this chapter. In Table 17-6 a consequence rating is assigned to each potential risk which describes the magnitude of adverse consequences. Where risks have been assessed elsewhere in the EIAR and are summarised within Section 17.3, the key findings and magnitude of adverse consequences of these risks are discussed within this section and in the relevant EIAR chapter.
How likely are these consequences?	Section 17.5.2 and Table 17-6 assigns a likelihood rating to each potential risk. Where risks have been assessed elsewhere in the EIAR and are summarised within Section 17.3, the likelihood of these risks is discussed within this section and in the relevant EIAR chapter.
What is the Project's state of preparedness in case of an accident/disaster?	Mitigation measures are discussed within Table 17-6 to describe the proposed project's state of preparedness.
Is there a plan for an emergency situation?	An Emergency Response Plan (ERP) has been developed as part of this EIAR and is included in the Construction Environmental Management Plan (CEMP, Appendix 2-4). The ERP is described in Table 17-6.

17.1.6 IEMA Guidance

The structure and assessment methodology of this chapter complies with the guidance set out in the IEMA (2020) Major Accidents and Disasters in EIA: A Primer. The guidance defines a Major Accident as:

"An event (for instance, train derailment or major road traffic accident) that threatens immediate or delayed serious environmental effects to human health, welfare and/or the environment and requires the use of resources beyond those of the client or its appointed representatives (i.e. contractors) to manage."

'Whilst malicious intent is not accidental, the outcome (e.g., train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events."

A Disaster is defined as follows:

"May be a natural hazard (e.g., earthquake) or a man-made/external hazard (e.g., act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident."

The guidance defines the likely significant effects (in relation to a major accident and/or natural disasters assessment) as something that:

'...could include the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration.'

17.2 Assessment Methodology

The impact assessment methodology is risk based and identifies potential unplanned risk events that the proposed project may be vulnerable to or that may occur due to the proposed project. There are three stages involved in determining such events were adopted from 'A Guide to Risk Assessment in Major Emergency Management' (DoCEE 2010) and 'The Major Accidents and Disasters in EIA: A Primer guidance' (IEMA, 2020):

- **Stage 1: Screening/Identification** – identifying potential unplanned risk events that the proposed project may be vulnerable to or that may occur as a result of the proposed project.
- **Stage 2: Classification** – Following the initial identification and screening process, major accidents and/or natural disasters were evaluated with regard to the likelihood of occurrence and the likely significant effects; and
- **Stage 3: Assessment** - This stage provides a greater understanding of the likelihood and consequence of events that have been carried forward into the EIA and defines a post mitigation risk score.

Potential hazards listed in the HSE Emergency Management: Area 1 Emergency Plan that are relevant to the proposed project have been considered within this assessment.

17.2.1 Stage 1: Screening

The screening stage of the assessment is a high-level exercise listing all risk events (unplanned) that the proposed project may be vulnerable to or that may be caused by the proposed project. In accordance with the 'EIA of Projects – Guidance on the preparation of the EIAR guidance' EC (2017). Risks are identified in respect of the proposed projects

- potential to cause accidents and/or natural disasters,
- and vulnerability to potential natural disasters/accidents.

The list of risks has been developed 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 or as a result of the proposed project during the construction, operation and decommissioning phases.

The list of identified risks are subject to a screening exercise to determine if the risks meet the criteria of a major accident or natural disaster as defined by the IEMA 2020 guidelines as described below.

The IEMA (2020) provide the following definitions for a major accident and disaster.

> Major Accidents are *"Events that threaten the immediate or delayed serious environmental affects to human health, welfare and/or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g., train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events."*
>
> A Disaster *"May be a natural hazard (e.g., earthquake) or a man-made/external hazard (e.g., act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident."*

Where appropriate, risks are also screened out of the assessment according to the following criteria in line with 'the Major Accidents and Natural Disasters in EIA: A Primer guidance' (IEMA, 2020):

- The risk event is not applicable to a particular geographic location (e.g. volcanic or earthquake activity in Ireland); and
- Risks that have already been assessed in other areas of this EIAR, for example flood risk.

17.2.2 Stage 2: Classification

Following the screening stage any remaining major accident and/or natural disaster events were evaluated with regard to the likelihood of occurrence and the likely significant effects potential impact. The classification and rating of both the likelihood and the likely significant effects are provided in Table 17-2 and 17-3.

These classifications and ratings are taken from 'A Guide to Risk Assessment in Major Emergency Management' DoCEE (2010). The EPA Guidelines (2022) state that the risk assessment must be based on a 'worst case' approach. Therefore, the consequent rating assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or natural disaster.

Table 17-2: Classification of Likelihood (summarised[1] from DoCEE (2010) Guidance)

Rating	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 communications; 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 organisations 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.

