18. SCHEDULE OF MITIGATION & MONITORING PROPOSALS

All mitigation and monitoring measures relating to the pre-commencement, construction, operational and decommissioning phases of the Proposed Project are set out in the relevant chapters of this EIAR.

All mitigation which will be implemented during the various phases of the Proposed Project are presented in Table 18-1 below. The mitigation measures have been grouped together according to their EIAR Chapter and Proposed Project phase and are presented under the following headings:

- Pre-Commencement Phase
- Construction Phase
- Operational Phase
- Decommissioning Phase

The mitigation proposals in the below format provides an easy to audit list that can be reviewed and reported on during each phase of the Proposed Project. The proposals for site inspections and environmental audits are set out in the Construction and Environmental Management Plan (CEMP) which is included as Appendix 4-5 of this EIAR. The tabular format in which the below information is presented, can be further expanded upon during each Proposed Project phase to provide a reporting template for site compliance audits.

All monitoring measures which will be implemented during the pre-commencement, construction, operational and decommissioning phases of the Proposed Project are outlined in Table 18-2. All monitoring measures were set out in the relevant chapters of this EIAR. The monitoring proposals are presented in terms of the monitoring requirement, frequency of monitoring and the mechanism for reporting results where applicable. By presenting the monitoring proposals in the below format, it is intended to provide a monitoring schedule that can be reviewed and tracked during all phases of the Proposed Project to ensure all the required monitoring is completed as required.

It is intended that the CEMP will be updated where required prior to the commencement of construction to include all mitigation and monitoring measures, planning conditions and or alterations to the EIAR and application documents should they emerge during the course of the planning process and would be submitted to the Planning Authority for written approval prior to the commencement of development.

18.1 EIAR Mitigation Measures

Table 18-1 Schedule of Mitigation

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
Ch. 4: Description of the Proposed Project – Description of the Proposed Project					
Pre-Construction Phase					
MM1	Environmental Management	Ch. 4: Description of the Proposed Project	› All proposed activities on the site of the Proposed Project will be provided for in an environmental management plan. › The CEMP includes details sets out details of the environmental controls to be implemented on site, site drainage measures, peat stability monitoring measures and a waste management plan. The CEMP also outlines the Emergency Response Procedure to be adopted in the event of an emergency in terms of site health and safety and environmental protection. In the event planning permission is granted for the Proposed Project, the CEMP will be updated prior to the commencement of the development, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned and will be submitted to the Planning Authority for written approval		
MM2	Cement Based Deliveries	Ch. 4: Description of the Proposed Project Appendix 4-5: Surface Water Management Plan	› The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout of trucks and discussing emergency procedures; › Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place. Where possible pre-cast elements for culverts and concrete works will be used.		
MM3	Pre-Construction Drainage	Appendix 4-5: Surface Water Management Plan CEMP Section 3	› Prior to commencement of works in sub-catchments across the site, main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage. It is proposed to complete these inspections on a catchment-by-		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			catchment basis as the construction works develop across the site, as works in all areas will not commence simultaneously. › Drainage and associated pollution control measures will be implemented onsite before the main construction works commence. Where possible drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of impact on surface waters by suspended sediment released during construction and entrained in surface run-off › The routes of any natural drainage features will not be altered as part of the Proposed Project. Turbine locations have been selected to avoid natural watercourses. 9 no. new watercourse crossing and 2 no. upgrades to an existing crossing are proposed within the Proposed Wind Farm site. Culvert upgrades at forestry drain crossings are also proposed. › There will be no direct discharges to natural watercourses. All discharges from the proposed works areas or from interceptor drains will be made over vegetated ground at an appropriate distance from natural watercourse and lakes. Buffer zones around the existing natural drainage features have informed the layout of the Proposed Project and are indicated on the drainage design drawings. › Where artificial drains are currently in place in the vicinity of proposed works areas, these drains may have to be diverted around the proposed works areas to minimise the amount of water in the vicinity of works areas. Where it may not be possible to divert artificial drains around proposed work areas, the drains will be blocked to ensure sediment laden water from the works areas has no direct route to other watercourses. Where drains have to be blocked, the blocking will only take place after an alternative drainage system to handle the same water has been put in place. › Existing artificial drains in the vicinity of existing site roads will be maintained in their present location where possible. If it is expected that these artificial drains will receive drainage water from works areas, check dams will be added (as specified below) to control flows and sediment loads in these existing artificial drains. If road widening or improvement works are necessary along the existing roads, where possible, the works will take place on the opposite side of the road to the drain. › Along the Proposed Grid Connection cable route there are 23 no. watercourse crossings, which includes natural stream/rivers and drains. All 23 no. crossings are existing culverts and bridges where works are required to accommodate the underground Proposed Grid Connection cable. No in-stream works are proposed at any of the Proposed Grid Connection cable crossing locations.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM4	Watercourse Inspection	Ch. 4: Description of the Proposed Project CEMP Section 2	› Confirmatory inspections of the proposed new no. 9 watercourse crossing and 2 no. existing watercourse crossing upgrade locations will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing.		
MM5	Drainage Maintenance	Ch. 9: Water Appendix 4-5: Surface Water Management Plan	› Any excess build-up of silt levels at check dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed.		
MM6	Earthworks	Appendix 4-5: Surface Water Management Plan CEMP Section 3	› Drainage and associated pollution control measures will be implemented onsite before the main construction works commence. Where possible drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of impact on surface waters by suspended sediment released during construction and entrained in surface run-off.		
