MWP

Chapter 16 – Schedule of Mitigation

Ballynisky Wind Farm

Ballynisky Green Energy Ltd.

December 2025

Contents

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16. Schedule of Mitigation Measures

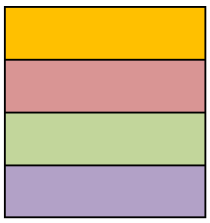
16.1 Introduction

This Schedule of Environmental Mitigation summarises and sets out an implementation for all environmental mitigation measures included in the **Environmental Impact Assessment Report (EIAR)** for the proposed Ballynisky Wind Farm project in County Limerick. The full project description is provided in **Chapter 03 Description of the Proposed Development**.

16.2 Methodology

The schedule on the following pages is structured in accordance with the following project phases:

- Prior to Commencement of Construction.
- During Construction Phase.
- Post Construction/Operational Phase; and
- Decommissioning.



The schedule is presented in a Table format which outlines, for each of the project phases:

I. The environmental aspect or resource for which mitigation is required;

II. The required or proposed mitigation measure to undertake/implemented;

III. The persons responsible for implementing the mitigation; and

IV. The relevant actions, procedures and plans relating to implementation of the mitigation.

Table 16-1: Schedule of Environmental Mitigation Measures

TIME FRAME / SCHEDULE	Chapter/ Appendix	ENVIRONMENTAL MITIGATION / RECOMMENDATION		Person(s) Responsible
PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Appendix 3D	Construction Environmental and Management Plan (**CEMP**)	A Construction Environmental Management Plan (CEMP) has been prepared for the project and will be implemented during construction in order to ensure that the project is constructed in accordance with best practice, with the minimum effects on the surrounding environment. The implementation of proposed mitigation measures, environmental commitments of the project and the monitoring and supervision of these measures will be managed through the CEMP which can be found in EIAR Volume III, Appendix 3D**.** It includes, but is not limited to, measures to control/manage various elements of development including the following: • EMP 01 - Management of Excavations and Land and Soils • EMP 02 - Surface Water Management and Run-off Control • EMP 03 - Fuels and Oils Management • EMP 04 - Management of Concrete • EMP 05 - Construction Noise and Vibration • EMP 06 - Construction Waste Management Plan • EMP 07 - Construction Traffic Management Plan • EMP 08 - Construction Dust and Air Pollution Management • EMP 09 - Ecological Management Plan for the Protection of Habitats and Fauna • EMP 10 - Landscape and Visual Management Plan • EMP 11 - Cultural Heritage Management Plan • EMP 12 - Emergency Response Plan • EMP 13 - Site Environmental Training and Awareness • EMP 14 - Monitoring and Auditing • EMP 15 - Environmental Accidents, Incidents and Corrective Actions • EMP 16 - Environmental Complaints Construction method statements will be prepared prior to commencement of construction and incorporated into the CEMP.	Developer Principal Contractor and Responsible personnel identified in the **CEMP**
PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Appendix 3D	Construction Environmental and Management Plan (**CEMP**)	A final Construction and Environmental Management Plan will be prepared by the appointed Contractor in advance of works commencing and will be submitted to the local authority(s) for approval. Construction method statements will be prepared prior to commencement of construction and incorporated into the CEMP.	Principal Contractor and Responsible personnel identified in the **CEMP**

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PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Appendix 14A	Traffic Management Plan (**TMP**)	The Appointed Contractor(s) will prepare a detailed Traffic Management Plan prior to the works commencing. This Plan will be finalised in agreement with An Garda Síochána and Limerick City & County Council. The plan will include provision for: • Communicating with the community, An Garda Síochána and Limerick City & County Council. • Details of site access and any site traffic rules, including security, parking, loading and unloading, required speed or other relevant details. • Details of the turbine component delivery and any road closures. • Programme of maintenance and upkeep of public roads. • Site operating hours (including delivery) to be outlined. • In order to mitigate from a significant impact during peak traffic hours, the majority of staff will either arrive on-site before or after the peak morning traffic and finish work before or after the evening peak traffic hours. • The condition of the public roads will be monitored on an on-going basis and a road sweeper provided to clean the public roads if required. • There will be no parking of any vehicles on the public road near the wind farm site entrance. • Adequate parking will be provided on site for both employees and visitors. • The condition of the site entrances will be monitored on an on-going basis and a road sweeper provided to clean the public road if required.	Principle Contractor
PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Chapter 6 Biodiversity and Chapter 7 Ornithology	Best Practice	**<u>Environmental Manager / Ecological Clerk of Works (ECoW)</u>** A suitable qualified and experienced Environmental Manager (or Ecological clerk of works or Ecologist) will be appointed prior to the commencement of construction works, to ensure the mitigation measures outlined in Chapter 06 Biodiversity, and in Volume III Appendices 6F (BEMP) and 3D (CEMP) of this EIAR are implemented during the construction phase of the development. The appointed ECoW will deliver a toolbox talk to all contractors, including sub-contractors, prior to construction starting on ecologically sensitive features within or in close proximity to the works area.	Developer Principal Contractor

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PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Chapter 6 Biodiversity	Mitigation by Design	Site design was carried out with cognisance to ecological features to minimise the effect of the Proposed Development on Biodiversity. Consultation between the design team (Project Manager, Project Engineers, and Project Ecologists) and the developer was conducted on an ongoing basis during the design phase, in order to formulate a project design which would avoid, prevent and/or minimise any significant adverse ecological effects, in so much as was practicably possible. A considerable effort was spent by the project ecologists and engineers on avoiding or minimising ecological effects and has been constraint led throughout the design process. The project has been designed to minimise the footprint of the Proposed Development on ecologically sensitive habitats. This has been achieved in collaboration with engineering constraints, for example by taking account of habitat value and areas potentially impacted. The project design has followed the basic principles outlined below to reduce/eliminate the potential for significant effects on ecological receptors: **Habitats** The project has been designed to minimise the footprint of the proposed development on more sensitive habitats, noting that minimum distances are required between turbine locations. This has been achieved in collaboration with engineering constraints by taking account of habitat value and areas of habitats affected. The project design has followed the basic principles outlined below to reduce/eliminate the potential for significant effects on ecological receptors: • Avoidance/minimisation of turbine array and wind farm infrastructures at sensitive habitats (e.g. hardstanding areas designed to the minimum size necessary to minimise habitat loss); • Avoiding wildlife refuge sites (e.g. waterbodies) insofar as possible; • Grid connection route and internal tracks selected to utilise existing built infrastructure for the majority of its length (i.e. cables to be laid within public roads and existing tracks); and • Cables laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds. For low-risk sites, such as at the proposed development site, SNH (2021) recommends a buffer distance of 50m between a turbine blade tip and the nearest woodland. In the case of the proposed Ballynisky turbines, the foraging features pertain largely to hedgerow habitats. The 50m buffer creates a clearance setback of 50m between the arc of the blade's sweep and the nearest hedgerow which could be used by bats. To calculate the	Design Team and project ecologists/ Developer Project Manager and/or Appointed Project Contractor

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		clearance distance, the formula here is used to calculate (D), the distance between the edge of the hedgerow and the centre of the tower: D = [(50 + bl)2 – (hh – fh)2] ½ Where bl = blade length, hh = hub height, fh = feature height (all in metres). Based on this formula, turbines 1, 2, 4, 5 and 6 should have a clearing of 91m given these are surrounded by hedgerows, while turbine 3 requires a 98.4m buffer. To ensure that the buffer areas do not develop into the types of habitats that support high value macroinvertebrate production that would be a prey resource for bats, the lands around the turbines will be used for production of grass corresponding to the improved agricultural grassland that occurs at the site. This will also discourage foraging by birds of prey such as Kestrel. Some mature trees will be felled where they occur in line with the infrastructure footprint and/or for bat buffer purposes. Such trees will ideally be felled at a time of year when bats are least likely to be present i.e. winter months. In any case, all trees with bat roost potential will be soft-felled (lowered slowly to ground) and left for a day without further disturbance prior to being moved or worked. Lights on turbines can reduce the potential risk of collision to bats; however, the use of "white lights" on the turbines will be avoided as these can attract insects, which in turn can attract bats. Any form of lighting on the turbines or other structures will have to be agreed in advance with the Irish Aviation Authority. Any lighting introduced to the development site will follow guidance in the document: • Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25 (Marnell et al. 2022) • The proposed lighting around the Site will be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/2311 Bats and artificial lighting at night. **Water Quality** No work will take place within 50m buffer zones of watercourses except for drainage / stream crossings and associated track construction. Working near watercourses during or after intense or prolonged rainfall events will be avoided and work will cease entirely near watercourses when it is evident that there is a risk of pollution occurring. The proposed site layout boundary will be marked by secure posts and robust high visibility tape. These areas will be marked out with reference	

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			to design drawings, under supervision of the project engineer, manager and the site ecologist. Sensitive areas such as the wet grassland area to the west of proposed turbine T2 outside of the site layout boundary and Ballynisky Pond will be avoided and an exclusion zone put in place. Machinery will not be permitted to breach these agreed boundaries during the construction phase. The site drainage system was designed integrally with the wind farm infrastructure layout as a measure to ensure that the proposal will not change the existing flow regime across the site, will not deteriorate water quality and will safeguard existing water quality status of the catchments from wind farm related sediment runoff. Silt control will be a primary concern during construction stage. Measures outlined below are included in the design of the project to avoid or minimise water quality impacts from arising during the construction phase of the project. Protecting water quality will protect aquatic fauna in fluvial habitats downslope of the proposed development site. The selection criteria for crossing natural / artificial drains and streams within the site were: • Avoid crossing drains or streams at acute angles where possible; • Avoid meanders at the crossing location; • Cross where foundations could be constructed without excess excavation; and • Consider vertical alignment requirements. The two (2) permanent deposition areas onsite are located 50 metres away from the nearest watercourses. For example, the larger of the two permanent deposition areas is separated from the Riddlestown Stream by an area of wet grassland. This habitat will act as a buffer for overland flow, attenuating runoff from the deposition area and preventing the ingress of sediment to this stream. All design and works in proximity to watercourses shall follow the generic best practice guidance outlined in the following documents: • 'Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters' (IFI, 2016); and • 'Guidelines for the Crossing of Watercourses during Construction of National Road Schemes' (TII, 2008).	
PRIOR TO COMMENCEMENT OF CONSTRUCTION	Chapter 6 Biodiversity	Biodiversity – Invasive Species	A pre-construction survey for invasive species was undertaken in August 2022, April 2024, and January 2025. No invasive alien or flora species were encountered during these site visits. A pre-construction survey for	Developer Project Manager