Table 17-3: Classification of Consequence (summarised from DoCEE (2010) Guidance)

Rating	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 Euros. • 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 Euros. • Normal community functioning with some inconvenience.

[1] Adapted to present the information clearly for the reader in this context, using a table format relevant to the focus of this chapter.

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 Euros. • 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 Euros. • 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 2,000 evacuated. • Very heavy contamination, widespread effects of extended duration. • >25M Euros. • Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

17.2.3 Stage 3: Assessment

In accordance with the DoCEE's (2010) guidelines, the evaluated major accidents and/or natural disasters from Stage 2 were subject to a risk-based assessment to determine the level of significance of each risk for each scenario. The risk matrix, described in DoCEE's (2010) guidelines indicate the critical nature of each risk. Each risk from the risk matrix is described below and presented visually Table 17-4.

The risk matrix consists of three zones;

- The red zone represents '**high risk** scenarios'; having an evaluated score of 15 to 25.
- The amber zone represents '**medium risk** scenarios'; having an evaluated score of 8 to 12.
- The green zone represents '**low risk** scenarios.' having an evaluated score of 1 to 6.

Table 17-4: Impact Assessment Matrix (summarised from DoCEE (2010) Guidance)

Likelihood Rating	5 – Very Likely	5	10	15	20	25
	4 – Likely	4	8	12	16	20
	3 – Unlikely	3	6	9	12	15
	2 - Very Unlikely	2	4	6	8	10
	1 – Extremely Unlikely	1	2	3	4	5
		1 – Minor	2 – Limited	3 – Serious	4 – Very Serious	5 - Catastrophic
		Consequence Rating				

The IEMA (2020) guidelines recommends that the major accidents and/or natural disasters assessment focuses on low likelihood but potentially high consequence events. Therefore, for the purposes of this assessment and to also adhere to the DoCEE's (2010) guidance, it has been assumed that the Red Zone correlates to a High Likelihood/High Consequence, and the Amber Zone correlates to a Medium Likelihood/High Consequence.

All major accidents and/or natural disasters that fall within the Amber or Red Zones ('Medium' or 'High' risk scenarios) were considered to present a risk of likely significant effects following EPA Guidelines (EPA 2022).

17.2.4 Study Area

The study area for the Major Accidents and Natural Disasters assessment is defined as the proposed project boundary, which incorporates the footprint of the proposed wind farm site, the grid connection route (GCR) and the turbine delivery route (TDR) area of accommodation works as shown in Figure 1-1 of Chapter 1 - Introduction. Further details of the proposed project are provided in Chapter 2- Description of the Proposed Project.

17.2.5 Limitations of Assessment

No limitations were encountered during this assessment.

17.3 Existing Environment

A summary of the baseline environment focusing on aspects relevant to the risk of major accidents and natural disasters is provided below. This section summarises relevant details from assessments carried out within the EIAR. Refer to Section 2.4 of Chapter 2 - Description of the Proposed Project for further detail regarding the site of the proposed project.

As noted in the IEMA guidance, the baseline description for this Chapter may include "existing sources of risk assessment or other relevant studies", as such descriptions of relevant assessments carried out within other sections of this EIAR are summarised below in relation to the risk of a major accident and/or natural disaster.

17.3.1 Meteorological

Ireland has a temperate, oceanic climate that results in typically mild winters and summers. Compared to other countries at similar latitudes Ireland does not experience the same extremes of temperature, largely due to the influence of the Atlantic Ocean on Irelands climate. The hills and mountains of Ireland provide shelter from strong winds and the oceanic influence [2].

Ireland's geographical location means it is less vulnerable to extreme natural hazards and disasters such as tsunamis or earthquakes. In recent years however, the occurrence of severe weather events has increased. Such weather events may include increase in periods of high temperature and drought, heavy rainfall, snow and extreme winds which have the potential to disrupt project activity.

The nearest representative weather monitoring station collating detailed weather records is Belmullet meteorological station, County Mayo, which is located approximately 130km west of the site. Meteorological data from the Belmullet station is available in 30-year averages[3]. The most recent 30-year average (1991-2020) provides an overview of the typical conditions experienced. January and February are the coldest months of the year, with an average temperate of 3.9 degrees Celsius. August is the warmest month with an average temperature of 17.7 degrees Celsius. January and November have the highest average monthly rainfall at 139.6 mm per month on average, compared to the lowest month May with an average of 70.8 mm of rainfall per month.

