APPENDIX 16-1

RISK ASSESSMENT MATRIX

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Construction Phase								
A	**Critical Infrastructure Emergencies**	Traffic accident during turbine delivery Extreme weather periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life;	1	The risk of traffic accident during turbine delivery due to severe weather conditions impacting the identified road network is unlikely when considering the assessment in Chapter 11 Climate (weather conditions recorded over the last 30 years within the area) and Chapter 15 Material Assets, Section 15.1 – Traffic Assessment (turbine delivery occurring during the night, Garda patrolled, etc)	1	The risk of a traffic accident due to severe weather conditions during the construction phase will result in a very low consequence in that a *'Very low disruption to the delivery of services essential for the maintenance of vital societal functions or economic activities'* should a severe weather event occur, with '*minor injuries only*'.	1
B	**Severe Weather**	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Damage to, or depletion of aquatic habitats and species.	3	The risk of severe weather is unlikely when considering the assessment in Chapter 11 Climate and weather conditions recorded over the last 30 years within the area. The works programme for the groundworks part of the construction phase of the Prospective Development, which is laid out in detail in the Construction and Environmental Management Plan (CEMP), (Appendix 4-3 of this EIAR) will take account of weather forecasts and predicted rainfall in particular and construction will be paused if required. All construction works will be paused during a Red Weather Warning as issued by Met Éireann and will not recommence until the weather warning has been lifted and it has been deemed safe to do so. It should be noted that the majority of the groundworks have already been completed at the Site, and minimal works are needed in order to complete the construction of the Prospective Development. Further detail on the remaining works to be carried out to complete the Prospective Development are detailed in Chapter 4 of this EIAR.	1	The risk of severe weather conditions during the construction phase will result in a very low consequence in that a '*Very low disruption to the delivery of services essential for the maintenance of vital societal functions or economic activities*' should a severe weather event occur, with '*minor injuries only*' Severe weather may cause increased mobilisation of sediment or '*simple localised contamination*' which will be controlled via the Prospective Development design and mitigation measures. Drainage management systems are already in place and functioning at the Existing Development. Since its installation, there has been no flooding at the Site. Further information on the Existing Development drainage design can be found in Chapter 4 of the rEIAR, while further detail on additional drainage design measures to be implemented as part of the Prospective Development can be found in Chapter 4 of this EIAR.	3
C	**Flooding**	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Groundwater Flooding; Flooding to surrounding properties; Damage to, or depletion of aquatic habitats and species.	1	The risk of flooding is considered very unlikely when taking into account the assessment in Chapter 9 Hydrology and Hydrogeology of the EIAR, the raising of infrastructure in flood zones to above flood zone level and the implementation of a bespoke drainage design plan for the project. Drainage management systems are already in place and functioning at the Existing Development and the fact that the the Wind Farm Site is not mapped within any historic or modelled groundwater flood zones. Since its installation, there has been no flooding at the Site. Further information on the Existing Development drainage design can be found in Chapter 4 of the rEIAR, while further detail on additional drainage design measures to be implemented as part of the Prospective Development can be found in Chapter 4 of this EIAR and appendix 4-4 Prospective Development Drainage Design of this EIAR. Flooding can also result in downstream MADs. However, the Wind Farm Site drainage will be designed to greenfield runoff rates and will ensure that there is no increase in surface water runoff rates from the Wind Farm Site. This will ensure that the Prospective Development does not increase the downstream flood risk.	1	The risk of flooding during the construction phase will result in a very low consequence in that there will be a 'limited disruption to community' should a severe weather event occur, with 'minor injuries only'. Flooding has the potential to cause increased sediment mobilisation or 'simple localised contamination' however flooding is not anticipated and should any flooding occur, it would be localised. Drainage management systems are already in place and functioning at the Existing Development. Since its installation, there has been no flooding at the Site. Further information on the Existing Development drainage design can be found in Chapter 4 of the rEIAR, while further detail on additional drainage design measures to be implemented as part of the Prospective Development can be found in Chapter 4 of this EIAR.	1
