Planning and Environmental Consultants

Environmental Impact Assessment Report

Taurbeg Wind Farm Extension of Operational Life

Chapter 16 – Major Accidents and Natural Disasters

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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 (consisting of the Proposed Lifetime Extension and Proposed Offsetting Measures) 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.

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Lifetime Extension', 'Proposed Project', 'Proposed Offsetting Measures', 'Proposed Offsetting Lands' and the 'Site'. 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 Natalia Stolarska, Michéal Cahill and reviewed by Eoin McCarthy. Natalia is an Environmental Scientist with MKO having joined the company in September 2023. Natalia holds a BSc (Hons) in Earth and Ocean Science from University of Galway and an MSc in Environmental Leadership from University of Galway. Natalia's key strengths and areas of expertise are in drafting EIAR report chapters, environmental impact assessment screening reports, wind farm feasibility studies and QGIS mapping. Since joining MKO in September 2023, Natalia has been

involved in a range of wind farm projects, assisting with field work, client briefing notes, constraints mapping and drafting EIAR chapters, with more projects in the pipeline.

Michéal Cahill is a Graduate Environmental Scientist with MKO with over a years experience in environmental consultancy. Michéal holds a first-class honours degree in Environmental Science at University of Galway and was awarded the Professor Emer Colleran Medal for his academic achievements. Prior to taking up his position with MKO in June 2024, Michéal previously worked as an environmental sustainability intern with RPS Group. Michéal has previous experience in the preparation and review of Environmental Impact Assessment Reports for both offshore and onshore wind farm projects, as well as aiding in the research and design phase of a proposed pumped hydroelectric storage plant.

Eoin is a Senior Environmental Scientist with over 13 years of environmental consultancy experience. Eoin holds a B.Sc. (Hons) in Environmental Science from NUI, Galway. Eoin took up his position with MKO in June 2011. Eoin's key strengths and areas of expertise are in project management, environmental impact assessment, wind energy site selection and feasibility assessment. Since joining MKO, Eoin has progressed from Graduate to Senior level and has been heavily involved on a significant range of energy infrastructure, tourism, waste permit, flood relief scheme and quarrying projects. He has overseen the design phase and applications of some of the largest wind energy projects in Ireland. In his role as project manager, Eoin works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Eoin is also involved in the development of project strategy for the projects that he manages. He has held the role of project manager and EIAR co-ordinator on over 700MW worth of wind energy projects. Within MKO Eoin plays a large role in the management of and sharing of knowledge with junior members of staff and works as part of a large multi-disciplinary team to produce EIA Reports.

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.
- South-West Regional Planning Guidelines 2010-2022;
- Regional Spatial and Economic Strategy for the Southern Region (RSES) 2020;
- Cork County Council – Major Emergency Plan 2021
- Health Service Authority advice for Health and Safety in the Renewable Sector.[1]
- Rialtas na hÉireann 2021-2022 National Risk Assessment: Overview of Strategic Risks[2]
- Fáilte Ireland
- EU Council Directive 2012/18/EU of 4th July 2012 on the Control of Major Accident Hazards Involving Dangerous Substances (COMAH Directive/ Seveso III Directive).
- European Communities Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations")
- ArcGIS SEVESO Map Viewer

Major accidents or natural disasters are hazards that have the potential to affect the existing Taurbeg Wind Farm and lead to environmental effects directly and indirectly. These include accidents during

[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*

the extended operational and decommissioning phases, caused by operational failure and/or natural hazards. The assessment of the risk of major accidents and/or disaster is considered in relation to the information required to be provided in the EIAR, i.e., population and human health, biodiversity, land 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 existing Taurbeg Wind Farm to potential accidents and disasters
- The Proposed Lifetime Extension'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".*

16.2.2.2 Guidance Documents

The following guidance documents have been consulted in the preparation of this section:

- 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

On a regional scale, Cork falls under the scope of the Major Emergency Management South Region (MEM)[3].

[3] *HSE South East (Area 5) Emergency Plan: Covering Geographical Areas of Counties Carlow, Kilkenny, South Tipperary, Waterford and Wexford, November 2019)*

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 extended 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 impacts occurring within the Site and causing environmental damage.

There is low potential for significant natural disasters to occur at the Site and Proposed Offsetting lands. 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 existing Taurbeg Wind Farm 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. Likewise, the Proposed Offsetting lands are 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 Site has low potential to cause natural disasters or major accidents. As detailed in Section 8.3.3 in Chapter 8 Land Soil and Geology, there are sections of peat identified within the Site and the Proposed Offsetting Lands on the published soils map (www.epa.ie) and published subsoils maps (www.gsi.ie).

Blanket peat is found at the existing Taurbeg Wind Farm Site and Proposed Offsetting Lands. Blanket peat in both areas has been significantly degraded due to agricultural land improvement and commercial forestry. The existing Taurbeg Wind Farm is located in an upland site, therefore there is potential for peat slides. The GSI have classified this area with a moderately low-moderately high potential for landslides. The GSI have classified the Proposed Offsetting lands with a "low" to "high" potential for landslides. The areas of high susceptibility are located on the western slopes of Mount Eagle.

Site walkovers and peat probing surveys were carried out and peat thickness within the Proposed Offsetting Lands ranged from 0 to 3.2m with a median value of 1.6m. 23% of the recorded peat depths within the Proposed Offsetting Lands were less than 1m and 72% were less than 2m.