Latest Research from the EPA in 2025 in the form of the publication of their first National Climate Change Risk Assessment indicate the predicted changes in Ireland's climate in the coming decades, including:

- Temperatures are projected to increase by 1.2–1.6°C by 2050 under a moderate emissions scenario (RCP4.5), and up to 2.0°C to 2.4°C by 2100 under a high emissions scenario (RCP8.5);
- Warm days (above 20°C) will become more frequent, especially in the east and midlands;
- Heatwaves are expected to increase in frequency, duration, and intensity, posing risks to health, agriculture, and infrastructure;

[2] Climate of Ireland - Met Éireann - The Irish Meteorological Service accessed 03/05/24
[3] Belmullet 1991–2020 averages (met.ie)

- Frost days (days below 0°C) are projected to decrease by 50–60% by mid-century, and up to 80% by 2100 under high emissions. This reduction is most pronounced in southern and coastal regions;
- Snowfall will become increasingly rare, with significant implications for ecosystems and seasonal water storage;
- Winter rainfall is projected to increase by 10–20% by 2050, especially in western regions;
- Summer rainfall may decrease by up to 15%, increasing drought risk in the east and southeast; and
- Sea levels around Ireland are projected to rise by 0.5 to 0.8 metres by 2100 under high emissions.

17.3.1.1 Climate Change Risk Assessment (CCRA)

The vulnerability of the proposed project to the potential impacts of climate change was assessed by the CCRA in Chapter 12 - Climate.

The CCRA involved an analysis of the sensitivity and exposure of the proposed project to climate hazards which together provide a measure of vulnerability.

The screening CCRA, detailed in Section 12.7.3. of Chapter 12 - Climate, did not identify any residual medium or high risks to the proposed project as a result of climate change. Therefore, a detailed CCRA for the construction and operational phase was scoped out of this assessment.

17.3.2 Hydrology

17.3.2.1 Flood Risk

A Flood Risk Assessment (FRA) has been carried out as part of the EIAR, see Appendix 9-3. A summary of the key findings of the FRA is provided below.

The proposed project is appropriately located within Flood Zone C, where the risk of flooding is highly unlikely, and it will not increase the risk of flooding elsewhere.

Fluvial

Summary of Assessment Results:

The Flood Risk Assessment for the proposed wind farm development identified that substation and Turbines T2, T7, and T10 show the highest freeboard values (≥ 30 m), reflecting their elevated topographic positions and minimal flood exposure. Turbines T1, T5, T9, T11, T13, and T14 required adjustment of Finished Floor Levels (FFLs) to ensure at least 0.5 m freeboard above the adjacent channel levels. Turbines T3, T4, and T6 are located away from any defined watercourse, where local slopes provide natural drainage and no hydraulic connectivity. The temporary construction compound is also adequately elevated, with FFLs designed to maintain 0.5 m freeboard. The risk of fluvial flooding at the site, under the 1-in-1000-year (0.1% AEP) MRFS event, is considered highly unlikely.

Coastal

The subject site lies approximately 24 km inland at a minimum elevation of around 114 mOD. Given this inland location and the elevated nature of the terrain, the risk of coastal flooding at the proposed wind farm site is considered highly unlikely.

Groundwater

There is no evidence to suggest groundwater as a potential source of flood risk to the proposed project.

Pluvial

The PFRA indicative mapping indicates no pluvial flooding at the proposed project.

Surface water arising on the proposed project will be managed by a dedicated stormwater drainage system in accordance with Sustainable Drainage Systems (SuDS) principles, limiting discharge from the site to greenfield runoff rates.

The landscaping and topography of the proposed project will provide safe exceedance flow paths and prevent surface water ponding to minimise residual risks associated with an extreme flood event or a scenario where the stormwater drainage system becomes blocked.

Therefore, it is estimated that risk of pluvial flooding associated with the proposed project is highly unlikely.

17.3.2.2 Contamination

Potential risk related to land, soil, surface water and groundwater contamination is discussed in Chapter 8 - Hydrology and Hydrogeology. Details of proposed mitigation are provided in Chapter 8, the CEMP (Appendix 2-4) and the Surface Water Management Plan (Appendix 2-7), With the implementation of mitigation measures, there is unlikely to be any significant adverse effects from contamination.

17.3.3 Land, Soils and Geology

The proposed wind farm site is situated in a mountainous region between Saddle Hill and Dough Mountain. The Geological Survey of Ireland (GSI) identifies Dough Mountain (LM009) and Thur Mountain (LM030) as designated geological heritage sites. Karst features such as dolines and swallow holes are present, especially west of Dough Mountain. Land use is mixed, dominated by forestry and agriculture, with peat depths varying across the site. Soil types range from blanket peat in the north to poorly drained acidic soils in the south, with subsoils including till, scree, and alluvium.

The design of the proposed project has included careful siting of infrastructure to minimise risk, A Peat Stability Risk Assessment (PSRA) has been undertaken to assess peat stability within the proposed wind farm site. This concluded that following the application of mitigation measures including site-specific temporary and permanent works designs for areas of deeper peat and steeper slopes, and careful detailed design and construction supervision for the other areas of the site, the hazard ranking for instability as a result of the excavations and groundworks proposed is “low” to “negligible”.