D	**Peat Stability**	Works requiring excavation or placement of peat. Severe weather conditions - storm flooding	Movement of peat; Sedimentation of nearby watercourse; and Damage to, or depletion of aquatic habitats and species.	1	The construction of Meenbog Wind Farm was designed to minimise the potential for peat instability and failure. With the appropriate monitoring and mitigation measures, the likelihood of for peat instability and failure across the site is negligible to low. As outlined in Chapter 8 Land, Soils and Geology, and Appendix 8-1 Peat Stability Assessment, the findings of the peat assessment showed that the Prospective Works have a low risk of failure, which include mitigation and monitoring measures for construction work in peat lands, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety. Refer to Appendix 8-1 Peat Stability Assessment Report for further information.	3	Due to the sensitivity of the aquatic habitats surrounding the site, there would be potential for 'heavy contamination localised effects of extended duration' (e.g. watercourses, aquatic habitats and associated species). The risk of peat instability during the construction phase will result in a serious consequence in that there would be 'Medium disruption to the delivery of services essential for the maintenance of vital societal functions or economic activities'	3

E	**Traffic Incident**	Driver negligence or failure of vehicular operations on Wind Farm Site roads. Traffic Management not implemented	Injury or loss of life.	3	Chapter 15 Material Assets of this EIAR, Section 15.1 details traffic movements which relate to the Construction Phase of the Prospective Development. The Traffic Management Plan included as Appendix 15-2 details proposals for traffic movements entering and leaving the Wind Farm Site, and within the internal access roads. The internal road network within the Wind Farm Site has been designed to allow for 2 vehicles to pass on the road, and/or in passing bays, which will reduce the likelihood of a traffic incident or collision occurring within the Wind Farm Site. There will also be a speed limit imposed on the internal Wind Farm Site road network, which will also reduce the likelihood of any traffic incident or collision. Due to the majority of works have already been completed as part of the existing development, the short time frame of the construction period will also reduce the likelihood of a traffic related incident or collision. As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on site or public roads, 'at some time.' An unlikely risk is therefore predicted. Staff will be trained/toolbox talks highlighting construction entrances and proper access and egress procedures.	2	A low consequence is predicted. Having regard to on-site speed limits and vehicular movements, there is a potential risk of 'serious injuries greater than 1 in 100,000' should a vehicular collision occur, with 'low disruption to the delivery of services essential for the maintenance of vital societal functions or economic activities.'	6
F	**Contamination**	Accidental fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles leading to uncontrolled emissions. Drainage and seepage water resulting from accident during infrastructure excavation; Stockpiled excavated material becoming unstable and providing a point source of exposed sediment; Excavation works during the construction of the Prospective Development which may result in entrainment of sediment from the excavations during construction.	Release of suspended solids to groundwater. Contamination of local drinking water supplies and groundwater aquifers. Groundwater and surface water emissions from construction activities. Accidental spillage during refuelling.	2	As outlined in Chapter 4: Description of the Prospective Development, fuel storage and re-fuelling plant and machinery will be managed on-site to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the Wind Farm Site. Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures as detailed in Chapter 9 Hydrology and Hydrogeology. Standard and specific mitigation to prevent accidents and indirect effects of accidents are included in the Prospective Development design and will be implemented. Due to the majority of works having already been completed as part of the Existing Development, the short time frame of the construction period and limited groundworks necessary will also reduce the likelihood of a contamination incident.	2	The risk of a fuel spillage or impact on surrounding drainage during the construction stage will result in a low consequence in that there would be 'critical injuries/illness greater than 1 in 250,000' with 'effects of short duration' through the use of bunded containment areas during operation. 'Simple, regional contamination', (e.g., watercourses), 'effects of short duration'.	4
G	**Fire / Explosion**	Equipment or infrastructure failure; Fuel spillage/storage; Electrical problems; and Employee negligence.	Illness or loss of life; Damage to, or depletion of habitats and species; Impacts on ambient air quality; Fire and explosion.	2	As outlined in Chapter 4: Description of the Prospective Development, fuel stored onsite during the construction phase of the Prospective Development will be stored in bunded areas. Therefore, fuel leakage/spillage 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 Prospective Development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site, and mitigation of the same during operation. Due to the majority of works having already been completed as part of the existing development, the short time frame of the construction period will also reduce the likelihood of a fire/explosion incident as any fuel that will be stored onsite will be stored for a limited time period.	2	Should a fire/explosion occur at the Wind Farm Site, the result would be a low consequence in that there would be 'low disruption' with 'localised effects of short duration' on people and environmental receptors due to the nature of the Prospective Development and the lack of infrastructure or fuel storage during construction that would result in any such incident. There will be 'community functioning with considerable inconvenience' in the area for a 'short duration' The ' command, control & co-ordination systems' as well as the 'common elements of response' detailed in the Donegal County Council Major Emergency Plan will work to reduce the consequence (both on people and the environment) of potential fire/explosions at the Wind Farm Site.	4