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WORKS			species will be carried out by an appropriately qualified ecologist. Should invasive species be recorded at works locations along the grid connection route or within the development footprint, an Invasive Species Management Plan will be prepared prior to construction works commencing.	Ecologist
PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Chapter 6 Biodiversity	Biodiversity – Mitigation by Management	**Mammal Surveys** Pre-construction mammal surveys to be undertaken by ecologist before any vegetation removal; In the unlikely event that protected faunal species are found actively using the site for breeding/roosting during the construction phase, works will cease immediately, and the area will be cordoned off until advice is sought from a suitably qualified expert or member of NPWS. Should the resting or breeding places of any protected species be discovered within the site during construction works, the NPWS will be informed. Any mitigations required will be carried out under license from NPWS and using NRA Guidelines (2005b) (now known as TII) where applicable. Seasonal restrictions for vegetation removal will apply in relation to the ecological features listed in Chapter 6, Section 6.8.33.1 - Table 6 22. **Marsh Fritillary and its supporting foodplant Devil's-bit scabious** Any clearance or disturbance of Devil's-bit scabious within the site layout and in proximity to proposed T2 location has the potential to result in the mortality of marsh fritillary and/or significant reduction in the quality of habitat for marsh fritillary, should the species be present at the time of construction. Appropriate mitigation measures will be implemented to ensure this Marsh Fritillary and its habitat are not significantly affected by the proposed construction works in Field 1. This will comprise of a check for larval webs **24 hours in advance** of any vegetation clearance and, should any Devil's-bit scabious plant be found supporting marsh fritillary, the plant will be dug out by hand and translocated to an area of suitable retained habitat.	Developer Project Manager Ecologist
PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Chapter 6 Biodiversity / Chapter 8 Water	Biodiversity – Baseline water quality monitoring	A programme for water monitoring will be prepared in consultation with Inland Fisheries Ireland prior to the commencement of the wind farm construction. The plan will include monitoring of water quality before and during the construction phase. It is proposed to undertake baseline water quality monitoring of the Ahacronane River along the northeast site boundary and of its tributary	Appointed Project Contractor Site Environmental Manager

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			stream along the northwest site boundary before the construction works commence. Monitoring will also be undertaken on a monthly basis over the course of the construction programme to ensure that the works are not impacting on surface water quality downstream of the site. The parameters analysed will include: • pH; • Suspended solids; • Ammonia; • Orthophosphate and total phosphorous; • Nitrate; • Nitrite; • Chloride; and • Biochemical oxygen demand (BOD). The results will be compared to the Surface Water Environmental Quality Standards (EQS) in the Surface Water Regulations (SI-272 of 2009 and subsequent amendments 2017 and 2019). The Construction Site Manager will also be responsible for undertaking routine inspections of the surface water drainage system (drains streams and rivers) to ensure that the construction works do not impact on surface water quality.	
PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Chapter 7 Ornithology	Ornithology – Pre-Construction breeding bird walkover	**Breeding Bird Walkover** A pre-construction walkover survey will be carried out by a qualified and experienced ornithologist following standard methods. The surveys will be undertaken prior to any vegetation clearance on Site. Following on from the walkover, guidance will be provided to the contractor if restrictive zones are required during the bird nesting season.	Developer Project Manager Ecologist Appointed Project Contractor
PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Chapter 9 Land and Soils	Land and Soils	The implementation of erosion and sediment controls will be made prior to the commencement of site clearance works. Silt traps, such as geotextile membrane, will be placed in the existing drainage network prior to construction work. These will be inspected weekly by a suitably qualified and experienced civil /structural engineer and cleaned regularly as required.	Appointed Project Contractor / civil / structural engineer
PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Chapter 13 Cultural Heritage	Archaeology/ Cultural Heritage	Exclusion zones (reflecting Recorded Monuments and Placements combined with Zone of Notification) will be established on the ground around recorded monuments: ringfort LI019-132, enclosure LI019-270, ringfort LI028-182, ringfort LI028-043, ringfort LI028-039 and ringfort LI028-038 to avoid accidental damages to the monuments. No heavy machinery, tree felling, or any groundworks will be undertaken within the exclusion zones. Following the results of the geophysical survey, a program of	Developer Project Manager and/or Appointed Project Contractor

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			archaeological test excavation trenching, under license from NMS, will be undertaken (if conditioned as part of a grant of planning permission) across the limits of the proposed core wind farm components. A targeted section of the grid connection (Option A) along the existing road within the Zone of Notification (ZON) of the recorded graveyard LI019-131002 will be archaeologically monitored under the license from the NMS. This section will extend within the ZON of the graveyard (LI019-131002) and be physically established prior to the construction stage.	
PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Chapter 14 Material Assets	Residential Amenity /Material Assets	Further to the surveys already carried out, pre-construction surveys will be carried out to verify the structural integrity of the proposed haulage route road network.	Developer Project Manager
PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS	Chapter 11 Noise	Residential Amenity/Best Practice	Prior to the commencement of construction an active community engagement exercise shall be undertaken by the community liaison officer. Letter drops shall take place in advance of the works. The nature of the information letters provided details of the Project, specifically: • Contractor name and contact details; • Project description; • Expected duration of works; and • A commitment to implement procedures and measures to minimise noise and vibration. This community notification exercise should be repeated in the event of an expected intensification of works in any area and/or in advance of works that occur outside of the permitted construction operating hours (any such works will be subject to prior agreement with the Local Authority). A site representative responsible for matters relating to noise and vibration will be appointed	
DURING CONSTRUCTION	Chapter 6 Biodiversity	Best Practice (Environmental Clerk of Works (ECoW)/Project Ecologist)	A suitably qualified and experienced project ecologist will be employed during the construction phase of the project. Duties will include the review of all method statements; delivery of toolbox talks and monitoring of construction phase activities to ensure all environmental controls and EIAR mitigation is implemented in full. The project ecologist will be	Developer Principal Contractor Ecologist

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			awarded a level of authority and will be allowed to stop construction activity if there is potential for adverse environmental effects other than those predicted and mitigated for in the EIAR.	
DURING CONSTRUCTION	Chapter 6 Biodiversity	Habitats	In areas where work takes place on habitats that have been selected as Key Ecological Receptors (KER), and where these areas will not be required during operation stage, such areas will be reinstated. Reinstatement protocols have been outlined in the Biodiversity Environmental Management Plan (BEMP) and have been incorporated into the CEMP. Spraying of vegetation using pesticides (herbicides, fungicides and insecticides) will not be permitted at any stage of development. Fluvial habitats will be protected by maintaining water quality in the receiving waterbodies. The BEMP will be implemented onsite as habitat compensation measures are considered necessary to off-set habitat loss. Subject to planning consent, planting of new hedgerows will commence where possible as a first step of the construction phase of the proposed development. This will allow time for these planted features to become established prior to any significant loss of existing features.	Developer Principal Contractor Ecologist Appointed Project Contractor
DURING CONSTRUCTION	Chapter 6 Biodiversity / Chapter 8 Water	Protection of Water Quality during Construction	During the construction phase of the project, there is potential for sedimented surface water run-off from the construction works areas to contaminate downstream watercourses. Fundamental to any construction project is the need to keep clean water (i.e. runoff from adjacent ground upslope of the permitted development footprint) clean and manage all other run-off and water from construction in an appropriate manner. A site-specific drainage system has been designed taking account of the following: • Knowledge of the ground and hydrological conditions at the site; • Previous construction experience of wind farm developments in similar environments; • Previous experience of environmental constraints and issues from construction of wind farms in similar environmental conditions; and • Technical guidance and best management practice manuals. • The following are the key elements of the proposed drainage system: ➢ Access tracks will be cambered to ensure dirty water flows towards the dirty water drain installed adjacent;	

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		➢ Settlement ponds placed on the dirty water drains prior to discharge across vegetation and then into the existing watercourses; ➢ Discharge from the settlement ponds will be filtered prior to travelling through overland flow/percolation to existing watercourses; ➢ 3 rows of vertical Terrastop barriers will slow flows and provide further settlement of suspended solids prior to discharge reaching watercourses; ➢ Check dams will be placed at maximum 50m c/c in trackside drains to limit erosion and provide attenuation volumes during times of high rainfall; and ➢ To ensure effective drainage from the permanent internal access track network, the drainage network installed for the construction phase will remain in place for the operational life of the wind farm.	Appointed Project Contractor
		Sediment such as clay or silt can cause pollution during the construction phase of a civil engineering project due to the erosion of exposed soil by surface water runoff. The water quality management system has been prepared to control erosion and prevent sediment runoff during the construction phase of the Ballynisky Wind Farm development. The implementation of sediment and erosion control measures is essential in preventing sediment pollution. The system was designed having regard to: • Knowledge of the site's environmental conditions; • Previous experience of environmental constraints and issues from construction of wind farms in similar environmental conditions; and • Technical guidance and best management practice manuals (see references). • For the construction of access tracks, the following best practice construction measures will be implemented: • Construction of interceptor drains to divert run-off away from the upgradient side of tracks, with clean run-off being diverted under the tracks to the down gradient side where the need arises i.e. if there is significant gradient between the up and down slope sides of the access tracks. In general, the tracks will be constructed along relatively shallow slopes where run-off is likely to be negligible; • Access track culverts will be used where required to divert clean water to run-off to vegetated areas; and • Temporary swales and/or ponds will be provided on the down-gradient side of the tracks to collect dirty water running off	Site Environmental Manager

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		from the construction area. If necessary, silt curtains or silt busters will be used to clean sediment laden run-off prior to distribution over vegetation on the down gradient side of the tracks. For construction of the turbine bases the following mitigation measures will be implemented: • Construction of interceptor drains to divert run-off away from the up-gradient side of the excavations with clean run-off being diverted around excavations to the down-gradient side so there is significant gradient between the up and down slope sides of the excavations; • Excavations will have a level base with a sump to allow sediment laden water either to percolate to ground or, where required, to be pumped out; and • Temporary ponds will be constructed to contain sediment water collected from the excavations. The ponds will be designed to allow flow through the end via a silt curtain or alternatively silt busters will be used to contain silt and clean water allowed to disperse over vegetation downstream of the temporary pond. All temporary ponds and culverts will be back-filled post construction and the areas revegetated as soon as possible. In areas where potentially hazardous materials are handled the following will be implemented: • All refueling of plant and equipment will take place either off-site or at a dedicated impervious refueling area in the construction compound; • Where plant such as construction cranes require refueling, this will be undertaken using fuel bowsers provided with double containment. The refueling bowser shall also be fitted with spill containment kits; • Where fuels are stored on-site, they will be located in bunded containment areas; • No concrete batching will be undertaken on the site; • No disposal of excess concrete or cleaning of concrete delivery chutes at designated areas in line with the CEMP will be permitted on the site; and • Concrete works will only be permitted in favourable weather conditions.	