MM7	Forestry Felling Drainage Measures	Ch. 4: Description of the Proposed Project Ch. 9: Water CEMP Section 3	› Before the commencement of any felling works, an Environmental Clerk of Works (ECoW) will be appointed to oversee the felling and extraction works. The ECoW will have the following functions: › Attend the site for the setup period when drainage protection works are being installed and be present on site during the remainder of the forestry felling works. › Prior to the commencement of works, review and agree the positioning by the Operator of the required Aquatic Buffer Zones (ABZs), silt traps, silt fencing (see below), water crossings and onsite storage facilities for fuel, oil and chemicals (see further below). › Be responsible for preparing and delivering the Environmental Tool Box Talk (TBT) to all relevant parties involved in site operations, prior to the commencement of the works. › Conduct daily and weekly inspections of all water protection measures and visually assess their integrity and effectiveness. › Take representative photographs showing the progress of operation onsite, and the integrity and effectiveness of the water protection measures.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Collect water samples for analysis by a 3rd party accredited laboratory, adhering to the following requirements: › Surface water samples shall be collected upstream and downstream of the keyhole felling site at suitable sampling locations. › Sampling shall be taken from the stream / river bank, with no in-stream access permitted. › The following minimum analytical suite shall be used: pH, Electrical Conductivity, Total Suspended Solids, Biochemical Oxygen Demand, Total Phosphorus, Ortho-Phosphate, Total Nitrogen, and Ammonia. › Review of operator's records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions. › Prepare and maintain a contingency plan. › Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed. › Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the ECoW. › All relevant measures set out in the most recent versions of the Forestry & Water Quality Guidelines, Forest Harvesting & the Environment Guidelines and the Forest Protection Guidelines will apply. In particular, to protect watercourses, the following measures will be adhered to during all /tree felling activities. › Works will be overseen by an ECoW as described above. › The extent of all necessary tree felling will be identified and demarcated with markings on the ground in advance of any felling commencing. › All roads and culverts will be inspected prior to any machinery being brought on site to commence the felling operation. No tracking of vehicles through watercourses will occur. Vehicles will only use existing road infrastructure and established watercourse crossings. › Existing drains that drain an area to be felled towards surface watercourses will be blocked, and temporary silt traps will be constructed to ensure collection of all silt within felling areas. These temporary silt traps will be cleaned out and backfilled once felling works are complete. This ensures there is no residual collected silt remaining in blocked drains after felling works are completed. No direct discharge of such drains to watercourses will occur from within felling areas. › New collector drains and sediment traps will be installed during ground preparation to intercept water upgradient of felling areas and divert it away. Collector drains will be excavated at an acute angle to the contour (0.3%-3% gradient), to minimise flow velocities.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› All silt traps will be sited outside of buffer zones and have no direct outflow into the aquatic zone. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of away from all aquatic zones. › Where felling is required inside the buffers, silt fences will be installed around existing watercourses. Silt fences will be installed as single, double or a series of triple silt fences, depending on the space available and the anticipated sediment loading. › All new collector drains will taper out before entering the aquatic buffer zone to ensure the discharging water gently fans out over the buffer zone before entering the aquatic zone. › Machine combinations, such as mechanical harvesters or chainsaw felling, will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance; › Mechanised operations will be suspended during and immediately after heavy rainfall. › Where brash is required to form brash mats, it will be laid out at harvesting stage to prevent soil disturbance by machine movement. › Brash which has not been pushed into the soil will be moved within the site to facilitate the creation of mats in more demanding locations. › Felling of trees will be pointed directionally away from watercourses. › Felling will be planned to minimise the number of machine passes in any one area. › Extraction routes, and hence brash mats, will be aligned parallel to the ground contours where possible. › Harvested timber will be stacked in dry areas, and outside any 50-metre watercourse buffer zone. Straw bales and check dams will be emplaced on the down gradient side of timber storage sites. › Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but removing of natural debris deflectors will be avoided.		
MM8	Felling License	Ch. 4: Description of the Proposed Project CEMP Section 2	› The commercial forestry felling activities required as part of the Proposed Project will be the subject of a Felling Licence application to the Forest Service, in accordance with the Forestry Act 2014, the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments. The policy requires that a copy of the planning permission for the wind farm be submitted with the felling licence applications; therefore, the felling licenses cannot be applied for until such time as planning permission is obtained for the Proposed Project.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM9	Traffic Management	Ch. 4: Description of the Proposed Project Ch. 15: Material Assets CEMP Section 3	› In the event planning permission is granted for the Proposed Project, the Traffic Management Plan will address the requirements of any relevant planning conditions, including any additional mitigation measures, should they be conditioned. Traffic management measures included the following: › Identification of a delivery schedule › Details of the alterations required to the infrastructure and any other minor alteration identified; › A dry run of the route using vehicles with similar dimensions. › The deliveries of turbine components to the site will be made in convoys of five vehicles at a time, and at night when roads are quietest. › Convoys will be accompanied by escorts at the front and rear operating a "stop and go" system. Although the turbine delivery vehicles are large, they will not prevent other road users or emergency vehicles passing, should the need arise. › The delivery escort vehicles will ensure the turbine transport is carried out in a safe and efficient manner with minimal delay or inconvenience for other road users. › It is not anticipated that any section of the public road network will be closed during transport of turbines, although there will be some delays to local traffic at pinch points. During these periods it may be necessary to operate local diversions for through traffic. All deliveries comprising abnormally large loads where required will be made outside the normal peak traffic periods, at night, to avoid disruption to work and school-related traffic. › A full dry run of the transport operation along the proposed route will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. This dry run will inform the Traffic Management Plan submitted for agreement with Tipperary County Council and Cork County Council. › All turbine deliveries will be provided for in the Transport Management Plan which will be finalised in advance of the construction stage, when the exact transport arrangements are known, delivery dates confirmed and escort proposals in place. The finalised Transport Management Plan will be submitted to the Planning Authority for agreement in advance of any abnormal loads using the local roads, and will provide for all		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			necessary safety measures, including a convoy and Garda escort as required, off-peak turning/reversing movements and any necessary safety controls.		
MM10	Waste Management	Ch. 4: Description of the Proposed Project CEMP Section 3.2	› Prior to the commencement of the development a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the objectives of the plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient authority so that they can ensure everyone working on the development adheres to the management plan		
Construction Phase					
MM11	Refuelling	Ch. 4: Description of the Proposed Project Ch.9: Water CEMP Section 3 Appendix 4-5: Surface Water Management Plan	› Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. On-site refuelling of machinery will be carried out at designated refuelling areas at the temporary construction compounds. › Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the site as required on a scheduled and organised basis. › Only designated trained and competent operatives will be authorised to refuel plant on-site. › Mobile measures such as drip trays and fuel absorbent mats will used during refuelling operations as required. All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage. The following mitigation measures are proposed to avoid release of hydrocarbons at the site: › All plant will be inspected and certified to ensure that they are leak free and in good working order prior to use at the site. › Fuels stored on site will be minimised. › Onsite refuelling will be carried out by trained personnel only; › All refuelling will be carried out outside of the designated hydrological buffer zones; › Mobile measures such as dip trays and fuel absorbent mats will be used during refuelling operations as required; › All plant and machinery will be equipped with fuel absorbent material and pads to deal with any accidental spillage;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The electrical substation compound will be bunded appropriately to 110% of the volume of oils that will be stored, and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › Spill kits will be available to deal with any accidental spillage in and outside the re-fuelling area. › An emergency plan for the construction phase to deal with accidental spillages will be developed (refer to Section 6 of this CEMP); › All hazardous wastes will be stored in bunded containers/areas before being collected by an authorised waste contractor and brought to an EPA licensed waste facility; › Hazardous wastes will be kept separate from non-hazardous wastes so that contamination does not occur.		