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 extended operational and decommissioning phases of the Proposed Lifetime Extension and the Proposed Offsetting Measures. The approach to identifying and quantifying risks associated with the Proposed Lifetime Extension and Proposed Offsetting Measures by means of a site-specific risk assessment is derived from the EPA '*Guidance on Assessing and Costing Environmental Liabilities'* document[4]. 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 the extended operational, and decommissioning phases.

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

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.

[4] *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*

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 Cork 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

Ranking	Likelihood	Impact	Description
			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 Infrastructure Social	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. Very heavy contamination, widespread effects of extended duration. >€25M Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

Risk Evaluation

Once classified, the likelihood and consequence 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					

16.3 Baseline Conditions

The functional areas of Cork County Councils fall under the South Major Emergency Region. The Major Emergency Plans prepared by Cork County Council (2021) outlines the following potential major emergency scenarios in the county:

- **Natural**
  - Flooding & Severe Weather.
- **Transportation**
  - Aircraft Collision / Loss
  - Major Road / Rail Incident;
  - Hazardous materials incident (Transportation);
  - Ship and Port incident;
  - Marine Emergency in Port (Passenger Ferry).
- **Technological**
  - Fire / Explosion / Toxic Cloud release at industrial site;
  - Seveso sites;
  - Loss of critical infrastructure;
  - Water contamination/pollution incident.
- **Civil**
  - Fire/ Major Crowd Safety incident;
  - Epidemics/pandemics;
  - Water Rescue.

Site/event Specific Emergency Plans for Cork County Council:

1. Severe Weather Plan (excluding flooding)
2. Flood Emergency Response Plan
3. Drinking Water Incident Response Plan

4. External Emergency Plans for Upper Tier Seveso Sites
5. Inter-Agency Emergency Plan for Cork Airport
6. Inter-Agency Emergency Plan for the Jack Lynch Tunnel
7. Bantry Bay Port Emergency Plan
8. Oil Spill / Hazardous Noxious Substances Contingency Plan

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

16.3.1 Meteorological

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The existing Taurbeg Wind Farm is located in County Cork, approximately 47.5 km west of the Atlantic Coastline at its closest point. The Proposed Offsetting lands are located in County Kerry, approximately 29km west of the Atlantic Coastline at its closest point. The dominant influence on Ireland's climate is the Atlantic Ocean. As a consequence, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude. The hills and mountains, many of which are near the coasts, provide shelter from strong winds and from the direct oceanic influence.

The Met Éireann weather station at Shannon Airport is the nearest weather and climate monitoring station to both the existing Taurbeg Wind Farm and the Proposed Offsetting Lands that has meteorological data recorded for the 30-year period from 1991 – 2020. The monitoring station is located approximately 50km to the North of Taurbeg Wind Farm. The wettest months are November and December, and typically, April and May the driest. July is the warmest month with an average temperature of 16°C. The mean annual temperature recorded at Shannon Airport was 10.7°C.

Wind speeds at Shannon Airport are greater than 16.7 kilometres per hour (9 knots), from November to April. The windiest month of the year at Shannon Airport is February, with an average monthly wind speed of 18.7 kilometres per hour (10.1 knots). The months of May to October tend to be more settled on average. The calmest month of the year in Shannon Airport is August, with an average monthly wind speed of 15.4 kilometres per hour (8.3 knots).

In relation to icy conditions, the wind turbines are fitted with anti-vibration sensors, which detect any imbalance caused by icing of the blades. The sensors cause the turbine to wait until the blades have been de-iced prior to beginning operation.

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

The works programme for the Proposed Offsetting Measures and decommissioning stage of the existing Taurbeg Wind Farm will take account of weather forecasts and work will be suspended in the case of extreme weather events.

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

- General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates;
- Weather Warning or Advisories: Met Éireann's main suite of warnings are issued by the duty forecaster between 10am and midday and are updated as necessary as new information becomes available. In general, warnings will not be issued more than 60-

hours ahead of the expected adverse weather but advisories on potential hazards are issued up to a week in advance. The three warning categories are:
    - Yellow: Not unusual weather. Localised danger.
    - Orange: Infrequent. Dangerous/disruptive.
    - Red: Rare. Extremely dangerous/destructive.
- MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale;
- 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events;
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and,
- Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.

16.3.2 Natural

16.3.2.1 Proposed Lifetime Extension

The existing Taurbeg Wind Farm is located in an upland area with the River Feale being located in the northeastern section of the Site. This river is susceptible to flooding, with the closest single flood event being 3.5km north of the Site. No past flooding events have been identified within the Site itself, with the Site also not being in a flood zone.

There is coniferous forestry present at the Site, leading to a low possibility of forest fires at the Site. Earthquake, tsunami and volcanic eruptions are not considered to be a risk to the Proposed Lifetime Extension either, due to its location inland c. 42km from the nearest coastline), and the lack of tectonic activity ever recorded in the area.

16.3.2.2 Proposed Offsetting Measures

The Proposed Offsetting Lands are located in upland area, with the Clydagh River being located in the southeastern section of the site. No past flooding events have been identified within the Site itself, with the site also not being in a flood zone. There are deforestation works and farmland restoration measures proposed as part of the Proposed Offsetting Measures.

Earthquake, tsunami and volcanic eruptions are not considered to be a risk to the Proposed Offsetting Measures, due to its location inland c. 29km from the nearest coastline), and the lack of tectonic activity ever recorded in the area.