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		Soil Stripping The timing of the construction phase soil stripping and excavation works will take account of predicted weather, particularly rainfall; • Soil stripping activities will be suspended during periods of prolonged rainfall events; and • The area of exposed ground will be kept to a minimum by maintaining where possible existing vegetation that would otherwise be subject to erosion in the vicinity of the wind farm infrastructure. The clearing of soil will be delayed until just before construction begins rather than stripping the entire site months in advance particularly during access track construction. Dewatering All ground water/surface water that may enter turbine foundations or cable trenches/joint bays will be removed, treated and disposed of appropriately, in accordance with best practice. Any dewatering (if/where required) will adhere to the following measures: • Where dewatering is required for construction activities, any pumped waters will be directed to the surface water settlement ponds prior to discharge to either percolation areas or following monitoring and inspection the surface water management system. • Ground water/surface water will not be pumped directly into trackside drains/watercourses; • Ground water/surface water which has become silted within the turbine foundations will be pumped to the surface water drainage system; and • Ground water/surface water which has become silted within the trenches/joint bays will be pumped and allowed to infiltrate to a designated percolation area (area designated by a competent person in the construction team). This percolation area will be situated in improved agricultural grassland. Fuel Management All plant will be refueled on site e.g. excavators, dumpers etc. while rigid and articulated vehicles will be fueled off site as would all site vehicles (jeeps, cars and vans). At construction stage, a Fuel Management Plan (which will form part of the CEMP) will be developed specific to the site and the particular plant and equipment required for construction. The plan outlined will have regard to the following elements: • Mobile bowsers, tanks and drums will be stored in a secure, impermeable storage area, away from drains and open water;	

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		• Fuel containers will be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores; • Ancillary equipment such as hoses, pipes will be contained within the bund; • Taps, nozzles or valves will be fitted with a lock system; • Fuel and oil stores, including tanks and drums, will be regularly inspected for leaks and signs of damage; • Only designated trained operators will be authorised to refuel plant on site; • Procedures and contingency plans will be set up to deal with any emergency accidents or spills; and • An emergency spill kit with oil boom and absorbers will be kept on site in the event of an accidental spill. Refueling of Construction Plant On-Site The following measures will be undertaken to avoid or minimise negative effects to water quality as a result of the use of hydrocarbons: • Refueling will be carried out using 110% capacity double bunded mobile bowsers. The refueling bowser will be operated by trained personnel. The bowser will have spill containment equipment which the operators will be fully trained in using; • Plant nappies or absorbent mats will be placed under refueling point during all refueling to absorb drips; • Mobile bowsers, tanks and drums will be stored in a secure, impermeable storage area, away from drains and open water; • To reduce the potential for oil leaks, only mechanically sound vehicles and machinery will be allowed onto the site. An up-to-date service record will be required from the main contractor; • Should there be an oil leak or spill, the leak or spill will be contained immediately using oil spill kits; the nearby dirty water drain outlet will be blocked with an oil absorbent boom until the fuel/oil spill has been cleaned up and all oil and any contaminated material removed from the area. This contaminated material will be properly disposed of in a licensed facility; • The site Environmental representative will be immediately informed of the oil leak/spill and will assess the cause and the management of the clean-up of the leak or spill. They will inspect nearby drains for the presence of oil and initiate the clean-up if necessary; • Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound and also in site vehicles and machinery; • Correct action in the event of a leak or spill will be facilitated by training all vehicle/machinery operators in the use of the spill kits and	

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		the correct containment and cleaning up of oil spills or leaks. This training will be provided by the Environmental Manager at site induction; • In the event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill, kits stored within site vehicles and machinery; • Collision with oil stores will be prevented by locating oils within a steel container in a designated area of the site compound away from vehicular movements; and • Long term storage of waste oils will not be allowed on-site. These waste oils will be collected in leak-proof containers and removed from the site for disposal or re-cycling by an approved service provider. Daily Inspections The following drainage control measures will also be included in the plan: • Daily inspection and immediate maintenance of all elements of the drainage system including clean and dirty water drains and settlement ponds; • Daily turbidity monitoring at outflows from the settlement ponds; and • Weekly laboratory water quality monitoring at outflows from the settlement ponds. Concrete Residue Wet concrete pollution is silty and very alkaline (high pH) and can have a serious effect on watercourses and aquatic life. Concrete should not enter site water. The following measures will also be implemented regarding concrete: • Designate a concrete chute washout area away from drains and watercourses; • Washout of concrete trucks will occur off-site at a designated, contained impermeable area (source quarry); and • No disposal of concrete remnants will be permitted on site. Construction Wheel Wash A Construction Wheel Wash will be used to wash truck tyres leaving the construction site. Water residue from the wheel wash will be fed through a settlement pond, interceptor and then discharge to a grassed area within	

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		improved agricultural grassland. The wheel wash area will be cleaned regularly to avoid the build-up of residue. Temporary Construction Compound The following measures will be undertaken to avoid or minimise negative effects to water quality as a result of the erection of the temporary compound: • Drainage within the temporary site compound will be directed to an oil interceptor to prevent pollution if any spillage should occur; • No domestic wastewater discharges to the environment. Temporary toilet facilities will include an integrated wastewater holding tank which will be emptied routinely by a licenced waste contractor; • A bunded containment area will be provided within the compound for the storage of fuels, lubricants, oils etc.; and • The compound will be in place for the duration of the construction phase and will be removed once commissioning is complete. Storage of materials Material storage on site will comply with the following: • The storage of materials, containers, stockpiles and waste, however temporary, will follow best practice at all times and be stored at designated areas. Storage will be located as follows: ➢ Away from drains and sensitive habitats (KERs); ➢ On an impermeable base; ➢ Under cover to prevent damage from the elements; ➢ In secure areas; and ➢ Away from moving plant, machinery and vehicles. • All containers will be stored upright and clearly labelled. Sufficient storage will be supplied near to all working areas; • Storage of fuels/oil will be located at least 50m from watercourses; • Fuel containers will be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores; • Collision with oil stores will be prevented by locating oils within a steel container in a designated area of the site compound away from vehicle movements; • Leakages of fuel/ oil from stores will be prevented by storing these materials in bunded tanks which have a capacity of 110% of the total volume of the stored oil. Ancillary equipment such as hoses and pipes will be contained within the bunded storage container. Taps, nozzles or valves will be fitted with a lock system; • Long term storage of waste oils will not be allowed on site. These waste oils will be collected in leak-proof containers and removed	

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		from the site for disposal or re-cycling by an approved service provider; and • On-site washing of concrete truck barrels will not be allowed. The washing of the chutes at the rear of the trucks may be permitted. A designated chute wash down area, which will retain the washout water, will be located within the construction compound and there will be no other chute wash down activity on any other part of the site. Stockpiles The following mitigation will be implemented during the construction phase: • Temporary stockpiles of excavated spoil, stored in the footprint of the excavation areas, will then be directed for use in backfilling, landscaping and restoration or placed in the deposition areas on site; • Stockpiles of stripped topsoil will be in locations with minimum trafficking to prevent damage and dusting; • Reusable excavated sub-soils, and aggregate will be stored in temporary stockpiles at suitably sheltered areas to prevent erosion or weathering and shall be shaped to ensure rainfall does not degrade the stored material; • Where unsuitable material is encountered this will be removed to the soil deposition areas for permanent storage; • Stockpiled materials will be located at least 50m away from drainage systems and silt retaining measures (silt fence / silt curtain or other suitable materials) to reduce risk of silt run-off shall be installed along the downgradient edges of stockpiled earth materials; • In the two permanent material stockpile areas, soil will be stored to a maximum height of 2m with a maximum batter ratio of 1V:3H. These areas will be detailed in Chapter 3 Project Description. The shallow batter angle allows for the plants and vegetation to be maintained using agricultural vehicles; and • Silt-retaining measures (silt fence / silt curtain or other suitable materials) will be installed to reduce risk of silt run-off along the down-gradient edges of stockpiled earth materials if there are drainage pathways connecting the storage areas to nearby watercourses. Excavation Works The following measures will be undertaken to avoid or minimise negative effects to water quality as a result of excavation works:	

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		• Earth movement activities will be suspended during periods of prolonged rainfall events; • The earthworks material will be placed and compacted in layers to prevent water ingress and degradation of the material; and • Drainage and associated pollution control measures will be implemented on site before the main body of construction activity commences. Excavated Materials and Soil Management All soils generated from excavation works within the wind farm associated with turbines, tracks and internal cable construction will be retained on site and reused in bunding, landscaping and restoration of the permanent deposition areas. No soils will be removed from the site. Permanent stockpiling of soils will be avoided on site. During access track excavations, excavated material will be temporarily stockpiled adjacent to the section of trench, with appropriate material used as backfill. Appropriate siltation measures will be put in place prior to excavations. Stockpiles will be stored a minimum of 50m back from rivers/streams on level ground with a silt barrier installed at the base. For all grid connection trenching along the local/public road, any unsuitable backfill material excavated will be immediately taken off site in trucks and disposed of under license from LCCC. This will prevent any contaminated run-off to roadside drains during heavy rainfall. Access Track Maintenance The track surface can become contaminated with clay or other silty material during construction. Access track cleaning will, therefore, need to be undertaken regularly during wet weather to reduce the volume of sediment runoff to the treatment system. This is normally achieved by scraping the track surface with the front bucket of an excavator and disposing of the material at designated locations within the site. Construction Vehicle Wash A Construction Vehicle Wash will be used to wash vehicles leaving the construction site. The vehicle wash area will be cleaned regularly so as to avoid the build-up of residue.	

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DURING CONSTRUCTION	Chapter 6 Biodiversity	Protection of Fauna	The following measures will be implemented during construction: • Habitat disturbance to fauna will be limited by controlling the movement of construction vehicles. Construction vehicles will not encroach onto habitats beyond the proposed development footprint. • Duration of construction activities will be restricted to between the hours 07.00am – 7.00pm, Monday to Friday, and 07.00am to 2.00pm on Saturdays and in accordance with the timings detailed in Chapter 3. Construction work will not take place at night unless in exceptional circumstances to reduce potential disturbance to fauna. • In the unlikely event that protected faunal species are found actively using the site for breeding/roosting during the construction phase, works will cease immediately, and the area will be cordoned off until advice is sought from a suitably qualified expert or member of the NPWS. • Should the resting or breeding places of any protected species be discovered within the site during construction works, the NPWS will be informed. Any mitigations required will be carried out under license from NPWS and using NRA Guidelines (2005b) (now known as TII) where applicable. • Adherence to Guidelines for the Treatment of Otters/Badgers prior to the Construction of National Road Schemes. Trees with high or moderate potential, not found to support bats when subject to an active survey would be 'soft felled' as per guidance in Marnell et al. (2022) i.e. avoid works at a time of year when bats are most likely to be present and if unavoidable, removal will be via section or limbs being cut and lowered to the ground or the tree shall be felled and left in situ for 24 hours prior to sectioning; April to October).	Experienced Bat Ecologist Appointed Project Contractor Appointed Ecological Clerk of Works
DURING CONSTRUCTION	Chapter 6 Biodiversity	Protection of Fisheries and Aquatic Life	Given that there will be no direct impacts on fluvial habitats, the only mechanism by which aquatic life, including fish, can be affected is via indirect negative water quality impacts. Protection of all aquatic life is therefore dependent on protecting water quality as outlined above.	Site Environmental Manager
DURING CONSTRUCTION	Chapter 6 Biodiversity	Prevention of Spread/Treatment of Invasive Species, Bio-security	While no invasive alien species were recorded at the proposed development site, there is potential for introduction of same to site during the construction phase. Prior to being brought onto the site, all plant and equipment will need to be clean and free of soil/mud/debris or any attached plant or animal material. Prior to entering the site, all plant/equipment will be visually inspected to ensure all adherent material and debris has been removed.	Appointed Project Contractor Appointed Ecological Clerk of Works