Routine and best practice mitigation measures will be implemented during the construction, operation, and decommissioning of the proposed project to avoid, reduce, or offset effects on

land, soils, and geology. Required mitigation measures include stepping or battering back of excavations to a safe angle (as determined through a slope stability assessment by a competent temporary works designer) or construction of a temporary sheet pile wall or rock fill berm to support the peat during construction or decommissioning. It is concluded that the proposed project will be unlikely to have significant effects on land, soils, and geology.

17.3.4 COMAH (Seveso) establishments

The Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (the "COMAH Regulations"), implement the Seveso III Directive (2012/18/EU). The purpose of the COMAH Regulations is to lay down rules for the prevention of major accidents involving dangerous substances. Seveso sites are defined as Industrial sites that, because of the presence of dangerous substances in sufficient quantities, are regulated under the Seveso III Directive.

COMAH (Control of Major Accidents and Hazards) (Seveso) establishments are designated as such as they pose an identified risk to public and environmental health and safety and are regulated by the Health and Safety Authority (HSA). COMAH establishments are categorised in two tiers – Upper Tier and Lower Tier depending on their activity.

The proposed project will not come under the Control of Major Accident Hazards (COMAH) Regulations.

Additionally, there are no Upper or Lower Tier COMAH establishments located in close proximity of the proposed wind farm site.

The closest COMAH establishment is the Lower Tier Lough Gill Distillery in Hazelwood, Co. Sligo, which is located approximately 20 km from the proposed wind farm site, approximately 11 km from the proposed grid connection route at its nearest point and 1km from the proposed TDR at its nearest point.

17.3.5 Major Infrastructure and Built Services

A detailed assessment of major infrastructure built services and waste services in relation the proposed project has been carried out in Chapter 15 - Material Assets.

17.3.5.1.1 Aviation

The nearest airport to the proposed project is Ireland West International Airport, located approximately 60 km southwest of the proposed wind farm site. Sligo Airport is located approximately 28 km west of the proposed wind farm site and Finner Camp Heliport (EIFR), Ballyshannon, Co. Donegal is approximately 16 km north of the proposed wind farm site.

Approximately 25 km east of the proposed wind farm site is the Enniskillen St Angelo Airport, licensed by the CAA (UK Civil Aviation Authority). Flights to and from this aerodrome operate under Visual Flight Rules (VFR) and there are no published IFPs (Instrument Flight Procedures) for this aerodrome. As the runway is over 25 km from the proposed wind farm site, there are no anticipated significant effects on the aviation activities of this aerodrome.

Likely significant effects with regard to aviation are discussed in further detail in Chapter 15 - Material Assets.

17.3.5.1.2 Telecommunications

The telecommunications impact assessment undertaken by Ai Bridges indicated that turbines T5 and T6 will have potential effects on the 2RN VHF off-air radio link between Truskmore and Monaghan. A range of mitigation options are discussed in Chapter 15, following the implementation of such mitigation there will be no likely significant effects on telecommunications.

17.3.5.1.3 Major Infrastructure and Built Services

All strategic infrastructure has been considered within the assessment (see Chapter 15 - Material Assets).

It is not anticipated that any major infrastructure and utilities such as gas, water and electricity will be encountered during the construction of the proposed project. The accommodation works footprint of the proposed project does not overlap with the gas pipelines in the vicinity of the proposed project. No underground water pipes have been identified within the footprint of the accommodation works for the proposed project site. No ESB infrastructure was identified within the area of the proposed project site. Chapter 15 Material Assets details associated mitigation and concludes that there are no likely significant effects during the construction, operation or decommissioning phases.

While all strategic infrastructure has been mapped and considered within the EIAR there is a possibility of some infrastructure, particularly underground utilities, being discovered during the proposed works, particularly within public road corridors, such as the locations of the accommodation works along the TDR or associated with the proposed GCR. As such, the potential risk of a major accidents and/or natural disaster in relation to major infrastructure such as underground gas, water and electricity lines remains and will be assessed further in this chapter.

17.4 Assessment of Effects

17.4.1 Future Baseline

With respect to major accidents and/or disasters, the 'future baseline' scenario or likely evolution of the baseline in absence of the proposed project means that there are no changes to the lands associated with the proposed project which comprises largely agricultural with areas of coniferous forestry occurring. The risk associated with climate change related issues would continue to change over time. The site would continue to be used as is and surrounding roads continue to operate as they currently do. Therefore, there would be a Neutral effect on risk of major accidents and/or disasters under the 'future baseline' Scenario.