16.3.3 Peat Stability

16.3.3.1 Proposed Lifetime Extension

The existing Taurbeg Wind Farm is located in an upland area which is dominated by peat bogs, agricultural pastures, coniferous forestry, transitional woodland scrub and renewable energy production. The risk of landslide or rock slide are also considered to range from low to high, with the majority of the site having a Landslide Susceptibility Classification of moderately low according to the GSI.

There are no construction activities associated with the Proposed Lifetime Extension, and therefore no peat stability assessment has been carried out at the Site.

The original EIAR found that the existing Taurbeg Wind Farm was suitable from a peat stability perspective, and the existing wind farm was constructed without any peat stability issues. The main risk related to the construction work activities and earthworks are associated with the construction of the wind farm. The risks are significantly lower for an operational wind farm.

There have been no reported occurrences of ground instability or peat slides during the both the construction and operational phase of the Taurbeg Wind Farm.

16.3.3.2 Proposed Offsetting Measures

The Proposed Offsetting Lands are covered in blanket peat with undulating terrain and widespread coniferous forestry, with the exception of the agricultural field in the north of the site which contains improved agricultural land. Peat thicknesses recorded during the site walkovers within the Proposed Offsetting Lands from 111 no. probes ranged from 0m to 3.2m with an average depth of 1.6m. 23% of recorded peat thicknesses within the Proposed Offsetting Lands were under 1m, and 72% were under 2m.

An analysis of peat sliding was carried out across the Proposed Offsetting Lands for both the undrained and drained conditions. The purpose of the analysis was to determine the Factor of Safety (FoS) of the peat slopes.

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

16.3.4 Transportation

16.3.4.1 Proposed Lifetime Extension

The Proposed Lifetime Extension will utilise the existing road network for maintenance and decommissioning activities. Typically, there are no more than 12 trips per year to the Site made by car or light goods vehicle for maintenance purposes. Traffic associated with the extended operational and decommissioning stages of the Proposed Lifetime Extension is addressed in Chapter 15 of this EIAR.

16.3.4.2 Proposed Offsetting Measures

The Proposed Offsetting Measures will utilise the existing road network for the proposed deforestation works and farmland restoration. Further detail on traffic impacts are addressed in Chapter 15 of the EIAR.

16.3.5 Technological

16.3.5.1 Proposed Lifetime Extension

As the Proposed Lifetime Extension is located in a rural area, the risk of any industrial incidents interacting with the Site are low. The closest lower tier SEVESCO site is LP Gas Filling Services, Quartertown Industrial Estate, Mallow, Co. Cork located approximately 34.5km south east of Taurbeg Wind Farm. The closest upper tier SEVESCO site is Irish Distillers (Perno Ricard), Dungourney, Co. Cork located 72.5km east of the Site.

16.3.5.2 Proposed Offsetting Measures

As the Proposed Offsetting Lands are located in a rural area, the risk of any industrial incidents interacting with the Site. The closest lower tier SEVESCO site West Cork Distillers Limited, Bioatlantis, Clash Indistrial Estate, Tralee in Co. Kerry located approximately 24km west of the Proposed Offsetting Lands. The closest upper tier SEVESCO site is National Oil Reserves Agency Ltd., Tarbert, Co. Kerry located approximately 37km north of the Proposed Offsetting Lands.

16.3.6 Civil

16.3.6.1 Proposed Lifetime Extension

The Proposed Lifetime Extension is located in a rural area, c.3.5km south of Rockchapel. As highlighted in Chapter 5, there are 6 Sensitive Receptors located within 1km of the existing turbine locations. The closest Sensitive Receptor (H10) is located approximately 731 metres from the nearest turbine location (T8). Therefore, due to these low population numbers, civil concerns such as overcrowding and epidemics are not considered to be a risk to the Proposed Lifetime Extension.

16.3.6.2 Proposed Offsetting Measures

The Proposed Offsetting Measures are located in a rural area, c.8km east of Castleisland. There are 22 dwellings located within 1km of the Proposed Offsetting Lands. The closest Sensitive Receptor (H10) is located approximately 60m south from proposed deforestation works. Therefore, due to these low population numbers , civil concerns such as overcrowding and epidemics are not considered to be a risk to the Proposed Offsetting Measures.

16.3.7 Turbine Safety

16.3.7.1 Proposed Lifetime Extension

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

The Guidelines state that there is a very remote possibility of injury to people from flying fragments of ice or from a damaged blade. However, most blades are composite structures with no bolts or separate components and the danger is therefore minimised. There is also a remote possibility of injury or environmental damage due to the unlikely possibility of turbine collapse or component damage.

16.3.7.2 Proposed Offsetting Measures

There is no wind farm infrastructure proposed within the Proposed Offsetting Lands, with works proposed being limited to deforestation of coniferous forestry and farmland restoration.

16.3.8 Electromagnetic Interference

16.3.8.1 Proposed Lifetime Extension

Underground electric cables are common practice throughout the country and installation does not give rise to any specific health concerns.

The extremely low frequency (ELF) electric and magnetic fields (EMF) associated with the operation of the cables fully comply with the international guidelines for ELF-EMF set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a formal advisory agency to the World Health Organisation, as well as the EU guidelines for human exposure to EMF. Accordingly, there is no operational impact on sensitive receptors (residential or other uses), construction staff, operational & maintenance staff users of the site as the ICNIRP guidelines are not exceeded at any distances even directly above the cables.