MM12	Cement Based Products Deliveries and Management	Ch. 4: Description of the Proposed Project	› Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in sealed concrete delivery trucks. › The use of ready-mixed concrete deliveries will eliminate any potential environmental risks of on-site batching. › When concrete is delivered to site, only the chute of the delivery truck will be cleaned, using the smallest volume of water necessary, before leaving the site. › Chute cleaning water will be isolated in temporary lined wash-out pits located near the Proposed Wind Farm site entrance. These temporary lined wash-out pits will be removed from the Proposed Wind Farm site at the end of the construction phase. Concrete trucks will be washed out fully at the batching plant, where facilities are already in place. The risks of pollution arising from concrete deliveries will be further reduced by the following: › When concrete is delivered to site, only the chute of the delivery truck will be cleaned, using the smallest volume of water necessary, before leaving the site. › Concrete trucks will not be washed out on the site but will be directed back to their batching plant for washout. › Site roads will be constructed to a high standard to allow transport of the turbine components around the site, and hence, concrete delivery trucks will be able to access all areas where the concrete will be needed. No concrete will be transported around the site in open trailers or dumpers so as to avoid spillage while in transport. All concrete used in the		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			construction of turbine bases will be pumped directly into the shuttered formwork from the delivery truck. If this is not practical, the concrete will be pumped from the delivery truck into a hydraulic concrete pump or into the bucket of an excavator, which will transfer the concrete to the location where it is needed. › The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, confirming routes, prohibiting on-site washout and discussing emergency procedures. › Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted on the site.		
MM13	Concrete Pouring	Ch. 4: Description of the Proposed Project Appendix 4-5: Surface Water Management Plan	› Using weather forecasting to assist in planning large concrete pours and avoiding large pours where prolonged periods of heavy rain is forecast. › Restricting concrete pumps and machine buckets from slewing over watercourses while placing concrete. › Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets. › Ensuring that covers are available for freshly placed concrete to avoid the surface washing away in heavy rain. › The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or a Siltbuster-type concrete wash unit (https://www.siltbuster.co.uk/sb_prod/siltbuster-roadside-concrete-washout-rcw/) or equivalent › Disposing of surplus concrete after completion of a pour in suitable off-site locations away from any watercourse or sensitive habitats.		
MM14	Road Cleanliness	Ch. 4: Description of the Proposed Project CEMP Section 3	› It is not anticipated that vehicle or wheel washing will be required as part of the construction phase of the Proposed Project because site roads will be already formed using on-site materials before other road-going trucks begin to make regular or frequent deliveries to the site (e.g. with steel or concrete). A road sweeper will be available if any section of the public roads were to be dirtied by trucks associated with the Proposed Project.		
MM15	Existing Drainage Features	Ch. 4: Description of the Proposed Project	› There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses. The distance		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		Appendix 4-5: Surface Water Management Plan CEMP Section 3	will vary between 5-20m depending on local slope, the nature of local soil deposits and also the type of vegetation present. Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Project. › Minimum buffer zones of 50m around the existing natural drainage features have informed the layout of the Proposed Wind Farm. › Where artificial drains are currently in place in the vicinity of proposed works areas, these drains may have to be diverted around the proposed works areas to minimise the amount of water in the vicinity of works areas. › Where it may not be possible to divert artificial drains around proposed work areas, the drains will be blocked to ensure sediment laden water from the works areas has no direct route to other watercourses. › Where drains have to be blocked, the blocking will only take place after an alternative drainage system to handle the same water has been put in place. Existing artificial drains in the vicinity of existing site roads will be maintained in their present location where possible. › If it is expected that these artificial drains will receive drainage water from works areas, check dams will be added (as specified below) to control flows and sediment loads in these existing artificial drains. › If road widening or improvement works are necessary along the existing roads, where possible, the works will take place on the opposite side of the road to the drain.		
MM16	Surface Water Drainage Measures	Appendix 4-5: Surface Water Management Plan	<u>Interceptor Drains</u> › Interceptor drains will be installed upgradient of any works areas to collect surface flow runoff and prevent it reaching excavations and construction areas of the site where it might otherwise have come into contact with exposed surfaces and picked up silt and sediment. The drains will be used to divert upslope runoff around the works area to a location where it can be redistributed over the ground surface as sheet flow. This will minimise the volume of potentially silty runoff to be managed within the construction area. <u>Drainage Swales</u> › Drainage swales (or collector drains) are shallow drains that will be used to intercept and collect run off from construction areas of the site during the construction phase.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Drainage swales will remain in place to collect runoff from roads and hardstanding areas of the Proposed Project during the operational phase and channel it to infiltration area for sediment settling. › Drainage swales will be installed downgradient of any works areas to collect surface flow runoff where it might have come into contact with exposed surfaces and picked up silt and sediment. Swales will intercept the potentially silt-laden water from the excavations and construction areas of the site and prevent it reaching natural watercourses. › The velocity of flow in the interceptor drains and drainage swales, particularly on sloped sections of the channel, will be controlled by check dams, which will be installed at regular intervals along the drains to ensure flow in the swale is non-erosive. Check dams will also be installed in some existing artificial drainage channels that will receive waters from works areas of the Site. <u>Level Spreaders</u> › A level spreader will be constructed at the end of each interceptor drain to convert concentrated flows in the drain, into diffuse sheet flow on areas of vegetated ground. The levels spreaders will be located downgradient of any proposed works areas in locations where they will not contribute further to water ingress to construction areas of the site. › The water carried in interceptor drains will not have come in contact with works areas of the site and therefore should be free of silt and sediment. The level spreaders will distribute clean drainage water onto vegetated areas where the water will not be reconcentrated into a flow channel immediately below the point of discharge. The discharge point will be on level or only very gently sloping ground rather than on a steep slope so as to prevent erosion. › Clean four-inch stone can be placed on the outside of the spreader lip and pressed into the ground mechanically to further dissipate the flow leaving the level spreader over a larger area. <u>Vegetation