H	**Collapse / damage to structures**	Earthquake, land slide, extreme weather events; Vehicular collisions due to driver negligence on public roads; and Traffic Management not implemented.	Injury or loss of life.	1	According to the Irish National Seismic Network (INSN), earthquakes measuring ~2 on the Richter Scale are "normal" in terms of seismicity in Ireland. These are known as microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. As such, buildings in Ireland are extremely unlikely to be damaged or collapse due to seismic activity. As outlined in Chapter 8 Land, Soils and Geology, and Appendix 8-1 Peat Stability Assessment Report, there is a low risk of landslide at the Site, therefore a low risk of collapse or damage to structures on the Site . As outlined in Chapter 11 Climate of this EIAR, due to Ireland's latitudinal position, the probability of extreme weather events posing a threat to human life are low. However, in the circumstance of such a weather event occurring at the Site during the construction phase, the Severe Weather Plan as set out in Section 11 of the Donegal County Major Emergency Plan will be followed. Having regard to speed limits within the Site, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse.	1	The risk of infrastructure collapse during the construction phase will result in a very low consequence in that there would be 'minor injuries only' and no real likelihood of any impact on any environmental receptors. In the event of a severe weather event, all stipulations outlined in the Severe Weather Plan will be followed explicitly.	1
Operation Phase								
I	**Severe Weather**	Extreme weather – periods of heavy rainfall, taking into account climate change, strong winds and lightning.	Illness or loss of life;	3	The risk of severe weather is unlikely when considering the assessment in Chapter 11 Climate and weather conditions recorded over the last 30 years within the area.	1	The risk of severe weather conditions during the operational phase will result in a very low consequence in that a 'very low disruption to the delivery of services essential for the maintenance of vital societal functions or economic activities' should a severe weather event occur, with 'minor injuries only'	3
J	**Flooding**	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life;	1	As detailed in Appendix 9-1, Flood Risk Assessment (FRA), a flood risk identification study was undertaken to identify existing potential flood risks associated with the Prospective Development. The risk of flooding is considered very unlikely when taking into account the assessment in Chapter 9 Water of the EIAR, the raising of infrastructure in flood zones to above flood zone level and the implementation of a bespoke drainage design plan for the project. Drainage management systems are already in place and functioning at the Existing Development and the fact that the Wind Farm Site is not mapped within any historic or modelled groundwater flood zones. Since its installation, there has been no flooding at the Site. Further information on the Existing Development drainage design can be found in Chapter 4 of the rEIAR, while further detail on additional drainage design measures to be implemented as part of the Prospective Development can be found in Chapter 4 of this EIAR. The rehabilitation and restoration of the Site post-construction will increase surface water retention/attenuation at the Site through drain blocking, re-profiling and the restoration of the bog hydrogeological regime. This will reduce the risk of flooding downstream of the Site As outlined in Chapter 9: Water, Section 9.5.3 fuels stored on site will be minimised and any hydrocarbons stored on-site will be bunded to 110% of the storage tanks maximum capacity	1	The risk of flooding during the operational phase will result in a very low consequence in that 'limited disruption to community' should a severe weather occur, with 'minor injuries only'. Flooding has the potential to cause increased sediment mobilisation or 'simple localised contamination' however flooding is not anticipated and should any flooding occur, it would be localised. Drainage management systems are already in place and functioning at the Existing Development. Since its installation, there has been no flooding at the Site. Further information on the Existing drainage design can be found in Chapter 4 of the rEIAR, while further detail on additional drainage design measures to be implemented as part of the Prospective Development can be found in Chapter 4 of this EIAR.	1