17.4.2 Stage 1: Screening

The list of risk events considered to meet the criteria of a potential major accident and/or natural disaster and therefore require further assessment are listed in Table 17-5 below.

Risks are screened at this stage using the criteria from Section 17.2 above and either screened in for further assessment or screened out from the process.

Any permutations within the proposed range of turbine dimensions (See Chapter 2, Description of the Proposed Project) have been considered within this assessment and will not affect the potential risks discussed below and subsequent significance of the likely significant effects.

Table 17-5: Major Accidents and Natural Disasters – Stage 1 Risk Register Screening

Risk ID	Stage	Risk Event and Consequence	Possible Cause(s)	Justification of Identified Risk	Likely Significant Effects	For Further Assessment (Y/N)
A	Construction	Striking major infrastructure resulting in damage, disruption to services and / or fatalities / injuries.	Interaction with unknown strategic underground services (such as power, water, gas & telecommunications); faulty equipment or procedures; contractor error.	As discussed in Section 17.4.5 above and in Chapter 15 - Material Assets, there are no likely significant effects during the construction, operation or decommissioning phases within the wind farm site as a result of the proposed project. The potential for interaction with major infrastructure during the installation of the proposed GCR and accommodation activities along the proposed TDR remains.	As there is a potential risk to major infrastructure and utilities during the proposed GCR works and TDR accommodations pre-mitigation, this risk has been screened in for further consideration.	Y
B	Construction	Contamination of ground or surface water. This is associated with construction works.	Heavy rain during construction activities; Mobilisation of contamination during construction activities such as excavation, fuel spillage, seepage, stockpiled material providing a point source of exposed sediment, erosion.	Chapter 8 - Hydrology and Hydrogeology has assessed the potential for significant effects on groundwater and surface water as a result of the proposed project. It has been identified that there is potential for significant effects to groundwater and surface water quality and flows. The effects are discussed in more detail in section 17.4.2 and section 8.4 of Chapter 8.	The hydrology and hydrogeology assessment concluded that with the implementation of the proposed mitigation measures, there is no anticipated risk of likely significant effects. Therefore, this risk is screened out.	N
C	Construction	Major traffic accidents resulting from construction phase traffic	Heavy goods vehicles (HGVs) navigating through narrow roads.	The potential for major accident due to increase in traffic and HVs using construction routes and site access	The potential severity of the effect of this risk should it occur is high and therefore	Y

Risk ID	Stage	Risk Event and Consequence	Possible Cause(s)	Justification of Identified Risk	Likely Significant Effects	For Further Assessment (Y/N)
		or temporary construction traffic management measures.	Driver error - not abiding by potential re-routing or management measures.	points during the construction phase of the proposed project remains a potential significant effect due to the nature and scale of the proposed works.	has been screened in for further consideration.	
D	Construction /Operation/ Decommissioning	Movement of peat within the site during construction / Landslide	Mismanagement of excavated material on site. Severe weather conditions- storm, flooding	This has been considered in further detail within Chapter 7, as described above in Section 17.4.3. The PSRA concludes a low to negligible risk of peat failure due to the generally shallow peat depths on the proposed wind farm site (0.1 m – 4.5 m) and proposed mitigation measures. There were no potential effects identified as a result of soil erosion.	The findings of the land, soils, geology assessment found there to be no significant risks, post mitigation and therefore this risk will not be considered for further assessment and is screened out.	N
E	Construction /Operation/ Decommissioning	Flooding of site during construction, operational and decommissioning stage.	Periods of heavy prolonged rainfall, Climate change.	The potential for flood risk has been considered within the Flood Risk Assessment (Appendix 8-4). The proposed project is appropriately located within Flood Zone C, where the risk of flooding is highly unlikely, and it will not increase the risk of flooding elsewhere.	The FRA has determined the risk of flooding to be highly unlikely. Therefore, this risk has been screened out from further assessment.	N
F	Construction / Operation	Collision risk resulting in damage to infrastructure and/or injuries	Low flying planes	The likely significant effects on aviation have been considered within Chapter 15 - Material Assets and Appendix 15-2 Aviation Review Statement. As discussed in Section 17.4.5 no significant effects on	The findings of Chapter 15 - Material Assets and Appendix 15-2 conclude that there are no anticipated effects on aviation as a result of the proposed project. Therefore,	N