The ESB document 'EMF & You' (ESB, 2017)[5] provides further practical information on EMF. Further details on the potential impacts of electromagnetic interference to telecommunications and aviation are presented in Chapter 15 Material Assets of this EIAR.

16.3.8.2 Proposed Offsetting Measures

There is no electrical cabling proposed within the Proposed Offsetting Lands, with works proposed being limited to deforestation of coniferous forestry and farmland restoration.

16.3.9 Loss of Critical Infrastructure

16.3.9.1 Proposed Lifetime Extension

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.

The Existing Taurbeg Wind Farm connects into the existing onsite 38kV substation.

There are no Gas Networks Ireland (GNI) pipelines within the Site.

16.3.9.2 Proposed Offsetting Measures

There are no Eirgrid or ESB infrastructure such as substations or overhead liens located within the Proposed Offsetting Lands.

There are no Gas Networks Ireland (GNI) pipelines within the Proposed Offsetting Lands.

16.4 Risk Assessment

This section outlines the possible risks associated with the Proposed Lifetime Extension and Proposed Offsetting Measures for the extended operational and decommissioning phases.

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

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

As outlined 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 11 no. turbines comprising the existing Taurbeg Wind Farm would be decommissioned in 2026 under the requirements of its current planning permission and would lose the opportunity to continue to contribute clean energy into the national grid, as would the opportunity to contribute to local, national and EU policy. Existing land use at the Proposed Offsetting Lands would continue and the Proposed Offsetting Measures would not take place.

16.4.1.2 Identification of Effect During Extended Operation

Risks specific to the Proposed Lifetime Extension have been identified and are presented in Table 16-4.

Table 16-4: Risk Register –Extended Operational Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
A	**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.
B	**Flooding** Risk of flooding in areas surrounding the Site impacting the operational phase and leading to environmental emissions	Extreme weather- periods of heavy rainfall and snow, taking into account climate change and strong winds
Potential to cause accidents and / or disasters.		
C	**Industrial Accident-Fire / Gas Explosion**	Equipment or infrastructure failure; Electrical problems; and Employee negligence.
D	**Collapse / damage to structures**	Earthquake, extreme weather events; and Vehicular collisions due to driver negligence on public roads.
E	**Traffic Incident** Collisions onsite and offsite with vehicles involved in operation of Proposed Lifetime Extension	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented

F	**Loss of Critical Infrastructure**	Electrical fault at wind farm substation bay
G	**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 extended operational phase. Spill or leak of oil during operational maintenance.

16.4.1.3 Identification of Effect During Decommissioning

Risks specific to the decommissioning of the existing Taurbeg Wind Farm have been identified and are presented in Table 16-5.

Table 16-5 Risk Register Decommissioning Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
H	**Severe Weather** Risk to decommissioning activity on Site leading to environmental emissions	Extreme weather- periods of heavy rainfall and snow, taking into account climate change and strong winds.
I	**Flooding of site** Risk of flooding in the Site impacting the decommissioning phase and leading to environmental emissions	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.
J	**Peat Stability**	Extreme weather and periods of heavy rainfall.
Potential to cause accidents and / or natural disasters.		
K	**Traffic Incident** Collisions onsite and offsite with vehicles involved in decommissioning of the existing Taurbeg Wind Farm	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented.
L	**Collapse / damage to structures**	Earthquake, extreme weather events; and Vehicular collisions due to driver negligence on Site and public roads.

M	**Contamination** Discharge or spillage of fuel, chemical solvents onto subsoils and into watercourse or percolated to groundwater	Accidental fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles leading to uncontrolled emissions.
O	**Industrial Accident – Fire / Gas Explosion**	Equipment or infrastructure failure, Electrical problems; and; Employee negligence.

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 16-6.

The risk register is based upon possible risks associated with the Proposed Lifetime Extension. As outlined in Section 16.2.4.2, the consequences 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 16-6.

16.4.1.4 Assessment of Effect Summary – Proposed Lifetime Extension

Table 16-6: Risk Assessment Summary – Proposed Lifetime Extension

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Extended Operational Phase								
A	**Severe Weather**	Extreme weather- periods of heavy rainfall or snow, taking into account climate change and strong winds	Illness or loss of life;	2	The risk of severe weather is low when considering the weather conditions recorded over the last 30 years within the area. All operation and site maintenance activities will be paused should a Status Red weather warning alert be issued by Met Eireann, as is standard practice[6].	1	The risk of severe weather conditions during the extended operational phase will result in a minor consequence in that a '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
B	**Flooding**	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Groundwater Flooding; Flooding to surrounding and downhill properties.	2	The risk of flooding is considered very low within the Site when taking into account the Flood Risk Assessment in Chapter 9 of the EIAR. The on-site	1	The result of flooding during the extended operational phase will result in a minor consequence in that a 'small number of	2