K	**Peat Stability**	Severe weather conditions – storm, flooding	Illness or loss of life;	1	The Prospective Development was designed to minimise the potential for peat instability and failure. With the appropriate monitoring and mitigation measures, the likelihood of for peat instability and failure across the site during the operational phase is negligible to low. As outlined in Chapter 8 Land, Soils and Geology, and Appendix 8-1 Peat Stability Assessment Report, the findings of the peat assessment showed that the Wind Farm Site will have a low risk of failure, which includes mitigation and monitoring measures for the operational phase in peat lands, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety. Refer to Appendix 8-1 Peat Stability Assessment Report for further information.	3	Due to the sensitivity of the aquatic habitats surrounding the site, there would be potential for 'heavy contamination localised effects of extended duration' (e.g. watercourses, aquatic habitats and associated species). The risk of peat instability during the operational phase will result in a serious consequence in that there would be 'medium disruption' to the community	3

L	**Traffic Incident**	Driver negligence or failure of vehicular operations on Wind Farm Site roads. Traffic Management not implemented	Injury or loss of life.	2	A very low number of vehicles will access the Wind Farm Site as part of the operational phase. As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur within the Wind Farm Site, 'at some time.' An unlikely risk is therefore predicted.	2	A low consequence is predicted. Having regard to on-site speed limits and vehicular movements, there is a potential risk of 'serious injuries greater than 1 in 100,000' should a vehicular collision occur, with 'low disruption to the delivery of services essential for the maintenance of vital societal functions or economic activities.'	4
M	**Contamination**	A vehicular incident on the Wind Farm Site roads involving fuel, wastewater or sewage transportation in the operational phase. Spill or leak of oil during operational maintenance.	Damage to, or depletion of aquatic habitats and species. Contamination of local drinking water supplies, Group Water Schemes, and groundwater aquifers.	2	As outlined in Chapter 9 Hydrology and Hydrogeology, Section 9.5.3, fuels stored on site will be minimised and any hydrocarbons stored on-site will be bunded to 110% of the storage tanks maximum capacity	1	The risk of a fuel spillage or impact on surrounding drainage during the operational stage will result in a low consequence in that there would be 'minor injuries only' with 'simple localised' effects, through the use of bunded containment areas during operation. The potential residual environmental effects are described in detail in Chapter 9: Water which concludes that there will be no significant environmental effects.	2
N	**Fire / Explosion**	Equipment or infrastructure failure; Fuel spillage/storage; Electrical problems; and Employee negligence.	Illness or loss of life; Damage to, or depletion of habitats and species; and Impacts on ambient air quality.	2	There is a possibility of equipment failure during the operational phase of the Prospective Development. The wind turbines proposed as part of the Prospective Development are expected to operate for a period of 25 years, but components may need to be replaced before this period has passed. The onsite 110kV substation will need maintenance. In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the Prospective Development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site, and mitigation of the same during operation.	2	Should a fire/explosion occur at the Wind Farm Site, the result would be a low consequence in that there would be 'low disruption' with 'simple, regional' effects of 'short duration" on people and environmental receptors due to the nature of the Prospective Development and the lack of infrastructure or fuel storage during operation that would result in any such incident. There will be 'community functioning with considerable inconvenience' in the area for a 'short duration'. The ' command, control & co-ordination systems' as well as the 'common elements of response' detailed in the Donegal County Council Major Emergency Plan will work to reduce the consequence (both on people and the environment) of potential fire/explosions at the Wind Farm Site.	4
O	**Collapse / damage to structures**	Earthquake, landslides, extreme weather events; and Vehicular collisions due to driver negligence on Wind Farm Site roads.	Injury or loss of life.	1	According to the Irish National Seismic Network (INSN), earthquakes measuring ~2 on the Richter Scale are "normal" in terms of seismicity in Ireland. These are known as microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. As such, buildings in Ireland are extremely unlikely to be damaged or collapse due to seismic activity. As outlined in Chapter 11: Climate of this EIAR, due to Ireland's latitudinal position, the probability of extreme weather events posing a threat to human life are low. However, in the circumstance of such a weather event occurring at the site of the Prospective Development during the operational phase, the Severe Weather Plan as set out in Section 11 of the Donegal County Major Emergency Plan will be followed. Having regard to speed limits within the Wind Farm Site, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse.	1	The risk of infrastructure collapse during the operational phase will result in a very low consequence in that there would be 'very low disruption' and no real likelihood of any impact on any environmental receptors. In the event of a severe weather event, all stipulations outlined in the Severe Weather Plan will be followed explicitly.	1
Decommissioning Phase								