Risk ID	Stage	Risk Event and Consequence	Possible Cause(s)	Justification of Identified Risk	Likely Significant Effects	For Further Assessment (Y/N)
				aviation are anticipated as a result of the proposed project.	this risk has been screened out from further assessment.	
G	Construction /Operation	Incident at nearby Seveso site involving release of dangerous substances.	Fire / explosion or an infrastructure failure at a Seveso site	As discussed above in Section 17.4.4, the proposed project is not a COMAH or nuclear installation and no interaction is anticipated between a COMAH site and the proposed project.	As the assessment in Section 17.4.4 has determined there will be no anticipated interaction with a COMAH site, there are no likely significant effects anticipated as a result of this risk and it is not considered for further assessment.	N
H	Operation	Collapse / damage of structures/infrastructure.	Earthquake	The cause of this risk event (earthquake) is not considered applicable to this geographic location as discussed above in Section 17.4.1.	As the geographic location of the proposed project is not applicable to this risk, it is not considered to have a likely significant effect and is not considered for further assessment.	N
I	Construction /Operation/ Decommissio ning	Risks related to climate change such as increased frequency and strength of storms, heightened flood risk, risk of extreme temperatures.	Climate change	The potential for climate change associated risks has been considered within Chapter 12 - Climate) as described in Section 17.4.1. The CCRA concluded that overall there are no likely significant effects on climate as a result of the proposed project, and no significant	As there have been no identified likely significant effects on the proposed project as a result of climate change or on climate as a result of the proposed project, this risk has been	N

Risk ID	Stage	Risk Event and Consequence	Possible Cause(s)	Justification of Identified Risk	Likely Significant Effects	For Further Assessment (Y/N)
				effects on the proposed project itself as a result of climate change hazard.	screened out from further assessment.	
J	Operation	Collapse / damage of turbine structures / infrastructure at substation	Heavy Vehicles (HVs) collision;	There is potential for a major accident with a building / structure collapse including the potential for serious injuries.	As the potential for likely significant effect exists with the severity of the effect being significant should it occur, this risk has been screened in for further assessment.	Y
K	Operation	Fire at wind turbines/substation or forest fire during construction / operation phase resulting in damage to infrastructure and/or injuries	Lightning strike; Equipment failure; wildfire.	There is potential for lightning strike or equipment failure at the proposed turbines and substation or the onsite forestry resulting in damage to infrastructure and/or injuries. The substation has been designed in accordance with ESB and EirGrid specifications (e.g. lightning protection masts and fire suppression equipment). Further details and mitigation measures are provided in Chapter 2 – Description of the Proposed Project and Chapter 12 – Climate.	As the potential risk of fire as a result of lightning strike and equipment failure has been identified, this risk is screened in and will be considered further.	Y

Risk ID	Stage	Risk Event and Consequence	Possible Cause(s)	Justification of Identified Risk	Likely Significant Effects	For Further Assessment (Y/N)
				As discussed above in Section 17.4.1, with the implementation of these measures, the risk of potential significant effect from lightning strikes is considered low. However, the potential for fire risk related to equipment failure remains.		
L	Operation	Ice falling from wind turbine blades	Injury from flying ice from wind turbine blades	Given the nature of the infrastructure of the proposed project, the potential for injury and damage to infrastructure due to falling ice from wind turbines has been identified.	As a risk of likely significant effects as a result of falling ice has been identified, this risk has been screened in for further consideration.	Y

Risks B, D, E, F, G, and H were not brought forward for further consideration and assessment as discussed in Table 17-5.

Risks A, C, J, K and L were considered to meet the potential of a major accident and/or natural disaster and require further assessment relative to the proposed project.

17.4.3 Stage 2: Classification and Assessment

Table 17-6 below considers risks A, C, J, K and L that were brought forward for further consideration and assessment.

The design of the proposed project incorporates mitigation measures. Following consideration of these measures the risks were assigned a consequence and likelihood rating to determine their risk score.

Table 17-6: Major Accidents and Disasters – Risk Classification Considering Mitigation

Risk ID	Stage	Risk Event and Consequence	Possible Cause(s)	Overview of Mitigation	Likelihood Rating	Consequence Rating	Risk Score
A	Construction	Striking major infrastructure resulting in damage, disruption to services and / or fatalities / injuries	Interaction with unknown strategic underground services (such as power, water, gas & telecommunications); faulty equipment or procedures; contractor error.	As outlined in section 17.4.5.1.3, the potential risk for interaction with major infrastructure including underground gas, water and electricity lines during the accommodation works along the proposed TDR and the proposed GCR, particularly along roads, has been identified. Chapter 15 – Material Assets has assessed the potential significant effects and the likelihood of encountering the above. A preliminary desktop study based off existing records and data has been conducted of existing utilities and infrastructure. A confirmatory check on the location of water network, gas network and electricity network services will be undertaken prior to commencement of construction. The Construction Environmental Management Plan (CEMP) is a live document (i.e. subject to review and updates pre-construction) and will be developed further with ongoing consultation with the contractor, Local Authority other relevant stakeholders. The CEMP will also include an Emergency Response Plan which will outline protocols should an interaction with major infrastructure occur.	2	3	6