Filters</u> › Vegetation filters are the existing vegetated areas of land that will be used to accept surface water runoff from upgradient areas. The selection of suitable areas to use as vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Vegetation filters will carry outflow from the level spreaders as overland sheet flow, removing any suspended solids and discharging to the groundwater system by diffuse infiltration. › Vegetation filters will not be used in isolation for waters that are likely to have higher silt loadings. In such cases, silt-bearing water will already have passed through stilling ponds prior to diffuse discharge to the vegetation filters via a level spreader. <u>Stilling and Settlement Ponds</u> › Stilling or settlement ponds will be used to attenuate runoff from works areas of the site of the Proposed Project during the construction phase and will remain in place to handle runoff from roads and hardstanding areas of the Proposed Project during the operational phase › The embankment that forms the sloped sides of the stilling ponds will be stabilised with vegetated turves, which will have been removed during the excavation of the stilling ponds area. › Stilling ponds will be located towards the end of swales, close to where the water will be reconverted to diffuse sheet flow. Upon exiting the stilling pond system, water will be immediately reconverted to diffuse flow via a fan-shaped rock apron if there is adequate space and ground conditions allow. <u>Siltbusters</u> › A “siltbuster” or similar equivalent piece of equipment will be available to filter any water pumped out of excavation areas, if necessary, prior to its discharge to stilling ponds or swales. <u>Dewatering Silt bags</u> › Dewatering silt bags are an additional drainage measure that can be used downgradient of the stilling ponds at the end of the drainage swale channels and will be located, wherever it is deemed appropriate, throughout the site. › The water will flow, via a pipe, from the stilling ponds into the silt bag. The silt bag will allow the water to flow through the geotextile fabric and will trap any of the finer silt and sediment		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			remaining in the water after it has gone through the previous drainage measures. The dewatering silt bags will ensure that there will be no loss of peaty silt into the stream. <u>Culverts</u> › All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse. › Some culverts will be installed to manage drainage waters from works areas of the Proposed Project, particularly where the waters have to be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the track or road sub-base. In some cases, two or more smaller diameter culverts may be used where this depth is limited, though this will be avoided as they will have a higher associated risk of blockage than a single, larger pipe. In all cases, culverts will be oversized to allow mammals to pass through the culvert. › Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling doesn't occur above or below the culvert and water can continue to flow as necessary. <u>Silt Fences</u> › Silt fences will be installed as an additional water protection measure around existing watercourses in certain locations, particularly where works are proposed within the 50-metre buffer zone of a natural watercourse, which is inevitable where existing roads in proximity to watercourses are to be upgraded as part of the Proposed Wind Farm. These areas include around existing culverts, around the headwaters of watercourses. › Silt fences will be installed as single, double or a series of triple silt fences, depending on the space available and the anticipated sediment loading. The silt fence designs follow the technical guidance document 'Control of Water Pollution from Linear Construction		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Projects' published by CIRIA (Ciria, No. C648, 1996). Up to three silt fences may be deployed in series. <u>Sediment Entrapment Mats</u> › Sediment entrapment mats, consisting of coir or jute matting, will be placed at the outlet of the silt bag to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure <u>Check Dams</u> › The velocity of flow in the interceptor drains and drainage swales, particularly on sloped sections of the channel, will be controlled by check dams, which will be installed at regular intervals along the drains to ensure flow in the swale is non-erosive. Check dams will also be installed in some existing artificial drainage channels that will receive waters from works areas of the Site. › Check dams will restrict flow velocity, minimise channel erosion and promote sedimentation behind the dam. The check dams will be installed as the interceptor drains are being excavated. › Check dams will be used along sections of access road drains to attenuate flows and intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock. › Check dams will be used along sections of access road drains to intercept silts at source › Check dams will not be used in any natural watercourses, only artificial drainage channels and interceptor drains. The check dams will be left in place at the end of the construction phase to limit erosive linear flow in the drainage swales during extreme rainfall events.		
MM17	Wastewater Management	Ch. 4: Description of the Proposed Project	› Temporary port-a-loo toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. The nearest licenced primary wastewater treatment plant is located in Kilmihil, approximately 5.6km South of the Proposed Project.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› There will also be a water supply onsite for hygiene purposes, by way of a temporary storage tank. The construction compound will also include a bunded refuelling and containment area for the storage of oil, lubricants and site generators etc, and full retention oil interceptor.		
MM18	Clear-Span Watercourse Crossing	Ch. 4: Description of the Proposed Project Ch. 9: Water CEMP Section 2	It is proposed to construct a new clear-span watercourse crossing at one location within the Site and upgrade one existing crossing. The clear-span watercourse crossing methodology presented below will ensure that no instream works are necessary. The standard construction methodology for the installation of a clear-span watercourse crossing is as follows: › The access road on the approach either side of the watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of each watercourse crossing. › All drainage measures along the proposed road will be installed in advance of the works. › A foundation base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry concrete lean mix. The base will be excavated along the stream bank with no instream works required. › Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge across the watercourse to provide temporary access for the excavator. Plant and equipment will not be permitted to track across the watercourse. › Once the foundation base has been completed, the pre-cast concrete box culvert will be installed using a crane which will be set up on the bank of the watercourse and will be lifted into place from the bank with no contact with the watercourse. › Where the box culvert is installed in sections, the joints will be sealed to prevent granular material entering the watercourse, › Once the crossing is in position stone backfill will be placed and compacted against the structure up to the required level above the foundations. › Underground cabling ducting will be contained within the road make-up of the proposed crossing. The watercourse crossings will be constructed to the specifications of the OPW bridge design guidelines 'Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945', and in consultation		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			with Inland Fisheries Ireland. Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material. Confirmatory inspections of the proposed new watercourse crossing locations will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing.		