[6] *https://www.met.ie/met-eireann-warning-system-explained*

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
			Damage to, or depletion of aquatic habitats and species.		drainage system ensures that runoff from the site is at Greenfield pre-development rates and has not increased the downstream flood risk;		people would be affected' should flooding occur with 'no fatalities and a small number of minor injuries with first aid treatment'.	
C	**Industrial Accident Fire / Gas Explosion**	Equipment or infrastructure failure; Fuel spillage/storage Electrical problems; and Employee negligence	Illness or loss of life; Damage to, or depletion of habitats and species; and Impacts on ambient air quality.	2	Fuel is securely stored on-site and given good site maintenance and visual inspections are carried out regularly, fuel is not considered to be a significant fire risk. In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the existing Taurbeg Wind Farm shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site, and mitigation of the same during operation.	2	Should a fire/explosion occur at the Site, a limited consequence would occur 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 existing Taurbeg Wind Farm and the upkeep and maintenance of fuel storage during the extended operational stage that would result in any such incident. There will be 'normal community functioning' in the area with 'some	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							inconvenience'. The 'generic command, control & co-ordination systems' as well as the 'common elements of response' detailed in the Cork Major Emergency Plans will work to reduce the consequence (both on people and the environment) of potential fire/explosions at the Site.	
D	**Collapse/ damage to structures**	Earthquakes, extreme weather events; and Vehicular collisions due to driver negligence.	Injury or loss of life. Movement of peat within the Site; Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species;	1	According to the Irish National Seismic Network (INSN), earthquakes measuring ~2 on the Richter Scale are "normal" in terms of seismicity in Ireland. These are known as microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. As such, buildings in Ireland are extremely unlikely to be damaged or collapse due to seismic activity.	1	The risk of infrastructure collapse during the extended 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)
					Having regard to public speed limits within the existing Taurbeg Wind Farm, it is envisaged that a collision between a vehicle and any site infrastructure would not result in significant damage/collapse. Mitigation measures regarding vehicular accidents can be found in Chapter 15; Material Assets.			
E	**Traffic Incident**	Driver negligence or failure of vehicular operations on existing Taurbeg Wind Farm roads. Traffic Management not implemented	Injury or loss of life.	2	A limited number of vehicles will be permitted on the Site as part of the extended operational phase. As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on the Site, 'at some time.' An unlikely risk is therefore predicted The current on-site speed limit of 20km/h will be enforced during the	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.'	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					extended operational phase of the Proposed Lifetime Extension, with speed limit signs being positioned at the entrance and junctions within the Site..			
F	**Loss of Critical Infrastructure**	Equipment or infrastructure failure; Electrical problems; and Employee negligence Landslide/ Earthquake; and Extreme weather conditions such as flooding and storms.	Injury or loss of life	1	ESB operate the grid from National Control Centres matching electricity production to customer demand, switching from synchronous to non-synchronous where required to ensure no power outages. The existing Taurbeg Wind Farm is connected to the national grid via the existing Glenlara Substation, and any shortages or failures will not impact other connections to the same substation	2	Should a power failure occur at the Existing Taurbeg Wind Farm 38kV substation, it will result in a limited number of people affected- localised effects of short duration	2
G	**Contamination**	Mismanagement of hazardous materials e.g. oil by turbine maintenance	Damage to, or depletion of aquatic habitats and species Contamination of local drinking water supplies and groundwater aquifers.	2	All hazardous wastes, if any, from the maintenance of the turbines and substation (including transformers) will be stored securely in bunded containers/areas	1	The risk of a fuel spillage or impact on surround drainage during the extended operational stage will result in a limited	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Mismanagement of general waste and welfare facilities waste.	Accidental spillage during refuelling onto subsoils		before being collected by an authorised waste contractor and brought to an EPA licensed waste facility. The wastewater holding tank at the substation will be emptied when required by a licenced contractor. Mitigation measures to be employed that will reduce the likelihood of contamination risks are outlined in Section 8.6 of Chapter 8: Geology & Soils and Section 9.5 of Chapter 9: Hydrology.		consequence in that there would be a limited number of people affected' with 'localised effects of short duration' through the use of bunded containment areas and off-site refuelling during operation. The potential residual environmental effects are described in detail in Chapter 9: Hydrology, which concludes that there will be no significant environmental effects.	
Decommissioning Phase								
H	**Severe Weather**	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of onsite watercourse Damage to, or depletion of aquatic habitats and species;	2	The risk of severe weather is low when considering the 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	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	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					Eireann as is standard practice		occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. Decommissioning will not require significant excavations works. There is no real likelihood of any impact on any environmental receptors	
I	**Flooding**	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species.	2	The risk of flooding is considered very unlikely as per the detailed assessment in Chapter 9 and Appendix 9-1 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