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			A pre-construction survey for invasive species will be conducted. Should invasive species be recorded at works locations along the grid connection route or within the development footprint, an Invasive Species Management Plan will be prepared prior to construction works commencing. All footwear/waders and all equipment that will be placed within the water will be treated to prevent foreign flora/fauna entering the water and after use to prevent the spread to other catchments. Non-native species control will be practised according to the following documents, noting that some works components are located at/near watercourses: • The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (NRA 2010); and • 'IFI Biosecurity Protocol for Field Survey Work' (IFI, 2010).	
DURING CONSTRUCTION	Chapter 6 Biodiversity	Biological monitoring	Biological water quality sampling (Q sampling) for surface water quality monitoring will be undertaken prior to the construction phase and immediately post construction. Macroinvertebrates will be sampled prior to construction. Biotic indices corresponding with those used in the baseline aquatic survey report will be used. Given the baseline information obtained for fish in the receiving environment, fish stock surveys will be undertaken at the same sites and at the same frequency as biological water quality sampling i.e., prior to construction and immediately post construction. Methodology will replicate that outlined in the aquatic survey report.	Appointed Project Contractor Ecologist Appointed Ecological Clerk of Works
DURING CONSTRUCTION	Chapter 7 Ornithology	Habitat reinstatement and creation	Detailed habitat re-instatement and creation is described in Appendix 6F – BEMP and Section 6.11 of EIAR Chapter 6 – Biodiversity, with proposed locations for these measures indicated in Figure 3-1 of the BEMP. This includes the following • **Wet grassland**: to compensate for the loss of wet grassland, retained wet grassland south of T6 will be enhanced by a reduction in grazing intensity and sensitive management to increase its suitability for breeding and wintering waders and lepidoptera. Wet grassland will also be enhanced north-west of T1, south-west of T3 and south and west of T2. Retained and enhanced wet grassland will be managed throughout the operational lifetime of the project. • **Hedgerows**: native tree species will be planted to bridge hedgerow gaps in order to maintain habitat quality and connectivity. Double rows of trees planted one metre apart will ensure replacement hedgerows are consistent with those to be removed during the project and that they are suitable for nesting, foraging and roosting	Appointed Project Contractor Appointed Ecological Clerk of Works

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			birds (notable non-target farmland species). Retained and created hedgerows will be left in situ following decommissioning. • **Watercourse buffering**: a riparian buffer zone will be established to provide a buffer between the project site and the receiving watercourses within the site (e.g., the Riddlestown Stream and the Ahacronane River). This will create an intact and permanent buffer area of natural vegetation alongside the aquatic zone, protecting water quality and aquatic ecosystems from possible overland flow of sediment and nutrient runoff from both the project and non-project land practices on site. In additional to maintaining the suitability of these watercourses for notable bird species (e.g., little egret, grey wagtail), the riparian buffer zone will create structural diversity and important woodland edge and open habitats suitable for a range of bird species at various times of year. • **Field Margins:** In total ca. 1,748 m of rough tussocky grassland that is at least 4 m wide with a litter layer of dead grass that is at least 7 cm deep will be created predominantly to the north and northeast of the proposed development boundary in proximity to confirmed barn owl (Tyto alba) nest locations (to the northeast) and in proximity to riparian habitat and mature hedgerows to the north of the proposed development. When creating rough tussocky grassland a native grass/seed mix should be used which best suits the local conditions, and most closely resembles the original unimproved grassland in the area. Tall, tussock-forming species (e.g. cocksfoot, false-oat, and timothy) as well as softer, shorter grasses (e.g. Yorkshire fog, fescue and bent species) are best. No management during the first year is required as the new grass should be left to grow tall and collapse in the autumn to form the 'litter layer'. Following establishment, areas should be topped or lightly grazed in the autumn every second or third year. There will be complete avoidance of herbicides, and the field margins will be fenced off to prevent grazing.	
DURING CONSTRUCTION	Chapter 7 Ornithology	Enhancement measures	Enhancements will target Key Ornithological Features identified, as well as species of conservation concern in Ireland (i.e., BoCCI Red and Amber listed species). Specifically, enhancements will be considered for farmland species such as passerines (e.g., linnet, skylark), barn owl and waders such as curlew and snipe. The provision of the BEMP will ensure that enhancements establish successfully and deliver long-term benefits. The following measures have been proposed in addition to the habitat reinstatement and creation measures described above. These measures will enhance the site and adjacent land for birds and other biodiversity receptors.	Appointed Project Contractor Appointed Ecological Clerk of Works

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		• **Ponds**: where conditions allow, silt ponds constructed for water quality protection (in line with drainage design and sensitively placed regarding turbine locations) will be retained to provide a permanent enhancement for various bird species including little egret, waders and non-target farmland species (Davies et al., 2016). The ECoW and site engineer will decide the final pond locations, but they will broadly correspond to locations indicated in Appendix 6F – BEMP, Figure 2-1. (see EIAR Chapter 6 – Biodiversity, Section 6.10.1.3) and Appendix 6F BEMP – Section 3.4 Pond Creation • **Mixed broadleaved woodland and scrub**: soil deposition areas will be converted to mixed broadleaved woodland and scrub (north of the site) and wet grassland (south of the site), to provide biodiversity enhancement for a range of species. The mixed woodland/scrub mosaic will incorporate native tree species known to be of value to different bird species at various times of year. • **Dead wood**: any trees requiring removal to facilitate the construction of the project will be stacked in piles to create habitat for invertebrates which will increase prey availability for birds including non-target farmland species. These features will be constructed under ECoW supervision and will be placed in areas where their benefit can be maximised (e.g., near higher quality bird habitat). • **Livestock control**: cattle drinkers will be installed in strategic locations to minimise poaching of retained watercourses (e.g., the Riddlestown Stream and the Ahacronane River). • **Field margin development** adjacent to boundary features such as hedgerows and ditches to provide nesting, foraging and sheltering habitat for small mammals. Rough tussocky grassland margins typically support a more diverse invertebrate and small mammal assemblage, providing food for a range of breeding and non-breeding bird species, including barn owl and raptors. and • **Nest box provision**: in addition to the natural nesting habitat (e.g., trees, hedgerows, grassland) described above, nest boxes will be provided to increase the availability of nesting opportunities, with emphasis on notable species including KOFs identified. Considering the scale of the project, the following nest boxes are proposed. These nest boxes would be inspected during monitoring visits and relocated/replaced if necessary to ensure they continue to provide suitable opportunities for the intended species. Nest boxes would comprise at least: ➢ Fifteen nest boxes suitable for a range of non-target farmland species. Based on the species recorded within and adjacent to the site these shall predominantly comprise close-fronted nest boxes with a round entrance,	

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			in sizes suitable for a range of species including house sparrow, tit species and flycatcher species. These nest boxes would be installed in woodland and hedgerows and distributed throughout the site; ➢ Two kestrel nest boxes: to be installed on suitable trees or buildings near suitable grassland foraging habitat, at least 500 m from any turbines; and ➢ One barn owl nest box: to be installed on a suitable tree or building near suitable grassland foraging habitat, at least 500 m from any turbines.	
DURING CONSTRUCTION	Chapter 8 Water	Proposed Drainage System and management	The drainage and treatment system will be managed and monitored and particularly after extreme rainfall events during the construction phase. Controls will be regularly inspected and maintained to ensure that any failures are quickly identified and repaired so as to prevent water pollution. A programme of inspection and maintenance will be designed and dedicated construction personnel assigned to manage this programme. A checklist of the inspection and maintenance control measures will be developed, and records kept of inspections and maintenance works. Fundamental to any construction project, is the need to keep clean water (i.e. runoff from adjacent ground upslope of the permitted development footprint) clean and manage all other run-off and water from construction in an appropriate manner. A site-specific drainage system has been designed taking account of the following: • Knowledge of the ground and hydrological conditions at the site; • Previous construction experience of wind farm developments in similar environments; • Previous experience of environmental constraints and issues from construction of wind farms in similar environmental conditions; and • Technical guidance and best management practice manuals. The system is designed to ensure that it will largely mimic the existing drainage regime across the site, will not deteriorate water quality and will safeguard catchment water quality status from wind farm-related sediment run-off. The following are the key elements of the proposed drainage system: • Clean water from upstream areas, which would otherwise flow into the site infrastructure areas, will be collected in cut-off drains and diverted away from or piped unimpeded through site infrastructure. This reduces the risk of clean water mixing with dirty water runoff	Appointed Project Contractor Site Environmental Manager

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		from the development and also reduces the volume of dirty water to be treated; • Access tracks will be cambered to ensure dirty water flows towards the dirty water drain installed adjacent; • Dirty water drains will be installed around the perimeter of all designated material storage areas prior to the placement of any materials within the storage area; • Runoff collected in dirty water drains will be routed through settlement ponds prior to travelling through overland flow/percolation to existing agricultural field drains or to existing watercourses. All outfalls from settlement ponds will be located outside the 50m buffer from rivers or streams; • Stone filter beds will be installed at the outfall of the settlement ponds; • Two (2) rows of Terrastop silt fencing will be installed along the top banks of watercourses and existing agricultural field drains where infrastructure will cross or run adjacent to a watercourse or existing agricultural field drains. The silt fencing will slow overland flows and provide additional filtration of suspended solids prior to entering watercourses. Silt fencing will be installed for the full length of any watercourse buffer where a track crosses a watercourse, including the crossing of the Ahacronane River between the substation and turbine T1; • Clean stone check dams will be placed at maximum 50m c/c intervals within trackside drains to limit erosion and provide attenuation volumes during times of high rainfall; • Areas between structures within the substation compound will be constructed of permeable crushed stone. A footpath will be installed around the substation building. This footpath will be graded to direct surface water away from the building towards a land drain installed within the compound stone and discharging to a bioretention basin and overflowing overland to existing land drainage; • All stormwater runoff from electrical infrastructure bunds within the substation compound where the risk of an oil leak or spill may be present, will be treated using a Class 1 full retention interceptor manufactured in accordance with IS EN 858 parts 1 and 2 and a Bund Guard pump and sump system (or similar); • All bunds will be fitted with alarmed sensors to detect oil. High water levels in the sump will activate the pump and the water level will begin to drop as the sump is emptied. When the oil layer is detected by the units' sensors, the pump will stop, and no water will leave the sump. When the next rainfall event occurs, this process is repeated with the oil layer always remaining in the bund; and	