MM19	Proposed Grid Connection – existing underground services, marker posts, joint bays and major watercourse crossings	Ch. 4: Description of the Proposed Project	<u>Existing Underground Services</u> › Any underground services encountered along the grid cable routes will be surveyed for level and the ducting will pass over the service provided adequate cover is available. › A minimum clearance of 300 mm will be required between the bottom of the ducts and the service in question. If the clearance cannot be achieved the ducting will pass under the service and again 300 mm clearance between the top of the communications duct and bottom of the service will be achieved. › In deeper excavations an additional layer of marker tape will be installed between the communications duct and top level yellow marker tape. If the required separation distances cannot be achieved then a number of alternative options are available such as using steel plates laid across the width of the trench and using 35N concrete surrounding the ESB ducts where adjacent services are within 600mm, with marker tape on the side of the trench. Back fill around any utility services will be with dead sand/pea shingle. <u>Marker Posts</u> › In deeper excavations an additional layer of marker tape will be installed between the communications duct and top level yellow marker tape. If the required separation › Surface cable markers will be placed along the route where cable depth is unavoidably shallow, due to constraints such as existing services, to indicate the precise location of the UGC. These markers will be metallic plates in accordance with ESBN and EirGrid standards. › Marker posts will be used on non-roadway routes to delineate the cable route and joint bay positions. Corrosion proof aluminium triangular danger sign, with 700mm base, and with centred lightning symbol, on engineering grade fluorescent yellow background shall be installed in adequately sized concrete foundations. Marker post shall also be placed in the		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			event that burial depth is not to standard. Siting of marker posts to be dictated by ESBN as part of the detailed design process. <u>Joint Bays</u> › Joints Bays are to be installed approximately every 650m - 850m along the UGC route to facilitate the jointing of 2 No. lengths of 110kV UGC. Joint Bays are 6m x 2.5m x 2.05m pre-cast concrete structures installed below finished ground level. Joint Bays will be located in the non-wheel bearing strip of roadways, however given the narrow profile of local roads this may not always be possible. Please refer to Appendices 4-2 and 4-4 for further details on joint bay construction and cable installation. › Where possible, joint bays will be located in areas where there is a natural widening/wide grass margin on the road in order to accommodate easier construction, cable installation and create less traffic congestion. During construction the joint bay locations will be completely fenced off, and once they have been constructed, they will be backfilled until cables are being installed. › In association with joint bays, Communication Chambers will be installed at every joint slab location to facilitate communication links. Earth Sheath Link Chambers are also be installed at every joint bay along the cable route. Earth Sheath Links are used for earthing and bonding cable sheaths of underground power cables, so that the circulating currents and induced voltages are eliminated or reduced. Earth Sheath Link Chambers and Communication Chambers are located in close proximity to joint bays. Earth Sheath Link Chambers and Communication Chambers will be pre-cast concrete structures with an access cover at finished surface level. <u>Major Watercourse Crossings</u> The cable route will involve 23-no. crossings, of which 5 no. will be horizontal directional drilling (HDD) crossings and will not interact with an existing bridge structure. As there is insufficient cover and depth in the bridge to cross with the bridge deck at these 5 locations, HDD will be required. Drawings of the bridge crossings and further details on culvert crossing methodology are included in Appendix 4-1 of this EIAR. The underground cable will encounter 18 no. water culverts along the route. Existing culverts will be crossed using open trenching with either an undercrossing or overcrossing. A confirmatory		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			site survey of all culverts has been completed as part of this phase of the project prior to planning to confirm the crossing methods. › Inland Fisheries Ireland have published guidelines relating to construction works along water bodies entitled "Requirements for the Protection of Fisheries Habitats during Construction and Development Works at River Sites (Eastern Regional Fisheries Board, 2004)", and these guidelines will be adhered to during the construction of the Proposed Project.		
MM20	Turbine Bases, Hardstanding and Infrastructure Foundations	Ch. 4: Description of the Proposed Project CEMP Section 2	› An embankment approximately 600 mm high will be constructed around the perimeter of each turbine foundation base and a fence will be erected to prevent construction traffic from driving into the excavated hole and to demarcate the working area. All necessary health and safety signage will be erected to warn of deep excavations etc. Access to and from excavated bases will be formed by excavating a pedestrian walkway to 1:12 grade. › There will be a minimum of 100 mm of binding concrete laid on the formation material positioned using concrete skip and 360o excavator to protect ground formation and to give a safe working platform.		
MM21	Temporary Construction Compound	Ch. 4: Description of the Proposed Project CEMP Section 2	The construction compounds will consist of temporary site offices, staff facilities and car-parking areas for staff and visitors. Construction materials and turbine components will be brought directly to the proposed turbine locations following their delivery to the site. The 3 no. temporary construction compounds will be constructed as follows: › The area to be used for each compound will be marked out at the corners using ranging rods or timber posts. Drainage runs and associated settlement ponds will be installed around the perimeter; › The compound platform will be established using a similar technique as the construction of the substation platform; › A layer of geo-grid will be installed where deemed necessary by the designer and compacted layers of well graded granular material will be spread and lightly compacted to provide a hard area for Site offices and storage containers;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› A limited amount of fuel will have to be stored on the Proposed Project site and for the Proposed Grid Connection in appropriately bunded containers and a bunded area for oil storage will be constructed within the compound. › Areas within the compound will be constructed as site roads and used as vehicle hardstanding during deliveries and for parking; › A bunded containment area will be provided within the compound for the storage of lubricants, oils and site generators etc; › A waste storage area will be provided within the compounds; › The compounds will be fenced and secured with locked gates if necessary; and, › Upon completion of the Proposed Project the temporary construction compounds will be decommissioned, granular material will be removed and the area will be allowed to vegetate naturally.		
Operational Phase					
MM22	Wastewater Management	Ch. 4: Description of the Proposed Project	› The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. › The wastewater storage tank alarm will be part of a continuous stream of data from the site's turbines, wind measurement devices and electrical substation that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007(as amended), will be employed to transport wastewater away from the site.		
MM23	Electrical Substation and BESS	Ch. 4: Description of the Proposed Project CEMP Section 2	› The area of the on-site substation will be marked out using ranging rods or wooden posts and the soil and overburden stripped and will be either temporarily stockpiled locally at the substation location, or transported immediately on excavation to one of the designated spoil management areas; › Perimeter fencing will be erected › The construction and components of the substation have been designed to EirGrid specifications. › The electrical substation and BESS compound will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;		
Decommissioning Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM24	Decommissioning	Ch. 4: Description of the Proposed Project Appendix 4-6: Decommissioning Plan	› Prior to the end of the operational period the Decommissioning Plan will be updated in line with decommissioning methodologies that exist at the time and will agree with the competent authority at that time.		