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
J	**Peat Stability**	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Damage to, or contamination of aquatic habitats and species. Movement of peat within the site; Sedimentation of nearby watercourse	1	It is proposed to leave turbine foundations in place underground and to cover them with soil and reseed as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option as excavation works will be avoided.	2	Should a peat stability failure occur at the Existing Taurbeg Wind Farm, it will result in a limited number of people affected with localised effects of short duration	2
K	**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 Site as part of the decommissioning phase. As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on site, 'at some time.' An unlikely risk is therefore predicted. An agreed speed limit will be enforced on the Site during all decommissioning works, with speed limit signs being positioned at the entrance and junctions within the Site.	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)
L	**Collapse/ damage to structures**	Earthquake, extreme weather events; Vehicular collision due to driver negligence on public roads.	Injury or loss of life. Movement of peat within the site; Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species.	1	According to the Irish National Seismic Network (INSN), earthquakes measuring ~2 on the Richter Scale are "normal" in terms of seismicity in Ireland. These are known as microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. As such, buildings in Ireland are extremely unlikely to be damaged or collapse due to seismic activity. Having regard to public speed limits within the existing Taurbeg Wind Farm, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse.	1	The risk of infrastructure collapse during the decommissioning 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
M	**Contamination**	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant	Damage to, or depletion of aquatic habitats and species Discharge to groundwater	2	As outlined in Appendix 4-3, fuel volumes stored on site will be minimised. Any storage areas will be appropriately sited and	2	The risk of a fuel spillage or impact on surrounding drainage during the decommissioning	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		and machinery and vehicles. Drainage and seepage water resulting from infrastructure removal; Erosion of sediment from site drainage channels.	Release of suspended solids to surface watercourses and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies		bunded to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the Site. Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage measures as detailed in Chapter 9.		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 in Chapter 9 which concludes that there will be no significant environmental effects.	
N	**Industrial Accident- Fire/ Gas Explosion**	Ignition of fuel storage tanks or fuel tanks in plant, machinery and vehicles Equipment and Infrastructure failures; Spillage of fuel; Employee Negligence	Illness or loss of life; Forest fires; Damage to or depletion of habitats and species; Impacts on ambient air quality	2	As outlined in chapter 9 of this EIAR, refuelling will take place off-site wherever possible, and machinery and plant will be inspected regularly for leaks and fitness for purpose. Only designated trained operatives will be authorised to refuel plant and machinery within the designated refuelling station and all refuelling equipment	2	The risk of an industrial accident fire/ Gas explosion 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 designated refuelling	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					will be fitted with a lock system; Setback distances from sensitive hydrological features, as well as bunding of fuel storage systems means that adequate room is provided to reduce the impact of industrial accidents and hydrological features		areas and regular equipment inspection during decommissioning. The potential residual environmental effects are described in detail in Chapter 9 which concludes that there will be no significant environmental effects	

16.4.1.4.1 Risk Scores – Proposed Lifetime Extension

The risk assessment for each of the potential risks identified are consolidated in Table 16-7 which provides their 'risk score.' A corresponding risk matrix is provided in Table 16-8, 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 16-7: Risk Scores – Proposed Lifetime Extension

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

Table 16-8: Risk Matrix – Proposed Lifetime Extension

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

Table 16-7 presents the potential risks identified during the extended operational and decommissioning phases of the existing Taurbeg Wind Farm 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 extended operational and decommissioning phase of the existing Taurbeg Wind Farm is identified below.

16.4.1.4.2 Contamination During Extended Operational and Decommissioning Phase

There is a potential risk of contamination from site activities during the extended 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 surface water features and associated ecosystems, subsoils, groundwater, 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 extended operational 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.

16.4.1.4.3 Fire/Explosion During Extended Operational and Decommissioning Phase

There is potential risk of fires/explosions at the Site. However, as outlined in Section 16.2, the scope of this assessment has been based on the understanding that the Proposed Lifetime Extension will operate in line with current best practice. Furthermore, in accordance with Chapter 19 of the Safety, Health and Welfare at Work Acts 2005 to 2014, the Proposed Lifetime Extension shall be subject to a fire safety risk assessment which will assist in the identification of major risks of fire on site.

Therefore, the risk of fires/explosions occurring on the Site, resulting in a major accident and/or disaster was given a risk score of 4 on a very precautionary basis. This indicates a scenario that is very unlikely to occur and having limited consequences should it do so, representing a low-risk scenario during both the extended operational or decommissioning phase.

16.4.1.4.4 Mitigation Measures

Please refer to Chapter 18 Schedule of Mitigation and Monitoring Measures which details all proposed mitigation and monitoring measures for the extended operational and decommissioning of the existing Taurbeg Wind Farm.

As outlined in Section 16.4.1 Likely Significant Effects, the scenario with the highest risk score in terms of the occurrence of major accidents and/or disasters was identified as 'Contamination' of the Site and risk of 'Fire/Gas Explosions' during the extended operational and decommissioning phases of the Proposed Lifetime Extension.

The existing Taurbeg Wind Farm was designed and built in line with the best practice measures as set out in its original planning application and Environmental Impact Statement (EIS), and as such mitigation against the risk of major accidents and/or disasters was embedded through the design.

16.4.1.4.5 *Contamination During Extended Operational and Decommissioning* Phases

Potential effects associated with contamination during extended operational and decommissioning phases are addressed fully in Chapter 8 Land Soil and Geology and Chapter 9 Hydrology and Hydrogeology of this EIAR. The mitigation measures outlined therein as well as the procedures and measures described in the Decommissioning Plan (Appendix 4-3) to protect environmental receptors as well as the procedures will ensure that the risk from these sources is low.

Fire/Explosion During Extended *Operational* Phase

The Proposed Lifetime Extension 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 extended operation.

16.4.1.4.6 Residual Effects

The risk of a major accident and/or disaster during the extended operational and decommissioning phases of the Proposed Lifetime Extension 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 extended operational and decommissioning phases of the Proposed Lifetime Extension are not significant.

16.4.1.4.7 Monitoring

Please refer to Chapter 18 Schedule of Mitigation and Monitoring Measures which details all proposed mitigation and monitoring measures for the extended operational and decommissioning phases of the Proposed Lifetime Extension.

Extended Operational Phase

The operator of the existing Taurbeg Wind Farm will continue to assess the risk of major accidents and/or disasters on site on an on-going basis during the Proposed Lifetime Extension.

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.