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			• To ensure effective drainage from the permanent internal access track network and substation compound, the drainage measures installed for the construction phase will remain in place for the operational life of the wind farm and will be maintained. These are routine measures which are known to work and are designed to prevent materials entering waters. • To ensure effective drainage from the permanent internal tracks, the drainage network installed for the construction phase will remain in place for the operational life of the wind farm; and • Culverts constructed to accommodate drainage along field drains where they intersect turbine bases have been designed to accommodate 1:100-year return period storm events.	
DURING CONSTRUCTION	Chapter 8 Water	Turbine base construction	Foundations will need to be constructed on competent bearing strata by excavating through the soil, subsoil and rock if necessary which may result in excavation into the shallow groundwater in the subsoils and or close to top of bedrock. A typical method of construction for turbine foundation is also described below: • Install temporary drainage around the perimeter of the excavation keeping clean and dirty water separated; • Excavate soil to competent bearing strata as determined by the detailed design of the foundation; • Upfill the excavation to the required level with imported, graded rock suitable for use under structures (if required); • Install cable ducting under the foundation footprint; • Form a level working area with concrete blinding to build the foundation reinforcement and formwork; • Install formwork and reinforcement; • Pour concrete; and • Once the concrete has set, the formwork has been removed and the earthing system is in place, backfill the foundation with suitable ballast material. There will be no concrete batched on site. It will be transported to the site as required. A dedicated, bunded area will be created at the temporary construction compound to cater for concrete chute wash-outs. This will be for the wash-out of the chutes only — after the pour. Concrete trucks will then exit the site and return to the supply plant to wash out the mixer itself.	Appointed Project Contractor
DURING CONSTRUCTION	Chapter 8 Water	River Crossings	The bridge for the river crossing of the Ahacronane River has been designed with a 310mm freeboard above the 100-year return period flood	Appointed Project Contractor

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		level. An additional flood relief culvert will be constructed under the site access track to the south of the bridge within the Ahacronane River floodplain. All river crossings will be agreed with the OPW and Section 50 consents obtained where required prior to construction. The proposed export cable route will require two (2) watercourse crossings. One of the crossings will be along the public road and the other will be in private land at the western end of the export cable route. Directional drilling will be employed to construct the watercourse crossings for the export cable route. The directional drilling process involves deepening the cable trench at a defined slope as it approaches the watercourse down to a sufficient depth below the watercourse. The trench will then pass under the watercourse and begin to raise at a defined slope until it reverts to the standard trench depth (1.2m). Mitigation measures will include but will be limited to: • Entry to the watercourse will be avoided, while vehicle usage along the banks will be restricted; • No in-stream works will take place; • Any machines working in close proximity of the watercourse will be protected against leakage and spillage of fuels, oils, greases and hydraulic fuels; • Silt traps, silt fences and settlement ponds will be provided to prevent silts and soils being washed away by heavy rains during the course of the construction; • An ECoW will be present onsite to oversee the works to ensure there is no potential for surface water run-off to the receiving waterbodies; • Existing vegetation will be preserved where possible and disturbed areas replanted promptly to stabiles soil and reduce erosion. The directional drill will be carried out as follows: • The directional drilling machine will set up at a launch and reception pit (an enlarged cable trench, i.e., a cable trench on either side of the crossing point at an appropriate distance back from the watercourse); • The drill will then bore in an arc under the watercourse feature; • The drilling head of the boring tool has a series of nozzles that feed a liquid bentonite mix along the bore direction, which provides both lubrication and seals the cut face of the bore; • Once the bore reaches the far side, the HDPE duct is then attached to the drill head and the duct is pulled back along the route of the bore to the original drilling point; • Any bentonite mix is deposited within the bore shaft and spillage is collected at either end of the bore with a dedicated sump; and	

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			• Once the duct is in place under the watercourse, the normal process of trenching can continue from either side of the launch and reception pits. Launch and reception pits at the river crossings will be backfilled.	
DURING CONSTRUCTION	Chapter 9 Land and Soils	Land use	To reduce the potential effect of changing the land use associated with the footprint of the proposed development, the footprint of the works has been minimised to avoid unnecessary soil sealing, disruption, etc. A minimal volume of soil and subsoil will be removed to allow for infrastructural work to take place in comparison to the total volume present on the site due to optimisation of the layout and mitigation by design. The turbine foundation will be backfilled with a cohesive material, where possible using the material arising during the excavation, and landscaped using the vegetated soil set aside during the excavation. The land outside the development footprint will not be affected by the development, and current land use practices will remain in place on these lands over the lifetime of the development. The area of land required to construct, operate, maintain and ultimately decommission the proposed development has been kept to the minimum reasonably practicable area as part of the design process. Existing access tracks have been utilised in the design as much as possible such that the existing land use does not change in these areas of the site during the operational life of the proposed development. This approach minimises the area temporarily altered from its current land use. The proposed grid route is located within the existing road network as much as possible, thereby minimising the impact on current land use.	Appointed Project Contractor Site Environmental Manager
DURING CONSTRUCTION	Chapter 9 Land and Soils	Soil Erosion	Due to the significant loads that will be imposed by the outriggers of the main lifting crane during the erection process for the installation of the wind turbines on site; it is intended that the proposed crane hardstands will be constructed using excavation methods over the footprint of the hardstand area / turbine base. Excavations for turbine foundations will be the largest scale excavations onsite. These excavations will be completed to an approved temporary works design and carried out such that they are stable or adequately supported. This is likely to involve creating safe side slope angles, installation of drainage around and within the excavation, and installation of sediment control measures within the drainage system to prevent soil erosion. Drainage will be constructed in parallel with access track construction and turbine excavation, including drains and stilling ponds, etc. A combination	

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	Chapter 9 Land and Soils	Soil Erosion	of new and upgraded drainage networks will be installed within the site. The existing drainage network will be utilised where possible and will be upgraded where necessary including the installation of settlement ponds and sediment traps at key locations. The drainage network has a twin system of water management separating out clean water from dirty water. This network and design approach is outlined in detail in Chapter 03 Description of the Proposed Development, Section 3.4.7 Drainage & Management of Surface Water Run-off. . The proposed wind farm drainage design is illustrated on Drawings 22569-MWP-00-00-DR-C-5006 and 22569-MWP-00-00-DR-C-5405. Temporary works will be such that they do not adversely interfere with existing drainage channels/regimes. Temporary stockpiles of excavated spoil, stored in the footprint of the excavation areas, will be directed for use in backfilling and restoration or placed in the deposition areas on site. Reusable excavated sub-soils and aggregate will be stored in temporary stockpiles at suitably sheltered areas to prevent erosion or weathering and shall be shaped to ensure rainfall does not degrade the stored material. Stockpiles will be stored away from any open surface water drains, and a 50m buffer area will be implemented between stockpiles and surface watercourses, managing height and slope of all stockpiles and minimising soil movement. Estimated volumes of material can be found in Section 3.4.9 of the Chapter 03 Description of the Proposed Development of this EIAR. Excess spoil material will be stored on site in the two (2) designated deposition zones. Whenever possible, existing access tracks have been utilised to access turbine locations. This reduces the volume of excavated material and imported crushed rock for track construction. Excavations and material removal that will take place during the construction phase will be localised to the turbine locations and access tracks. Excavated material from the grid route will be used to reinstate the area around the cable trench following backfilling of the trench with approved materials. In the event that there is a requirement for soil to be exported from site, this will be treated as an Article 27 by-product (a non-waste) where practicable or treated to comply with Article 28 and recycled if possible. A Resource Waste Management Plan (RWMP), Appendix 9A, will be implemented by the appointed contractor. The implementation of erosion and sediment controls will be made prior to the commencement of site clearance works. Silt traps, such as geotextile membrane, will be placed in the existing drainage network prior to construction work. These will be inspected weekly and in the event of major rain events to ensure their performance adequacy, by a suitably	Appointed Project Contractor Site Environmental Manager

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			qualified and experienced civil / structural engineer and cleaned regularly as required. The mitigation measures for the grid connection will be the same as those at the wind farm site. These include mitigation measures for soils and geology, drainage, siltation control, hydrocarbon release and general site management and will be fully in line with any requirements identified in the Environmental Management Plans found in the CEMP (Appendix 3D). The land use at these locations will not change. In relation to Grid Connection Option A, use of the existing public road network will be used to reduce subsoil and bedrock excavation volumes. The subsoil and bedrock which will be excavated during the construction phase will be localised to the proposed grid connection route alignment. A minimal volume of subsoil and bedrock will be removed to allow for grid connection works, and suitable material will be reused in trench backfilling where possible. Excess excavated material will be removed to the deposition areas. Once in place, the grid connection will not affect existing or further land uses.	
DURING CONSTRUCTION	Chapter 9 Land and Soils	Compaction/Loading	The project CEMP (refer to **Appendix 3D)** includes site management controls to mitigate for compaction. A traffic management plan has been developed for the construction phase (refer to **Appendix 14A**). This is to manage and control vehicular movement onsite. Measures will include the scheduling of HGVs during the construction phase to reduce the number of vehicles moving in, through and off site. This in turn will reduce the impact of soil compaction and erosion. Unscheduled vehicles will not have access to the site. Machinery will not operate directly on excavated/stockpiled soils. Heavy vehicles will only follow designated and newly constructed access tracks and avoid loading areas which are not contained within the footprint of the main works to minimise disturbance of the original soil and subsoil formations and to retain soil structure. This implies that machinery will be kept on tracks and aside from advancing excavations, will not move onto areas that are not permitted for the development. Buffers will also be created between tracks and monuments to prevent threat of disturbance. The compound, vehicles, stockpiled materials and heavy machinery will be in place for the duration of the construction phase and will be removed once commissioning is complete. Within excavations and around excavations, pore water pressure will be kept low by avoiding loading the soil/subsoil and giving careful attention	Appointed Project Contractor Site Environmental Manager

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			to the existing drainage as compaction would alter the surface drainage regime (see **Chapter 08 Water**).	
DURING CONSTRUCTION	Chapter 9 Land and Soils	Slope Stability	All temporary cuts/excavations will be carried out such that they are stable or adequately supported. Temporary works will be such that they do not adversely interfere with existing drainage channels/regimes. All site excavations and construction will be supervised by a suitably qualified and experienced engineer. The Contractor's method statements for each element of work will be reviewed and approved by the engineer prior to site operations. Prior to excavation, drains will be established to effectively intercept overland flow prior to earthworks. The existing network of drainage within the site will be utilised whenever possible. From examination of factual evidence to date, the majority of landslides occur after an intense period of rainfall. An emergency response system will be developed for the construction phase of the proposed development, particularly during the early excavation phase. This, as a minimum, will involve 24 hour advance meteorological forecasting (Met Éireann download) linked to a trigger-response system. When a pre-determined rainfall trigger level is exceeded (1 in 100-year storm event or very heavy rainfall at >25mm/hr), planned responses are undertaken. Refer to CEMP (Appendix 3B). These responses will include cessation of construction until the storm event including storm runoff has passed over. A project geotechnical engineer or engineering geologist will be employed during the construction phase of the works. As part of the detailed design and assessment, identification of potential planes of weakness will be made in the overburden such as discrepancies in the material type and foliation direction in the bedrock. Earthworks will be constructed to safe, stable angles in accordance with detailed design and best practice. Plant and materials will be stored in approved locations only (such as the proposed site compound) and will not be positioned or trafficked in a manner that would surcharge existing or newly-formed slopes.	Site Environmental Manager Project Geotechnical Engineer
DURING CONSTRUCTION			The CEMP (refer to Appendix 3D of Volume III) includes site management controls to mitigate for contamination/pollution. The permanent access tracks works will require a drainage network to be in place for the construction and operation phases of the proposed development.	Site Environmental Manager

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	Chapter 9 Land and Soils	Accidental Spills & Contamination/Pollution	

Fundamental to any construction phase is the need to keep clean water (i.e. runoff from adjacent ground upslope of the permitted development footprint) clean and manage all other runoff and water from construction in an appropriate manner.