MM25	Decommissioning	Ch. 4: Description of the Proposed Project Appendix 4-6: Decommissioning Plan	› The wind turbines proposed as part of the Proposed Project are expected to have a lifespan of 35 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Project will be decommissioned fully. The onsite 110kV electrical substation and 110kV electrical cabling will remain in place as it will be under the ownership of the ESB and will form a permanent part of the national electricity grid. › Upon decommissioning of the Proposed Project, the wind turbines will be disassembled in reverse order to how they were erected. All above ground turbine components will be separated and removed off-site for recycling. › Turbine hardstands and foundations will remain in place underground and will be left to revegetate naturally. Leaving the turbine hardstands and foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant environment nuisances such as noise, dust and/or vibration. › Site roadways will be left in situ, as appropriate to facilitate on-going forestry operations. Underground cables, including grid connection, will be removed and the ducting left in place. › A decommissioning plan will be agreed with the local authorities three months prior to decommissioning the Proposed Project.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM26	Surface Water Drainage Measures	Appendix 4-5: Surface Water Management Plan	Interceptor Drains › On completion of the construction phase works, it is envisaged that the majority of the interceptor drains could be removed. At that stage, there will be no open excavations or large areas of exposed ground that are likely to give rise to large volumes of potentially silt-laden run off. › Any areas in which works were carried out to construct roads, turbine bases or hardstands, will have been built up with large grade hardcore, which even when compacted in place, will retain sufficient void space to allow water to infiltrate the subsurface of these constructed areas. › It is not anticipated that roadways or other installed site infrastructure will intercept ground-conveyed surface water runoff to any significant extent that would result in scouring or over-topping or spill over. › Where the drains are to be removed, they will be backfilled with the material from the diversion dike. Interceptor drains will be retained in certain locations, for example where roadways are to be installed on slopes, to prevent the roadways acting of conduits for water that might infiltrate the roadway sub-base. In these cases, interceptor drains will be maintained in localised areas along the roadway with culverts under the roadway, which will allow the intercepted water to be discharged to vegetation filters downgradient of the roadway. › Similarly, in localised hollows where water is likely to be funnelled at greater concentrations than on broader slopes, interceptor drains, and culverts may be left in situ following construction.		
Ch. 5: Population and Human Health: Population and Human Health					
Pre-construction Phase					
MM27	Human Health	Ch. 5: Population and Human Health	At the outset of the Proposed Project, during the constraints mapping process detailed in Ch. 3: Site Selection & Reasonable Alternatives of this EIAR, all sensitive receptors within c. 1.63km of the area suitable for siting wind turbines within the EIAR Site Boundary were identified and mapped.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› This included all occupied and unoccupied dwellings, businesses, stud farms and schools. In addition, a planning history search to identify properties that may have been granted planning permission, but not yet been constructed, was carried out. Any property with a valid planning permission for a dwelling house was also added to the sensitive receptors' dataset. All inhabitable dwellings (existing, proposed and permitted) and other sensitive receptors (inclusive of schools, businesses and stud farms) within 1.63km of the proposed turbines have been considered as part of the following shadow flicker assessment. There are 104 no. sensitive receptors located within 1.63km of proposed turbine locations.		
MM28	Property Values	Ch. 5: Population and Human Health	The Proposed Wind Farm has been designed in accordance with the parameters set out in the Guidelines and with cognisance of the draft Guidelines, adhering to the required setback distances from sensitive receptors set out in those documents.		
MM29	Traffic and Transport	Ch. 5: Population and Human Health Ch. 15 Material Assets	› A pre-condition survey of roads associated with the Proposed Project will be carried out prior to construction commencement to record the condition of the road. A post construction survey will be carried out after works are completed. Where required the timing of these surveys will be agreed with the local authority. › A competent Traffic Management Coordinator will be appointed for the duration of the construction of the Proposed Project and this person will be the main point of contact for all matters relating to traffic management. › Locals in the area will be informed of any upcoming traffic related matters e.g. delivery of turbine components at night, via letter drops and posters in public places. Information will include the contact details of the Contract Project Coordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number will also be provided. › Liaison with the relevant local authorities including the roads sections of local authorities that the delivery routes traverse, and An Garda Siochana, during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required.		
Construction Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM30	Human Health	Ch. 5: Population and Human Health CEMP Section 5	The Proposed Project will be constructed, operated and decommissioned in accordance with all relevant Health and Safety Legislation, including: › Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005); › Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2016 (S.I. No. 36 of 2016); › S.I. No. 291/2013 - Safety, Health and Welfare at Work (Construction) Regulations 2013 and › Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006). The following measures will be taken: › A Health and Safety Plan covering all aspects of the construction process will address the Health and Safety requirements in detail. This will be prepared on a preliminary basis at the procurement stage and developed further at construction stage. › All hazards will be identified, and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project. Safepass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting Site access during construction. Fencing will be erected in areas of the Site where uncontrolled access is not permitted. › The suitability of machinery and equipment for use near power lines will be risk assessed. › All staff will be trained on operating voltages of overhead electricity lines running the Site. All staff will be trained to be aware of the risks associated with underground cables. All contractors that may visit the Site are made aware of the location of lines before they come on to Site.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› When activities must be carried out beneath overhead lines, e.g., component delivery or substation construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. › Information on safe clearances will be provided to all staff and visitors. › Signage indicating locations and health and safety measures regarding electrical cables will be erected in canteens and on Site. › All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the Site Health and Safety Plan. › The suitability of machinery and equipment for use near power lines will be risk assessed. › All staff will be trained on operating voltages of electricity cables running the Site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the Site are made aware of the location of lines before they come on to Site. › When activities must be carried out beneath overhead lines, e.g., component delivery or substation construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. › Information on safe clearances will be provided to all staff and visitors. › Signage indicating locations and health and safety measures regarding electrical cables will be erected in canteens and on Site. › All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the Site Health and Safety Plan. › The suitability of machinery and equipment for use near power lines will be risk assessed. › All staff will be trained on operating voltages of electricity cables running the Site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the Site are made aware of the location of lines before they come on to Site. › When activities must be carried out beneath overhead lines, e.g., component delivery, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. › Overhead line proximity detection equipment will be fitted to machinery when such works are required. The scale and scope of the project requires that a Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) are required to be appointed in accordance with the provisions of the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013*'. The PSDP appointed for the construction stage shall be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to): › When activities must be carried out beneath overhead lines, e.g., component delivery, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. › Overhead line proximity detection equipment will be fitted to machinery when such works are required. › Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project; › Where possible, eliminate the hazards or reduce the risks; › Communicate necessary control measures, design assumptions or remaining risks to the PSCS so they can be dealt with in the Safety and Health Plan; › Ensure that the work of designers is coordinated to ensure safety; › Organise co-operation between designers; › Prepare a written Safety and Health Plan; › Prepare a safety file for the completed structure and give it to the client; and › Notify the Authority and the client of non-compliance with any written directions issued.		