Decommissioning Phase

A Decommissioning Plan has been prepared (Appendix 4-3), the final detail of which will be agreed with the local authority prior to any decommissioning works. 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 phases of the Proposed Lifetime Extension..

16.4.1.5 Identification of Effect During Proposed Offsetting Measures

Risks specific to the Proposed Offsetting Measures have been identified and are presented in Table 16-9.

Table 16-9: Risk Register – Proposed Offsetting Measures

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
A	**Severe Weather** Risk to operational activity on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.
B	**Flooding** Risk of flooding within the via pluvial flooding leading to environmental emissions.	Extreme weather- periods of heavy rainfall and snow, taking into account climate change and strong winds
C	**Peat Stability** Movement of peat within the site during Proposed Offsetting Measures	Not adhering to mitigation measures and recommendations outlined in PSRA Severe weather conditions- storm, flooding
Potential to cause accidents and / or disasters.		
D	**Industrial Accident-Fire / Gas Explosion**	Equipment or infrastructure failure; and Employee negligence.
E	**Traffic Incident** Collisions onsite and offsite with vehicles involved during Proposed Offsetting Measures works and monitoring.	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented
F	**Contamination**	A vehicular incident on the public road involving fuel, wastewater or sewage

	Discharge or spillage of fuel, chemical solvents, onto subsoils and into watercourse or percolated to groundwater	transportation during works on the Proposed Offsetting Lands. Spill or leak of hydrocarbons during ongoing monitoring and management of the Proposed Offsetting Lands .

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 16-10.

The risk register is based upon possible risks associated with the Proposed Offsetting Measures. As outlined in Section 16.2.4.2, the consequences 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 16-10.

16.4.1.6 Assessment of Effect Summary – Proposed Offsetting Measures

Table 16-10: Risk Assessment Summary – Offsetting Measures

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Extended Operational Phase and Proposed Offsetting Measures								
A	**Severe Weather**	Extreme weather- periods of heavy rainfall or snow, taking into account climate change and strong winds	Illness or loss of life;	2	The risk of severe weather is low when considering the weather conditions recorded over the last 30 years within the area. Proposed Offsetting Measures 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 Proposed Offsetting Measures 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
B	**Flooding**	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.	Illness or loss of life; Groundwater Flooding; Flooding to surrounding and	2	The risk of flooding is considered very low within Proposed Offsetting Lands when taking into account the Flood Risk Assessment in Chapter 9 of the EIAR.	1	The result of flooding during the Proposed Offsetting Measures will result in a minor consequence in that a 'small number of people would be affected' should flooding occur with	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
			downhill properties. Damage to, or depletion of aquatic habitats and species				'no fatalities and a small number of minor injuries with first aid treatment'.	
C	**Peat Stability**	Extreme weather- periods of heavy rainfall; Not adhering to mitigation measures and recommendations outlined in PSRA.	Damage to, or contamination of aquatic habitats and species. Movement of peat within the site; Sedimentation of nearby watercourse	2	A comprehensive and robust Peat Stability Risk Assessment (PSRA) was undertaken by Fehily Timoney (refer to Appendix 8-1) for the Proposed Offsetting Measures. The Peat Stability Assessment was informed by the Scottish Government's 2017 guidance document, *Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments.* Ground investigation works carried out as part of the peat stability assessment included peat depth probing and shear strength testing. The extensive suite of ground investigations, the	2	The risk of peat instability during the Proposed Offsetting Measures will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration'. Contamination of environment (e.g. watercourses, aquatic habitats and associated species), localised effects of short duration.	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					robust peat stability assessment and the lessons learned from previous peat slide events on similar sites will ensure that the risk of such an event, occurring during the Proposed Offsetting Measures is minimised. The findings of the PSRA showed that the site has an acceptable margin of safety and is suitable for the Proposed Offsetting Measures. The findings include recommendations and control measures for the Proposed Offsetting Measures, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety.			
D	**Industrial Accident Fire / Gas Explosion**	Equipment or plant failure; Fuel spillage/storage; and Employee negligence	Illness or loss of life; Damage to, or depletion of habitats and species; and	2	Fuel will not be stored on-site and therefore fuel is not considered to be a significant fire risk. Equipment and Plant will be regularly inspected to	1	Should a fire/explosion occur at the Proposed Offsetting lands, a limited consequence would occur in that 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)
			Impacts on ambient air quality.		ensure they are in good condition.		people would be affected' with no fatalities and a small number of minor injuries with first aid treatment' There will be no infrastructure or fuel storage during the Proposed Offsetting Measures that would result in any major incident, with any fire/explosion being caused by felling plant/machinery. There will be 'normal community functioning' in the area with 'some inconvenience' .	
E	**Traffic Incident**	Driver negligence or failure of vehicular operations on roads adjacent to the Proposed Offsetting Lands. Traffic Management not implemented	Injury or loss of life	2	Plant and Machinery required for deforestation works will utilise the existing forestry tracks during the Proposed Offsetting works.	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'small	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on the Proposed Offsetting Lands, 'at some time.' An unlikely risk is therefore predicted. An on-site speed limit of 10km/h will be enforced during the Proposed Offsetting Measures.		number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.	
F	**Contamination**	Mismanagement of hazardous materials e.g. oils used in machinery; Mismanagement of general waste and welfare facilities waste	Damage to, or depletion of aquatic habitats and species Contamination of local drinking water supplies and groundwater aquifers.	2	Any waste material generated during the Proposed Offsetting Measures will be collected by an authorised waste contractor and brought to an EPA licensed waste facility. Mitigation measures to be employed that will reduce the likelihood of contamination risks are outlined in Section 8.6 of Chapter 8: Geology & Soils and Section 9.5 of Chapter 9: Hydrology	1	The risk of a fuel spillage or impact on surround drainage during the Proposed Offsetting Measures 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 off-site refuelling during works.	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							The potential residual environmental effects are described in detail in Chapter 9: Hydrology, which concludes that there will be no significant environmental effects.	