Risk ID	Stage	Risk Event and Consequence	Possible Cause(s)	Overview of Mitigation	Likelihood Rating	Consequence Rating	Risk Score
C	Construction	Major traffic accidents resulting from construction phase traffic or temporary construction traffic management measures	HVs navigating through narrow roads. Driver error - not abiding by potential re-routing or management measures.	Potential risks will be reduced by the development and implementation of a construction phase Traffic Management Plan (TMP) (see Appendix 16-1) as described in Chapter 16, Traffic and Transportation. Due to the use of borrow pits on site there will be a reduced amount of heavy vehicle traffic on public roads. The Traffic Management Plan is a live document (i.e. subject to review and updates pre-construction) and will be developed further through the detailed design and construction phase with ongoing consultation with the Local Authority, An Garda Síochána, Emergency Services and other stakeholders.	2	3	6
J	Operational/ Construction	Collapse / damage of turbine structures / infrastructure at substation	HVs collision; Severe weather.	Extensive and detailed confirmatory ground investigation will be undertaken by the appointed Contractor to inform the detailed design and appropriate construction technologies and plant to be deployed. Contractors with a proven track record in delivering work of the scope required by the works will be appointed. Given the nature of their use, the turbines are designed to be placed in high wind environments and therefore significant research has gone into their ability to withstand extreme wind loadings.	2	3	6

Risk ID	Stage	Risk Event and Consequence	Possible Cause(s)	Overview of Mitigation	Likelihood Rating	Consequence Rating	Risk Score
				There are no dwellings located within 760 m of the proposed turbine locations, therefore the risk to residential receptors from turbine collapse is not considered significant. The proposed tip height of the turbines is between 180 m-185 m, therefore all residential dwellings are significantly removed from any area of a potential turbine collapse. The Emergency Response Plan of the proposed project is detailed within the CMEP (see Appendix 2-6).			
K	Operational	Fire at wind turbines /substation or onsite forestry during construction / operation phase resulting in damage to infrastructure and/or injuries	Lightning strike; Equipment failure; wildfire.	All buildings will be designed and constructed to meet the requirements of Part B (Fire Safety) of the Building Regulations 2012 (S.I. No. 138 of 2012). Neither the draft 2019 Wind Energy Development Guidelines (WEDGs) nor the current 2006 WEDGs refer to the likelihood of fires from turbines and it is considered that the potential risk of a fire is very low. The risk of turbine fire or collapse is very low on the basis of comprehensive turbine base design considerations, safety checks throughout the turbine installation process and turbine suppliers' many years of experience in developing and innovating safety in the wind energy industry. The turbines will be fitted with lightning conductors to minimise the potential risk of lightning induced fires. Substations are understood to provide an inherent fire risk with potential for significant impact, particularly	2	3	6

Risk ID	Stage	Risk Event and Consequence	Possible Cause(s)	Overview of Mitigation	Likelihood Rating	Consequence Rating	Risk Score
				on the wider electricity supply. Neither the draft 2019 Wind Energy Development Guidelines (WEDGs) nor the current 2006 WEDGs refer to the likelihood of fires from substations and it is therefore considered that the potential risk of a fire is very low. Current substation designs contribute to the mitigation of potential for inherent fire risk with measures including shut-off should a fire occur and additional designs of fire walls to contain the spread of fire. The onsite forestry is designed with firebreaks incorporated. Firebreaks offer a level of protection if a fire is at risk from spreading into the forest and is considered good forest practice. Proper forestry management which is conducted on an ongoing basis, involving regular maintenance and management of elements such as firebreaks As noted in the CEMP (Appendix 2-4), the appointed Contractor will be responsible for developing a detailed environmental Emergency Response Plan (ERP) for the proposed construction works and environmental emergencies, as part of the H&S Plan. The ERP is to outline specific protocol in relation to fire on site should it occur.			
L	Operational	Ice falling from wind turbine blades	Injury from flying ice from wind turbine blades	The 2006 Wind Energy Development Guidelines and the Draft 2019 WEDGs refer to the very remote possibility of injury to people (or animals) from flying fragments of ice or from a damaged blade but note that most blades are composite structures with no	2	2	4

Risk ID	Stage	Risk Event and Consequence	Possible Cause(s)	Overview of Mitigation	Likelihood Rating	Consequence Rating	Risk Score
				bolts or separate components and that most turbines are fitted with anti-vibration sensors, which will detect any imbalance caused by icing of the blades and prevent start-up. Modern Wind Turbine Generators have incorporated an advanced blade anti-icing solution to their design. The Anti-Icing system uses electro-thermal heating elements embedded in the blade material to prevent ice build-up and allow turbines to function in cold climates.			

The results from the evaluation of risk, have been summarised/categorised in Table 17-7 below.