Wheel wash facilities will be available onsite for the duration of the construction phase. These and other measures are outlined in the Construction Environmental Management Plan - CEMP (Appendix 3D). The proposed surface water drainage is summarised in Chapter 3 Description of the Proposed Development, Chapter 8 Water and Appendix 3E SWMP.

A bunded containment area will be provided within the compound for the storage of fuels, lubricants, oils etc.

Good site practice will be applied to ensure no fuels, oils or any other substance are stored in a manner on site in which they may spill and enter the ground, particularly when the initial top layer of made ground is excavated. Dedicated, bunded storage areas will be used for all fuels or hazardous substances. Spill kits will be maintained on site. The CEMP includes a management plan and can be seen in Appendix 3B.

The potential for hydrocarbons getting into the existing drains, local watercourses, and land and soils environment will be mitigated by only refuelling construction machinery and vehicles in designated refuelling areas using a prescribed re-fuelling procedure. A fuel management plan will be implemented incorporating the following elements:

- **Refuelling of Construction Plant On-Site** - Refuelling will be carried out using 110% capacity double bunded mobile bowsers. The refuelling bowser will be operated by trained personnel. The bowser will have spill containment equipment which the operators will be fully trained in using. Plant nappies or absorbent mats will be placed under refuelling points during all refuelling to absorb drips. Mobile bowsers, tanks, and drums will be stored in secure, impermeable storage areas, over 50m away from drains and open water. To reduce the potential for oil leaks, only vehicles and machinery will be allowed onto the site that are mechanically sound. An up-to-date service record will be required from the main contractor. Should there be an oil leak or spill, the leak or spill will be contained immediately using oil spill kits, all oil, and any contaminated material will be contained in a quarantined area and properly disposed of in a licensed facility. Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound and also in site vehicles and machinery. Correct action in the event of a leak or spill will be

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			facilitated by training all vehicle/machinery operators in the use of the spill kits and the correct containment and cleaning up of oil spills or leaks. This training will be provided by the Environmental Manager at site induction. In the event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill kits kept in site vehicles and machinery; and • **Materials Handling, Fuels and Oil Storage** - Leakages of fuel/ oil from stores will be prevented by storing these materials in bunded tanks which have a capacity of 110% of the total volume of the stored oil. Ancillary equipment such as hoses and pipes will be contained within the bunded storage container. Taps, nozzles, or valves will be fitted with a lock system. On-site washing of concrete truck barrels will not be allowed. A designated chute wash down area, which will retain the washout water, will be located within the construction compound and there will be no other chute wash down activity on any other part of the site. The drainage and treatment system will be managed and monitored and particularly before and after extreme rainfall events during the construction phase. Controls will be regularly inspected and maintained. A programme of inspection and maintenance will be designed and dedicated construction personnel assigned to manage this programme. A checklist of the inspection and maintenance control measures will be developed, and records kept of inspections and maintenance works. The purpose of this management control is to ensure that the measures in place are operating effectively, prevent accidental leakages, and identify potential breaches in the protective retention and attenuation network during earthworks operations. Stockpiles of stripped topsoil will be in locations with minimum trafficking to prevent damage and dusting. The access track surface can become contaminated with clay or other silty material during construction. Access track cleaning will, therefore, need to be undertaken regularly during wet weather to reduce the volume of sediment runoff to the treatment system. This is normally achieved by scraping the track surface with the front bucket of an excavator and disposing of the material at designated locations within the site.	
DURING CONSTRUCTION	Chapter 9 Land and Soils	Rock Blasting	Rock blasting will only take place if extraction using rippers or hydraulic breakers is deemed impractical. Circumstances include where the rock strength is such that other means of extraction are not possible, and excavation rates need to be increased to keep up with the construction	Appointed Project Contractor

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			programme. If rock blasting proves to be necessary, a detailed blasting design will be undertaken by a suitably qualified and experienced specialist for each location to ensure that a peak particle velocity (PPV) of 10 mm/s is not exceeded at a distance of greater than 20m from the blast holes as per BS 7385 Part 2: 1993. If this cannot be achieved, blasting will not be permitted at this location. To mitigate against the risk of slope failure occurring, blasting will not be permitted at turbine locations unless robust mitigation measures are put in place. Blasting for the track cuttings and hardstands, if required, will be subject to the same rigorous controls as that proposed at turbine foundation locations. Blasting mitigation measures, included within the CEMP (Appendix 3B of Volume III), will ensure compliance with the Explosives Act 1875 and 2006 and BS 7385 in relation to blasting. Limerick City and County Council, An Garda Síochána, and adjoining landowners will be notified in advance of any blasting activities on the site. Additionally, the NPWS and any other required consultees will be consulted as part of the general consultation and blasting permitting process in order to keep them informed of any blasting proposals for the site.	
DURING CONSTRUCTION	Chapter 9 Land and Soils	Piled Foundations	To minimise potential environmental impacts associated with piling activities, a range of mitigation measures will be implemented during the construction phase. Piling works will be carefully planned and limited to locations where geotechnical investigations confirm that conventional foundations are not feasible. Where piling is required, best practice construction methods will be employed to reduce disturbance to soils, groundwater, and the surrounding environment. All piling activities will be undertaken in accordance with the CEMP (Appendix 3D), which will include detailed method statements, site-specific risk assessments, and pollution prevention measures. Piling rigs will be operated by experienced contractors who will ensure that boreholes are installed and filled efficiently to avoid unnecessary delays or prolonged ground exposure. To manage spoil generated during piling, excavated materials will be assessed for reusability on-site, with suitable material used for backfilling or landscaping. Any excess spoil will be transported to the designated deposition areas within the site. Measures will be taken to prevent silt-laden runoff from entering nearby watercourses, including the use of silt fences, settlement ponds, or other appropriate filtration systems.	Site Environmental Manager Appointed Project Contractor

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DURING CONSTRUCTION	Chapter 10 Air and Climate	Dust	Best practice will be adhered to during the construction phase in order to minimise fugitive dust emissions. The mitigation measures for dust abatement have been sourced from National and International best practice guidance documents for the implementation of dust management plans such as; • Control of Dust from Construction and Demolition Activities,' UK British Research Establishment (BRE); • Environmental Good Practice on Site,' Construction Industry Research and Information Association (CIRIA); • Environmental Management Plans,' Institute of Environmental Management and Assessment (IEMA); and • Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan' National Roads Authority of Ireland (NRA). Construction phase generated dust will be minimised by the following measures which are also incorporated into the site-specific CEMP (Volume III, Appendix 3D): • The use of water as a dust suppressant, e.g., a water bowser to spray access tracks and crane hardstanding areas during any extended dry periods when fugitive dust emissions could potentially arise; • Public roads will be inspected regularly for cleanliness and cleaned as necessary; • All loads entering and leaving the site will be covered during dry periods if dust becomes a disturbance on site; • Control of vehicle speeds passing over access tracks and crane hardstanding areas within the site; • Wheel wash facilities will be implemented at the site entrance from the public road to facilitate removal of any material collected by vehicles entering or leaving the site and preventing its deposition on public roads; • Site stockpiling of materials will be laid out to minimise exposure to wind; and • Daily site inspections at the wind farm and grid connection will take place to examine dust measures and their effectiveness.	Site Environmental Manager Appointed Project Contractor
DURING CONSTRUCTION	Chapter 10 Air and Climate	Construction traffic emissions	Construction traffic emissions will be reduced using the following measures: • Ensure regular maintenance of plant and equipment. Carry out periodic technical inspection of vehicles to ensure they perform most efficiently; • Implementation of the Traffic Management Plan (TMP) to minimise congestion; and	Site Environmental Manager

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			• All site vehicles and machinery will be switched off when not in use - no idling.	
DURING CONSTRUCTION	Chapter 11 Noise and Vibration	General	Regarding construction activities, reference shall be made to BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise and where appropriate, Mineral Policy Statement 2. BS 5822 offers detailed guidance on the control of noise and vibration from construction activities. The following various practices will be adopted during construction as required: • Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; ➢ Normal construction activities will be undertaken within the hours 07.00am – 7.00pm, Monday to Friday and 07.00am - 2.00pm on Saturdays; ➢ Works along public roads would be from 9.00a.m. to 5.00p.m. Monday to Friday and 9.00a.m. to 2.00p.m. on Saturdays; ➢ Any changes in hours for certain construction works such as concrete pours will be agreed with the Local Authority. • Keeping the surface of the site access tracks even to mitigate the potential for vibration from lorries. • Selection of plant with low inherent potential for generation of noise and/or vibration; • Placing of noisy/vibratory plant as far away from sensitive properties as permitted by site constraints; and • Management of deliveries to avoid significant peak periods.	Appointed Project Contractor Site Environmental Manager
DURING CONSTRUCTION	Chapter 11 Noise and Vibration	Noise	The contract documents shall specify that the Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures when deemed necessary to comply with the recommendations of BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction on open sites – Noise and Mineral Policy Statement 2 where appropriate. The following list of measures will be implemented, where necessary, to ensure compliance with the relevant construction noise criteria: • Proper maintenance of plant will be employed to minimise the noise produced by on site operations. • All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract. • Compressors will be attenuated models, fitted with properly lined and sealed acoustic covers and will be kept closed whenever the	Appointed Project Contractor

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	Chapter 11 Noise and Vibration	Noise	machines are in use. All ancillary pneumatic tools shall be fitted with suitable silencers; • Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use. • Any plant, such as generators or pumps, which is required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen. • During the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Table 11-1 using methods outlined in BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise and Mineral Policy Statement where appropriate; • Erect site hoarding and temporary screens around noisy equipment. • Acoustic enclosures or portable screens will be utilised for plant and equipment operating in close proximity to residential dwellings such as the HDD crossings along grid connection Option A. •	Site Environmental Manager
DURING CONSTRUCTION	Chapter 11 Noise and Vibration	Vibration	Vibration from construction activities will be limited to the values set out in 7. With regards to piling should it be required, it is considered that, based on the large distances between locations where piling may take place and the nearest NSLs, no significant impact will be experienced. Therefore, no mitigation measures are proposed.	Appointed Project Contractor Site Environmental Manager
DURING CONSTRUCTION	Chapter 11 Noise and Vibration	Blasting	The following mitigation measures will be employed to control the impact during blasts, if blasting is required: • A blast management plan will be prepared and implemented during the construction phase • Trial blasts will be undertaken to obtain scaled distance analysis; • Ensuring appropriate burden to avoid over or under confinement of the charge; • Accurate setting out and drilling; • Appropriate charging; • Appropriate stemming with appropriate material such as sized gravel or stone chipping; • Delay detonation to ensure small maximum instantaneous charges;	Appointed Project Contractor Site Environmental Manager