Operational Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM31	Human Health	Ch. 5: Population and Human Health Appendix 4-4	› Prepare a safety file for the completed structure and give it to the client; and › Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits. The doors will only be unlocked as required for entry by authorised personnel and will be locked again following their exit. › Staff associated with the project will conduct frequent visits, which will include inspections to establish whether any signs have been defaced, removed, faded, or are becoming hidden by vegetation or foliage, with prompt action taken as necessary. › Signs will also be erected at suitable locations across the Site as required for the ease and safety of operation of the wind farm. These signs include: › Buried cable route markers at 50m (maximum) intervals and change of cable route direction; › Directions to relevant turbines at junctions; › "No access to Unauthorised Personnel" at appropriate locations; › Speed limits signs at Site entrance and junctions › "Warning these Premises are alarmed" at appropriate locations; › "Danger HV" at appropriate locations; › "Warning – Keep clear of structures during electrical storms, high winds or ice conditions" at Site entrance; › "No unauthorised vehicles beyond this point" at specific Site entrances; and › Other operational signage required as per Site-specific hazards. › The proposed substation, which will be operated by Eirgrid/ESBN will be locked and fenced off from public access. The substation will be operational remotely and manually 24 hours per day, 7 days a week. Supervisory operational and monitoring activities will be carried out remotely using a SCADA system, with the aid of computers connected via a telephone modem link. › Periodic service and maintenance work which include some vehicle movement. › For operational and inspection purposes, substation access is required. › Servicing of the substation equipment will be carried out in accordance with the manufacturer's specifications, which would be expected to entail the following: ○ Six-month service – three-week visit ○ Annual service – six-week visit ○ Weekly and daily visits as required.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› An operational phase Health and Safety Plan will be developed to fully address identified Health and Safety issues associated with the operation of the Site. Access for emergency services will be available at all times. › A Fire Risk Management and Emergency Response Plan has been developed in relation to the effects on the environment and health and safety of the proposed Battery Energy Storage System following a fire emergency. The report outlines the mitigation design, procedures and actions to protect lives and safety of site and emergency services personnel, the protection of the environment, minimisation of damage and disruption and the return to normal operations. The report states the design factors which contribute to reducing the escalation in the severity of a potential incident, facilities for the emergency services and the safeguarding of the environment through fire water retention.		
MM32	Shadow Flicker	Ch. 5: Population and Human Health	<u>Screening Measures</u> In the event of an occurrence of shadow flicker exceeding guideline threshold values of 30 minutes per day at residential receptor locations, mitigation options will be discussed with the affected homeowner, including: › Installation of appropriate window blinds in the affected rooms of the residence; › Planting of screening vegetation; › Other site-specific measures which might be agreeable to the affected party and may lead to the desired mitigation. If agreement can be reached with the homeowner, then it would be arranged for the required mitigation to be implemented in cooperation with the affected party as soon as practically possible and for the full costs to be borne by the wind farm operator. <u>Wind Turbine Control Measures</u> The draft Guidelines limit of zero shadow flicker occurrences at any sensitive receptors will be adhered to and shadow flicker control units will be fitted with shadow flicker control units to allow the turbines to be controlled to prevent the occurrence of shadow flicker at properties surrounding the wind farm. The shadow flicker control units will be added to any required turbines. All predicted incidents of shadow flicker will be pre-programmed into the wind farm's		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			control software. The wind farm's SCADA control system can be programmed to shut down any particular turbine at any particular time on any given day to avoid any shadow flicker occurrences at properties which are not naturally screened nor can be screened in any other manner. In order to ensure that the model and SCADA system is accurate and working well a site visit will be carried out to verify the system. The shadow flicker prediction data will be used to select dates on which a shadow flicker event could be observed at one or multiple affected properties and the following process will be adhered to. *1. Recording the weather conditions at the time of the site visit, including wind speeds and direction (i.e. blue sky, intermittent clouds, overcast, moderate breeze, light breeze, still etc.).* *2. Recording the house number, time and duration of site visit and the observation point GPS coordinates.* *3. Recording the nature of the sensitive receptor, its orientation, windows, landscaping in the vicinity, any elements of the built environment in the vicinity, vegetation.* *4. In the event of shadow flicker being noted as occurring the details of the duration (times) of the occurrence will be recorded.* *5. The data will then be sent to the wind farm operational team to confirm that the model and SCADA system are working.* *6. Following 12 months of full operation of the Proposed Project a report can be prepared for the Local Authority describing the shadow flicker mitigation measures used at the wind farm and confirming the implementation and successful operation of the system.*		
Ch. 6: Biodiversity					
Pre-construction					
MM33	Invasive Species Management	Ch. 6: Biodiversity Appendix 6-5	During field surveys, a search for Invasive Alien Species (IAS) listed under the 'Third Schedule' of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011) and the 'First Schedule' of the European Union (Invasive Alien Species) Regulations 2024 (S.I. 374 of 2024) was conducted.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Four species were identified either within or directly adjacent to the Site during the multidisciplinary walkover surveys and dedicated aquatic surveys carried out by MKO throughout 2024 and 2025. Those species were: › Giant Hogweed (Heracleum mantegazzianum) › Japanese Knotweed (Reynoutria japonica) › Giant Knotweed (Reynoutria sachalinensis) › Rhododendron (Rhododendron ponticum) **Proposed Wind Farm site** Japanese Knotweed and Giant Knotweed During field surveys undertaken, Japanese Knotweed and Giant Knotweed were recorded at three locations and one location respectfully, within the Proposed Wind Farm site. Prior to the commencement of any works, the following steps will be undertaken: › A pre-commencement survey for Japanese Knotweed and Giant Knotweed will be undertaken by a suitably qualified ecologist to determine the locations and extent of the species within the Proposed Project site and record any changes in the extent of the infestation since the 2024 and 2025 surveys. It will also serve to identify if this species has established elsewhere within the Site. › The locations and extent of Japanese Knotweed and Giant Knotweed within the Proposed Wind Farm site, and along the Proposed Grid Connection underground cabling route and TDR, should it establish, will be clearly marked out using hazard tape to ensure they are not disturbed. An exclusion zone surrounding each stand will also be identified and an appointed ecological clerk of works (ECoW) will inform the extent of the area to be treated as potentially contaminated. The exclusion zone will extend to 7m around the identified stands. › The ECoW will be appointed to supervise all works carried out within the exclusion zones, when required.