16.4.1.6.1 Risk Scores – Proposed Offsetting Measures

The risk assessment for each of the potential risks identified are consolidated in Table 16-11 which provides their 'risk score.' A corresponding risk matrix is provided in Table 16-12, 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 16-11: Risk Scores – Proposed Offsetting Measures

Risk ID	Potential Risk	Likelihood Rating	Consequence Rating	Risk Score
Proposed Offsetting Measures				
A	Severe Weather	2	1	2
B	Flooding	2	1	2
C	Peat Stability	2	2	4
D	Industrial Accident- Fire / Gas Explosion	2	1	2
E	Traffic Incident	2	1	2
F	Contamination	2	1	2

Table 16-12: Risk Matrix - Proposed Offsetting Measures

		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	A,B,D,E,F	C			
	1. Extremely Unlikely					

Table 16-11 and Table 16-12 presents the potential risks identified during the Proposed Offsetting Measures.

The scenario with the highest risk score in terms of a major accident and/or natural disaster during the Proposed Offsetting Measures is identified below.

16.4.1.6.2 Mitigation Measures – Proposed Offsetting Measures

Please refer to Chapter 18 Schedule of Mitigation and Monitoring Measures which details all proposed mitigation and monitoring measures for the Propsoed Offsetting Measures.

As outlined in Section 16.4.1 Likely Significant Effects, the scenario with the highest risk score in terms of the occurrence of major accidents and/or disasters was identified as 'Peat Stability' during the Proposed Offsetting Measures

16.4.1.6.3 Mitigation – Peat Stability Risk During Proposed Offsetting Measures Works

Potential effects associated with peat stability as a result of the Proposed Offsetting Measures are addressed fully in Chapter 8 Land Soil and Geology of this EIAR. A dedicated PSRA has also been prepared, see Appendix 8-1 for further detail. The mitigation measures outlined therein to protect environmental receptors as well as the procedures will ensure that the risk from these sources is predicted to not be significant.

16.4.1.6.4 Residual Effects

The risk of a major accident and/or disaster during the Proposed Offsetting Measures 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 Proposed Offsetting Measures are not significant.

16.4.1.6.5 Monitoring

Please refer to Chapter 18 Schedule of Mitigation and Monitoring Measures, as well as Chapter 8 and Appendix 8-1 of this EIAR, which detail all proposed mitigation and monitoring measures for the risk of Peat Stability at the Proposed Offsetting lands. Additionally, a Hen Harrier Offsetting Plan has been prepared (Appendix 7-7), which details the above management and monitoring measures which will be undertaken at the Proposed Offsetting Lands.

The Proposed Offsetting Lands will continue to be assessed for the risk of major accidents and/or disasters on an ongoing basis.

Monitoring During Proposed Offsetting Measures – Peat Stability

Monitoring measures to assess peat stability on the Proposed Offsetting Lands are outlined in Chapter 8,18 and Appendix 8-1 of this EIAR and include:

- Set up, maintain and report findings from monitoring systems, including sightline monitoring.
- Installation of monitoring posts is recommended where works are taking place in areas where peat depths exceed 2m
- Movement monitoring posts will be observed at least once a day with more frequent inspections which adjacent works are ongoing. Should movements be recorded the frequency of these inspections will be increased.
- The contactor will also develop a routine inspection of all areas surrounding work in peat, not just exclusively on the monitoring posts. These inspections will include an assessment of ground stability and drainage conditions.
- Maintain vigilance and awareness through Tool-Box-Talks on peat stability

Although the stability of the peat is considered to be safe for the activities proposed, it is important to consider the actions which will be carried out if signs of instability are identified during the outlined

monitoring or should a failure occur at the Proposed Offsetting Lands. Where excessive movement has been observed in the installed monitoring outlined above, the following increased monitoring measures will be taken:

- A competent Geotechnical Engineer will carry out an assessment of the peat instability including drainage. The competent Geotechnical Engineer will compile a report outlining the surveys undertaken, the potential cause of the instability, assessment of any increased risk caused by the instability, and the further measures required to manage this risk,
- An increased monitoring regime will be specified including increase in number of monitoring post lines, decrease on monitoring post spacing and an increase in the frequency of monitoring post observations,
- Should no further movement be detected, activities will be recommenced while maintaining the increased monitoring regime.

16.4.1.7 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 Lifetime Extension and Proposed Offsetting Measures on the environment was carried out as part of the EIAR. Both the Proposed Lifetime Extension and Proposed Offsetting Measures have been considered, in combination with existing, permitted and existing wind farms and plans (wind energy or otherwise), as set out in Appendix 2-3 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 2-3, both the Proposed Lifetime Extension and Proposed Offsetting Measures with mitigation measures in place, were found to have no potential for significant in-combination or cumulative effects. This is based on the low risk associated with both the Proposed Lifetime Extension and Proposed Offsetting Measures 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.