P	**Severe Weather**	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.	Illness or loss of life;	3	The risk of severe weather is unlikely when considering the assessment in Chapter 11 Climate and weather conditions recorded over the last 30 years within the area. Decommissioning works will be paused should a Status Red weather warning alert be issued by Met Eireann as is standard practice	1	The risk of severe weather conditions during the decommissioning phase will result in a very low consequence in that there would be 'limited disruption' to people should a severe weather event occur, with 'minor injuries only'. Decommissioning will not require significant excavations works. There is no likelihood of any impact on any environmental receptors.	3
Q	**Flooding**	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.	Illness or loss of life;	1	The risk of flooding is considered to be low when taking into account the assessment in Chapter 9 Hydrology and Hydrogeology of the EIAR, and Appendix 9-1 Flood Risk Assessment.	1	Flooding has the potential to cause increased sediment mobilisation or 'simple localised contamination' however flooding is not anticipated and should any flooding occur, it would be localised.	1

R	**Peat Stability**	Severe weather conditions – storm, flooding	Illness or loss of life;	1	The risk of peat instability or failure is considered to be low when taking into account the assessment in Chapter 8 Land, Soils and Geology of the EIAR, and Appendix 8-1 Peat Stability Assessment Report. Further information on the peat instability risk and mitigation measures during the decommissioning of the Prospective Development is considered in Appendix 4-6 Decommissioning Plan	3	The risk of peat instability or failure during the decommissioning phase will result in a moderate consequence in that there would be 'localised effects' should a peat instability or failure event occur, with 'medium disruption' to the community.	3
S	**Traffic Incident**	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented.	Illness or loss of life;	3	Traffic movements associated with the decommissioning phase of the Prospective Development will be limited to Heavy Goods Vehicles (HGVs) needed for the decommissioning works, and Light Goods Vehicles (LGVs) needed to transport construction staff to the Wind Farm Site. As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on site, 'at some time.' An unlikely risk is therefore predicted	2	A low consequence is predicted. Having regard to on-site speed limits and vehicular movements, there would be a potential risk of 'critical injuries/illness greater than 1 in 250,000' should a vehicular collision occur, with 'Medium disruption' to the community	6
T	**Contamination**	Accidental fuel spillage during delivery to the Wind Farm Site. Failure of fuel storage tank or tanks in plant and machinery and vehicles leading to uncontrolled emissions.	Illness or loss of life;	2	As outlined in Chapter 4 Description of the Prospective Development, fuel will be stored on-the Wind Farm Site but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the Wind Farm Site. Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage measures as detailed in Chapter 9 Hydrology and Hydrogeology.	2	The risk of a fuel spillage or impact on surrounding drainage during the decommissioning stage will result in a low 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. 'Simple contamination' of environment (e.g., watercourses), 'localised effects of short duration'. The risk of a fuel spillage or impact on surrounding drainage during the decommissioning stage will result in a low consequence in that there would be 'minor injuries only' with 'simple localised' effects, through the use of bunded containment areas during operation. With 'simple localised contamination' of environment (e.g., watercourses).	4
U	**Fire/Explosion**	Equipment or infrastructure failure; Fuel spillage/storage; Electrical problems; and Employee negligence.	Illness or loss of life; Damage to, or depletion of habitats and species; and Impacts on ambient air quality.	2	There is a possibility of equipment failure during the decommissioning phase of the Prospective Development. The wind turbines proposed as part of the Prospective Development are expected to operate for a period of 25 years. Following the end of this period, the wind turbines may either operate for a further period or be replaced with a new set of turbines, subject to planning permission being obtained, or the Subject Development may be decommissioned fully. The Grid Connection infrastructure will remain in place as it will form part of the national electricity grid under the control of EirGrid. The works required during the decommissioning phase are described in Section 4.12 in Chapter 4: Description of the Prospective Development. In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the Prospective Development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site, and mitigation of the same during decommissioning.	2	Should a fire/explosion occur at the Wind Farm Site, the result would be a low consequence in that there would be 'low disruption' with 'simple, regional' effects of 'short duration" on people and environmental receptors due to the nature of the Prospective Development and the lack of infrastructure or fuel storage during operation that would result in any such incident. There will be 'community functioning with considerable inconvenience' in the area for a 'short duration'. The ' command, control & co-ordination systems' as well as the 'common elements of response' detailed in the Donegal County Council Major Emergency Plan will work to reduce the consequence (both on people and the environment) of potential fire/explosions at the Wind Farm Site.	4