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			• Decked charges and in-hole delays; • Blast monitoring to enable adjustment of subsequent charges; • Good blast design to maximise efficiency and reduce vibration; • Avoid using exposed detonating cord on the surface; • Hours within which blasting can be conducted will be restricted; • Prior to the commencement of any blasting activity an active community engagement exercise shall be undertaken by the community liaison officer, (e.g. 48 hours written notification); • The firing of blasts at similar times will be implemented to reduce the 'startle' effect; • On-going circulars informing people of the progress of the works will be issued; • An onsite documented complaints procedure will be implemented; and • Independent monitoring by external bodies for verification of results will be implemented.	
DURING CONSTRUCTION	Chapter 11 Noise and Vibration	Monitoring	Noise and vibration monitoring will be carried out in accordance with the guidance contained in BS 5228-1:2009 during the construction phase to ensure compliance with the criteria or if noise complaints are received.	Site Environmental Manager
DURING CONSTRUCTION	Chapter 12 Landscape and Visual	Landscape and visual	Tree protection and fencing will be carried out where necessary during the construction phase, in the vicinity of the substation and temporary compound. Works will be avoided near the bases of mature trees. No works will take place along the mature Lime tree avenue in the area of the former Waterville house, as this area is outside the planning application boundary. Mitigation measures include the re-instatement of the areas following the removal of the temporary construction compound and the closure and re-instatement of the temporary site entrance to the west of the site, including replanting of the hedgerow with native species similar to what is to be removed. The deposition areas are to be vegetated as detailed in Appendix 6F BEMP. For the grid connection route, the section of the road adjacent to the church and graveyard at Kibradran will avoid any works near the enclosing wall of the graveyard and will be located within the road corridor to the opposite side of the road.	Appointed Project Contractor Site Environmental Manager

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DURING CONSTRUCTION	Chapter 13 Cultural Heritage	Cultural heritage	The following shall be implemented during the construction phase: • All groundworks associated with the construction works, turbine hardstands, substation, compound, internal grid connection / access tracks and temporary access track will be archaeologically monitored under licence from the NMS. • Groundworks associated with the external grid connection (Option A) to the existing substation at Carrons wind farm substation within the greenfield sections will be archaeologically tested in advance under license from the NMS. It is proposed to excavate a series of 7 test trenches (T1-T7) within the greenfield section of proposed grid connection (Option A) (See Chapter 13, Figures 13-15). The scope of the test excavations will be agreed following consultation / liaison with the Limerick City & County Council Archaeologist. • Groundworks associated with cuttings through the townland / parish/ barony boundaries will be kept to a minimum. The cutting locations of these boundaries will be archaeologically recorded and all boundary cuttings shall be archaeologically monitored with photographs and written descriptions.	Appointed contractor
DURING CONSTRUCTION	Chapter 14 Material Assets	Road and traffic	A Traffic Management Plan has been prepared and is outlined in EIAR Volume III Appendix 14A. Construction activities associated with the proposed development will include working practices to ensure the safety and convenience of all road users during the construction of the development as detailed previously. This includes pedestrians, cyclists and other traffic. Pre-construction and post-construction surveys will be carried out to verify the structural integrity of the proposed haulage route road network. Repairs will be carried out on the public roads as necessary during the construction phase to ensure that the condition does not deteriorate below an acceptable standard. Following completion of construction, the condition of the public road will be of at least the same standard as it was prior to commencement of construction. Information regarding the extent and duration of the development will be provided to the public and business community. Prior to construction works, the developer / appointed contractor will provide advice to the public in relation to: • Commencement and duration periods for the works; • Current and proposed road closures or other traffic management tools; • Alternative routes; and	Appointed Project Contractor Site Environmental Manager

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			• Provision for access / egress.	
DURING CONSTRUCTION	Chapter 14 Material Assets	Grid capacity and electrical infrastructure	Mitigation by design has been adopted whereby the grid connection methodology at the proposed development has been selected to utilise existing built infrastructure as discussed in Chapter 04 Alternatives. Ecological, field and desk study assessments have been applied to determine project development infrastructure locations and mitigation by avoidance of any constraints. Cables will be laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds. There is no anticipated effect upon the grid network outside of the infrastructure for the proposed development itself. The proposed development will not result in any significant effects on grid capacity but will provide a positive effect on the electricity supply infrastructure. No specific mitigation measures are proposed.	Site Environmental Manager
DURING CONSTRUCTION	Chapter 14 Material Assets	Telecommunications	Results from the impact analysis indicated that four mast sites have been identified in the surrounding area, with only one microwave radio link crossing the proposed development site. The Vodafone point to point (PTP) microwave radio link runs between Ballymurragh East and Askeaton. To overcome potential interference, mitigation by avoidance has been applied. A mitigation measure of re-routing the service into Askeaton from an alternative Vodafone Feeder/POP site was put forward to Vodafone, who agreed to the proposal. Part of the agreed proposal is that the developer will cover the mitigation cost. Therefore, there will be no impact to telecommunication links as a result of the development.	Developer Principal Contractor Appointed Project Contractor
DURING CONSTRUCTION	Chapter 14 Material Assets	Aviation	Whilst the proposed development will not impede aircraft, IAA Electronic Air Navigation Obstacle Data sets have identified obstacles as objects whose height above ground level is 100m or higher, affecting air navigation. Irish Wind Energy Association (IWEA) Guidelines have set out the following measures to ensure that pilots of aircraft are fully aware of the presence of wind turbines. • All turbines and meteorological masts having a height of 100m or more are promulgated in the Irish Air Navigation Obstacle database; • Wind turbines or any structure exceeding 100m in height may require appropriate aviation warning lighting as agreed with IAA; and • The IAA should be informed 30 days in advance of the erection of any structure exceeding 45m in height.	Developer Principal Contractor Appointed Project Contractor

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			Having regard to the above: • The developer will agree an aeronautical obstacle warning light scheme for the wind farm development with the IAA; • The developer will provide the IAA with as-constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location; and • The developer will notify the IAA of intention to commence crane operations with a minimum of 30 days prior notification of turbine erection.	
DURING CONSTRUCTION	Chapter 14 Material Assets	Water and wastewater infrastructure	There are no existing watermains within the footprint of the proposed wind farm however there is a distribution watermains which exists along a section of road where the grid connection route passes. All construction phase and operation phase wastewater will be taken off-site by an authorised waste contractor and brought to an authorised waste facility.	Site Environmental Manager
DURING CONSTRUCTION	Chapter 14 Material Assets	Waste Management	Waste will be managed, as follows: (a)Prevention; (b)re-use; (c)Recycling; (d)Other recovery (including energy recovery); and (e) Disposal. All waste for offsite treatment/disposal will be stored temporarily in appropriate dedicated storage areas. The areas in which wastes will be stored on site will be segregated to prevent material and contaminated surface water runoff entering local surface water drains. All chemical, hydrocarbon or other controlled wastes will be stored in designated areas in appropriate approved containers within bunds or on spill pallets, as required. All waste to be removed from site will be undertaken by authorised waste contractors and transported to an authorised facility in accordance with best practice and the site waste management plan.	Site Environmental Manager
POST CONSTRUCTION /OPERATIONAL PHASE	Chapter 5 Population and Human Health	Shadow Flicker	Mitigation measures in the form of shadow flicker control modules will be installed on relevant turbines to control the occurrence of shadow flicker by standing the turbine down based on times of day and the relative angle of the sun and turbine, thus eliminating the occurrence of shadow flicker at receptor locations as outlined in Chapter 05, Population and Human Health, Table 5-9. As a result, shadow flicker effects will not occur at any dwelling. The applicant also commits that shadow flicker will not occur at any community facilities including St Kieran's GAA facilities, Coolcappa	Wind farm operator

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			Community Hall, St Kyren's Church and Graveyard, Coolcappa National School, Kilbradran Graveyard and Newcastle West Golf Course alone or cumulatively with any other wind farm developments.	
POST CONSTRUCTION /OPERATIONAL PHASE	Chapter 6 Biodiversity	Operation of the wind farm	Various measures will be implemented which lower the risk of bat fatalities throughout the lifespan of the windfarm. Buffer zones surrounding each turbine will dissuade bats that depend on landscape features for guidance from flying near turbines and these bat buffer zones will be maintained throughout the lifetime of the windfarm (see Appendix 6F BEMP). The two following methods will be used to further reduce bat fatalities and are described in detail in Appendix 6D Bat Report: • Feathering (reduced speed rotation when turbines are idling); and • Curtailment (turbines remain off when conditions are optimal for bat activity i.e. when air temperature is >10^{o}C at nacelle height and wind speeds <5m/s at 2.5m). Cut-in speeds will be increased between April and September, inclusive, from 30 minutes prior to sunset and 30 minutes after sunrise at all turbines, except T6.	Wind farm operator Appointed contractor
POST CONSTRUCTION /OPERATIONAL PHASE	Chapter 7 Ornithology	Monitoring	The assessment of effects undertaken in Chapter 7 Ornithology identified no significant effects on key ornithological features during the operational phase of the project and, as such, targeted mitigation during this period is not required. The following monitoring measures are proposed as industry best practice rather than in response to any identified impacts associated with the proposed development. Operational monitoring in the form of vantage point surveys and transect surveys will be undertaken in prescribed monitoring years during the operational lifetime of the proposed Ballynisky Wind Farm (see Chapter 7, Section 7.7.3.1 for detailed monitoring plan) • During the operational phase, an avian fatality monitoring programme will be implemented within the operational wind farm Chapter 7, Section 7.7.3.2This will aim to confirm the accuracy of the collision risk modelling predictions that were made within the EIAR assessment. Carcases of birds likely to be associated with collision with turbines will be searched for using specially trained cadaver dogs and their handlers. Monitoring will involve monthly searches of carcasses within monitoring years (January-December) to ensure	Wind farm operator Appointed ecologist

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			• non-breeding and breeding species of birds are accounted for. All feather spots and bird carcasses will be photographed and logged in an annual fatality search report, which will be submitted to relevant stakeholders and the planning authority for consultation; and • Water quality and biological monitoring of the Ahacronane River to ensure the condition of the river is favourable for bird species and other biodiversity receptors.	
POST CONSTRUCTION /OPERATIONAL PHASE	Chapter 8 Water	Water quality	Water quality monitoring will take place prior to and during the construction phase and for the first 6 months of the operational phase. Subject to consent, the location of sampling points and the programme of monitoring for water quality will be agreed with Limerick City and County Council prior to the commencement of construction. This monitoring, together with visual monitoring, will help to ensure that the mitigation measures that are in place to protect water quality are effective. The Water Monitoring Programme to include monitoring of streams and from end points of the drainage system and visual monitoring of sediment and erosion control measures. Routine inspection and preventive maintenance visits will be undertaken to ensure the smooth and efficient running of the wind farm. This will include inspection of the drainage systems for the turbine bases, the access track network, the river crossing and the substation building. If/where necessary, obstructions will be removed from water courses or drains to ensure the drainage system operates in accordance with the design specification. Visual assessment of the drainage system will be undertaken as outlined in the CEMP to ensure the development is not impacting on surface waters downstream of the development.	Wind farm operator
POST CONSTRUCTION /OPERATIONAL PHASE	Chapter 9 Land and Soils	Change of land use	The potential effect on the land and soils of the site due to excavations will be lower during operation and maintenance, as the majority of excavations will have been reinstated. Some erosion of soil may continue into the operation phase, however as vegetation becomes established and equilibrium is achieved, erosion rates will reduce to normal levels. Ongoing track and drainage management will be required during the operational phase. Stability of soil will be monitored by a qualified Geotechnical Engineer. No additional mitigation measures are required in	Wind farm operator