Table 17-7: Risk Assessment Evaluation

Likelihood Rating	5 – Very Likely					
	4 – Likely					
	3 – Unlikely					
	2 - Very Unlikely			A, C, J, K		
	1 – Extremely Unlikely			L		
		1 – Minor	2 – Limited	3 – Serious	4 – Very Serious	5 - Catastrophic
		Consequence Rating				

From assessing the potential risks and mitigation measures presented in Table 17-6, Risks A, C, J, K and L all fall within the green zone and were considered low risk scenarios broadly acceptable with mitigation measures. This chapter presents a completed risk assessment of major accidents and natural disasters relevant to the proposed project. Should the project proceed, risk management will continue as a live process throughout the detailed design, construction, operational, and decommissioning phases, with existing plans subject to ongoing review and updates.

17.5 RESIDUAL EFFECTS

This chapter has assessed the potential risk of major accidents and natural disasters from the construction, operation and decommissioning phases of the proposed project. In accordance with the DoCEE guidance the risk of a major accident and/or natural disaster is considered 'Low'.

With implementation of the mitigation measures already detailed in Chapter 6 - 18 in this EIAR (Table 17-6), there will not be significant residual effects associated with the proposed project.

17.6 CUMULATIVE EFFECTS

In assessing the potential for likely significant cumulative effects, any other existing, permitted or proposed developments in the surrounding area have been considered where they have the potential to generate in-combination or cumulative effects with the proposed project (see Appendix 1-6 for details of the developments considered).The closest wind farm to the proposed project is the adjacent Faughary Wind Farm, located approximately 600 m west of the proposed project (at its closest point).

Chapter 16 assess potential effects relating to traffic and transport. The distance outlined above is sufficient to capture the zone of influence or study area for the Traffic and Transport Assessment. The planning applications identified are considered likely significant cumulative effects if they have a current planning application and have not been constructed. The planning

applications identified within the study area at the time of this assessment are not of significant scale/proximity to result in likely significant cumulative effects.

Drainage management measures will be employed during the construction phase of the proposed project which will ensure that there is no flood risk to the downgradient (downstream) of the proposed wind farm site as described in Section 1.4.2 and Chapter 8 Hydrology and Hydrogeology). As such the proposed project will not contribute to potential cumulative flood risks.

Considering the low likelihood of occurrence and the implementation of appropriate mitigation measures in relation to the risk of turbine collapse, the risk of fire and the risk of falling ice as discussed in Table 17-5, there is no significant cumulative effects predicted in relation to these risks.

There are no potential cumulative effects identified for any part of the proposed project (including the route of the proposed GCR, or along the proposed TDR). This is based upon the low risk of major accidents or natural disasters associated with the proposed project and a review of the projects in the surrounding area.

Based on the low risk associated with the proposed project described in this chapter of the EIAR and the implementation of proposed mitigation measures for the proposed project and the other projects, there is a very low potential for significant cumulative increase to the risk of a major accident and/or natural disaster occurring in relation to these projects. Specific risks are considered below.

17.7 TRANSBOUNDARY EFFECTS

At its nearest distance, the proposed Wind Farm Site is located 3.6km south of the border with Northern Ireland. Accordingly, the potential for transboundary effects has been considered, where necessary.

As outlined in Table 17-7, with all mitigation measures implemented there are no significant effects anticipated from the proposed project in relation to the risk of major accidents and/or natural disasters, and therefore there is no significant transboundary effects anticipated.

17.8 CONCLUSION

This chapter has assessed the vulnerability of the proposed project to major accidents and natural disasters, as well as the potential of the proposed project itself to cause potential major accidents and/or natural disasters during the construction, operation and decommissioning phases.

Table 17-7 confirms the significance of any residual effects following the application of mitigation measures. Following the assessment with mitigation measures, the risks fall within the green zone and were considered low risk scenarios. Any permutations within the proposed range of turbine dimensions will not affect the significance of the potential effects as this EIAR has been undertaken with the consideration of all proposed project ranges and parameters as outlined in Chapter 2.

With all mitigation measures implemented there is no significant residual effects from the proposed project in relation to the risk of major accidents and/or natural disasters.

17.9 REFERENCES

Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) – COMAH Regulations.

Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (as amended).

Department of Defence (2020) – A National Risk Assessment for Ireland.

Department of Environment, Community and Local Government (DECLG) (August 2018) – Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.

Department of Environment, Heritage and Local Government (2010) – A Guide to Risk Assessment in Major Emergency Management.

Environmental Protection Agency (2022) – Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

European Commission (2017) – Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Reports.

European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU) – The EIA Directive.

IEMA (2020) – Major Accidents and Disasters in EIA: A Primer.

Institute of Environmental Management and Assessment (IEMA) (2020) – 'Major Accidents and Disasters in EIA: A Primer' guidance.

Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) (as amended).

Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005).