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			relation to land use for soil and the geological environment during the operation of the proposed development.	
POST CONSTRUCTION /OPERATIONAL PHASE	Chapter 9 Land and Soils	Soil and geology	All vehicular movement during operation and maintenance will be restricted to the areas of hard standing and existing/newly constructed access tracks. The volume of traffic during the operational phase will be greatly reduced in comparison with the construction phase. The potential effect on slope stability will therefore be minimal. The risks associated with sedimentation and contamination of the watercourses and aquifers due to erosion and runoff will be significantly reduced to minimal levels as areas are revegetated and construction traffic ceases. Refer to EIAR Chapter 08 Water for further details in relation to hydrology and hydrogeology. No mitigation is required for the grid connection, unless repair works are undertaken. Should repair works be required, mitigation will include: • Use of temporary excavations over the shortest distances possible; • All excavated material will be stored and reused during reinstatement; and • The works are likely to be completed over short periods of 1 to 2 days.	Wind farm operator
POST CONSTRUCTION /OPERATIONAL PHASE	Chapter 9 Land and Soils	Accidents and spills	Mitigation measures for oils and fuels remain the same as the construction phase but will significantly reduce during the operation stage. Maintenance of the turbines, substation and maintenance vehicles is all that is required. Turbine transformers will be located within the turbines, so any leak of oil would be contained within or adjacent to the turbine. Minimal refuelling or maintenance of operational vehicles or plant will take place on site. Off-site refuelling will occur at a controlled fuelling station. Any on-site re-fuelling will be undertaken using a double skinned bowser with spill kits at the ready for accidental leakages or spillages. A minimal amount of fuels will be stored on site. An emergency plan for the operational phase to deal with accidental spillages will be prepared and will be communicated to plant operatives. Spill kits will be available to deal with any accidental spillage in and outside the re-fuelling area. The substation transformer oil storage tanks will be in a concrete bund capable of holding 110% of the oil in the transformer and storage tanks.	Wind farm operator
POST CONSTRUCTION /OPERATIONAL	Chapter 11 Noise and vibration	Noise levels	Compliance with the prescribed limits as set out in Chapter 11 will be demonstrated by a suitable post construction Noise Complaint	Wind farm operator

TIME FRAME / SCHEDULE	Chapter/ Appendix		ENVIRONMENTAL MITIGATION / RECOMMENDATION	Person(s) Responsible
PHASE			Monitoring Programme (NCMP). The NCMP will adopt the guidance in IOA SGN No.5 Post Completion Measurements. A detailed methodology shall be agreed in writing with the planning authority prior to the commissioning of the wind farm including the following as appropriate: • Monitoring to be conducted under downwind conditions (45 degree sector); • Wind turbines to operate in normal mode i.e. without any additional restrictions; • Monitoring to be conducted at one or more Noise Monitoring Location(s) (where pre-commissioning background noise levels are available) or at representative/nearest Noise Sensitive Location(s); and • Synchronised 10-minute wind speeds at standardised 10m height to be derived from upwind anemometer or from turbine power output curves. The instrumentation used will comply with IOA SGN No. 1 Data Collection and will be conducted by a professionally competent acoustic consultant. Where the results of the measurements demonstrate an exceedance of the permitted noise levels, a mitigation strategy will be formulated to reduce turbine noise levels to within the prescribed noise limits. The noise monitoring will then be repeated with such mitigation measures in place to demonstrate compliance with the conditions and for the operator to continue to run the site in this way unless circumstances change.	
POST CONSTRUCTION /OPERATIONAL PHASE	Chapter 14 Material Assets	Telecommunications	In the event of interference to telecommunication services arising from the wind farm development, the applicant will work with telecommunication providers to remedy any issues of interference to affected communication links. Notwithstanding this, as is standard practice, a signed Protocol between the developer and 2rn will be put in place, in which the developer will be responsible to resolve any issue of interference with television reception as a result of the proposed development.	
DECOMMISSIONING	Chapter 3 Project Description	Reinstatement	At the end of the estimated 35-year lifespan, the Developer will make the decision whether to apply for permission to repower the wind farm, or to decommission the turbines. Any further proposals for development at the site during or after this time will be subject to a new planning	Wind farm operator

TIME FRAME / SCHEDULE	Chapter/ Appendix		ENVIRONMENTAL MITIGATION / RECOMMENDATION	Person(s) Responsible
			application and will be subject to environmental assessment. If planning permission is not sought after the end of life of the turbines, the site will be decommissioned and partially reinstated with all turbines and towers removed. Removal of infrastructure will be undertaken in line with landowner(s) and regulatory requirements and best practice applicable at the time. The information below outlines the likely decommissioning tasks based on current requirements and best practice. Prior to the decommissioning work, the following will be provided to Limerick City and County Council for approval: • A plan outlining measures to ensure the safety of the public workforce and the use of best available techniques at the time; and • A comprehensive reinstatement proposal, including the implementation of a programme that details the removal of all structures and landscaping. If the site is to be decommissioned, cranes of similar size to those used for construction will disassemble each turbine. The towers, blades and all components will then be removed and recycled as appropriate. At present it is anticipated that underground cables connecting the turbines to the substation will be cut back and left underground. The cables will not be removed if an environmental assessment of the decommissioning operation demonstrates that this would do more harm than leaving them in situ. The assessment will be carried out closer to the time to take into account environmental changes over the project life. The new 38kV substation will remain in place as it will be under the ownership of ESB/EirGrid and will operate as an asset to the National Grid going forward. Hardstand and turbine foundation areas will be left in situ and covered with soil to match the existing landscape. Access tracks will be left for use by the landowners. Wastes generated during the decommissioning phase will be taken off site and disposed of at an authorised waste facility. Any materials suitable for recycling will be disposed of in an appropriate manner.	
DECOMMISSIONING	Chapter 6 Biodiversity	Biodiversity	The impacts of decommissioning a wind farm are potentially similar to construction impacts, but it is anticipated that underground cables connecting the turbines to the selected substation will be cut back and left underground, thereby lessening the significance of impact. If the cables are left in situ, then no reinstatement works will be required, and the associated environmental impact of project decommissioning would be minimal.	Wind farm operator

TIME FRAME / SCHEDULE	Chapter/ Appendix		ENVIRONMENTAL MITIGATION / RECOMMENDATION	Person(s) Responsible
DECOMMISSIONING	Chapter 7 Ornithology	Ornithology	The assessment of effects undertaken identified no potentially significant effects on KOF during the decommissioning phase of the project and as such, targeted mitigation during this period, over and above the embedded mitigation outlined above, will not be required. Any habitat temporarily cleared during the decommissioning phase to accommodate the planned works will be reinstated on a like-for-like basis. Where infrastructure is removed, those areas will be restored to their pre-construction baseline conditions and returned for agricultural use. Following reinstatement, the site will be monitored on a regular basis to determine the progress of re-vegetation and, if necessary, to look at introducing supplementary planting with native species. A reassessment of the site will be carried out at the end of the first-year post-decommissioning to assess the site's progression over the previous year in relation to vegetation status, drainage management and general site appearance, to ensure the site remains favourable to ornithology and wider biodiversity.	Wind farm operator
DECOMMISSIONING	Chapter 8 Water	Water quality	The potential impacts on the water environment during the decommissioning stage will be similar to those during the construction phase, and as such the proposed mitigation for the Decommissioning Phase are similar to those outlined previously. Moreover, due to the relative long life of the wind farm infrastructure, it is likely that a revised/updated environmental assessment will be required at the time of decommissioning to account for any changes in baseline conditions at the proposed development site, and potential changes in assessment guidelines and legislation.	Wind farm operator
DECOMMISSIONING	Chapter 9 Land and Soils	Land and Soils	Where appropriate, mitigation measures used during decommissioning activities shall be comparable to those used during construction. By keeping some development components in place, when necessary, some of the effects will be avoided. In order to recover vegetation and lessen the effects of runoff and sedimentation, the bases will be rehabilitated and covered with local topsoil. Access tracks that are not needed for farming purposes will also be allowed to naturally revert to vegetation. The proposed development's materials and equipment will all be removed from the site and disposed of or repurposed in a way that is environmentally responsible. There will be mitigation measures put in place to prevent potential pollution from fuel leaks and soil compaction.	Wind farm operator
DECOMMISSIONING	Chapter 10 Air and Climate	Air and Climate	Impacts resulting from the decommissioning phase are expected to be similar in nature, but smaller in scale in comparison to the construction phase. Therefore, similar mitigation measures such as those related to dust and construction vehicles will be implemented.	Wind farm operator

TIME FRAME / SCHEDULE	Chapter/ Appendix	ENVIRONMENTAL MITIGATION / RECOMMENDATION		Person(s) Responsible
DECOMMISSIONING	Chapter 11 Noise	Noise	Activities and noise levels associated with the decommissioning phase are likely to be broadly similar to the construction phase. The mitigation measures that will be considered in relation to any decommissioning of the site are the same as those proposed for the construction phase of the development.	Wind farm operator
DECOMMISSIONING	Chapter 14 Material Assets	Grid Capacity and Electrical Infrastructure	During decommissioning, underground cables connecting the turbines to the onsite substation will be cut back and left underground. The cables will not be removed if an environmental assessment of the decommissioning operation demonstrates that this would do more harm than leaving them in situ. The assessment will be carried out closer to the time to take into account environmental changes over the development life	Wind Farm Operator
DECOMMISSIONING	Chapter 14 Material Assets	Aviation	Prior to the decommissioning work, the following will be provided to Limerick City and County Council for approval: • A plan outlining measures to ensure the safety of the public workforce and the use of best available techniques at the time; and • A comprehensive reinstatement proposal, including the implementation of a program that details the removal of all structures and landscaping. If the site is to be decommissioned, cranes of similar size to those used for construction will disassemble each turbine. The towers, blades and all components will then be removed.	Wind Farm Operator
DECOMMISSIONING	Chapter 14 Material Assets	Water and Waste Infrastructure	During decommissioning works, temporary compounds will be set up and used as a secure storage area for materials, waste materials and will contain temporary site accommodation units to provide welfare facilities and enclosed wastewater management system. Sanitary wastewater will be collected in portable toilets. Disposal of sanitary wastes will be managed through a contract with a licensed waste contractor.	Wind Farm Operator Appointed contractor
DECOMMISSIONING	Chapter 14 Material Assets	Waste Management	On decommissioning, the majority, about 85% of turbine components, including steel, copper wire, electronics and gearing, can be recycled or reused. The fibreglass blades, however, are difficult to recycle and currently are generally disposed of by landfill. There are existing options available to developers for blade reuse and recycling in the form of artificial reefs, playgrounds or street furniture, cement co-processing for the glass fibre component, and blade recycling through pyrolysis and gasification (Wind Europe, 2017).	Wind Farm Operator Appointed contractor