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› All site and turbine transport staff will receive a toolbox talk from the ECoW regarding the identification and protocols surrounding Japanese Knotweed and Giant Knotweed within the Proposed Wind Farm site. To accommodate the Proposed Project, the requirement for the removal of vegetation will arise. As stands of Japanese Knotweed and Giant Knotweed are located in proximity to the Proposed Wind Farm infrastructure, the following will be undertaken to ensure these accommodation works do not exacerbate the spread of these species into the wider environment: › All vegetation clearance in proximity to recorded stands of Japanese Knotweed and /or Giant Knotweed will be undertaken under the supervision of the appointed ECoW. No vegetation cleared from within the 7m exclusion zone will be removed from the infested area. › All personnel and machinery which enter the exclusion zones must be thoroughly washed down, as per the following: • All plant, machinery, tools and personnel will be cleaned down prior to leaving the contaminated areas. • Clean down will be undertaken on an impermeable membrane such as a radon barrier and following completion of the clean down operation, this will be brushed clean with sweepings left within the contaminated area to ensure that there is no potential to spread any contaminated material. • Power washing will be avoided to prevent potentially contaminated run-off spreading outside the site. • No plant, machinery, tools, or personnel will leave the exclusion zone, until authorised by the ECoW. All washed down material will remain within the 7m exclusion zone. **Proposed Grid Connection** Giant Hogweed		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Giant Hogweed was recorded at three locations along the Proposed Grid Connection underground cabling route. Prior to the commencement of any works, the following site setup procedures will be carried out: › Additional pre-commencement surveys will be undertaken by a suitably qualified ecologist to determine the location and extent of the species and record any changes in the extent and/or location of this species which may have occurred since the 2024 and 2025 surveys. › The locations and extent of Giant Hogweed along the Proposed Grid Connection underground cabling route will be clearly marked out using temporary fencing/markers to ensure they are not disturbed. An exclusion zone surrounding each stand will also be identified and will inform the extent of the area to be treated as potentially contaminated. The exclusion zone will extend to 4m around the identified stands (TII, 2020). › An ecological clerk of works (ECoW) will be appointed to supervise all works carried out within the exclusion zones. › All staff will receive a toolbox talk from the ECoW regarding the identification and protocols surrounding Giant Hogweed along the Proposed Grid Connection underground cabling route. › Given that short sections of the Proposed Grid Connection underground cabling route will be lain within the above 4m exclusion zones, the measures below will be in place to ensure there is no spread of this species. › The treatment and control of invasive alien species will follow guidelines issued by Transport Infrastructure Ireland (TII) - The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020). Rhododendron Rhododendron was recorded at one location along the Proposed Grid Connection underground cabling route and one location along the proposed Turbine Delivery Route. Prior to the commencement of any works, the following site setup procedures will be carried out:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Additional pre-commencement surveys will be undertaken by a suitably qualified ecologist to determine the location and extent of this species and record any changes in the extent of the infestation since the 2024 and 2025 surveys. › The locations and extent of Rhododendron along the Proposed Grid Connection underground cabling route will be clearly marked out using temporary fencing/markers to ensure they are not disturbed. An exclusion zone surrounding each stand will also be identified and will inform the extent of the area to be treated as potentially contaminated. The exclusion zone will extend to 10m around the identified stands (Higgins, 2008). › An ecological clerk of works (ECoW) will be appointed to supervise all works carried out within the exclusion zones. › All staff will receive a toolbox talk from the ECoW regarding the identification and protocols surrounding Rhododendron along the Proposed Grid Connection underground cabling route. › Given that short sections of the Proposed Grid Connection underground cabling route will be lain within the above 10m exclusion zones, the measures below will be in place to ensure there is no spread of this species. › The treatment and control of invasive alien species will follow guidelines issued by the Transport Infrastructure Ireland (TII) - The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020). Excavation within Contaminated Areas and Retention on-site › The Proposed Grid Connection underground cabling route will be laid a 4m from the identified stands where possible to minimise the likelihood of encountering roots. › Once machinery and personnel enter the contaminated area, they will not leave until they have been cleaned down following the procedure that is set out below. › Excavated material will be kept within the contaminated area and will either be backfilled into the trench following the pipelaying operation or will remain within the contaminated zone adjacent to the trench and be graded and reseeded. No excavated material will leave the contaminated zone.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Following works, all personnel, equipment and machinery will be cleaned down as per the methodology below, prior to exiting the contaminated area. Clean Down Procedure › All plant, machinery, tools and personnel will be cleaned down prior to leaving the contaminated areas. › Clean down will be undertaken on an impermeable membrane such as a radon barrier and following completion of the clean down operation, this will be brushed clean with sweepings left within the contaminated area to ensure that there is no potential to spread any contaminated material. Power washing will be avoided to prevent potentially contaminated run-off spreading outside the contaminated zone.		
MM34	Otter	Ch. 6: Biodiversity	**Habitat Loss** Due to the time that can elapse between the original surveys, any future planning consent and construction, a pre-construction survey for otter will be carried out no more than 10 to 12 months prior to construction, as per NRA (2008) guidance, to identify the presence of any new breeding sites. The pre-construction survey will aim to ensure that adequate mitigation, as provided below under 'Disturbance, Mortality' is provided at each watercourse crossing (or other habitat of value to otters) affected by the Proposed Project. **Disturbance/Mortality** No significant effects are anticipated. However, taking a precautionary approach, and due to the time that can elapse between the original surveys, any future planning consent and construction, a pre-construction otter survey will be carried out by a qualified ecologist to identify the presence of any breeding sites within the Site, that may have been established in the intervening period. The requirement for a pre-construction survey does not represent a lacuna in the survey assessment but is fully in line with industry best practice.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Any holts identified within 50m of proposed infrastructure will subsequently be monitored for a minimum period of 2 weeks using remote cameras in order to ascertain use by otter and levels of activity. If an active otter holt is identified and works can be undertaken safely then an exclusion zone will be set up around the hold as follows: › Exclusion zone fencing and appropriate signage will be put in place between working areas and otter holt exclusion zones to ensure that there will be no encroachment of the breeding site exclusion zones by construction activities. If a newly established and active holt was identified within an area where works could not avoid direct impacts on the holt, the holt would likely need to be excluded, with the provision of a derogation licence from NPWS, prior to works commencing. This would involve the erection of one-way fencing, only allowing egress from the holt and will be undertaken in line with current guidelines by an appropriately qualified ecologist in advance of construction works commencing. › Currently based on the finding of the surveys and current information regarding the Site, no derogation licence is required for this application, as no breeding sites have been recorded in close proximity to the Proposed Project. However, should the pre-commencement surveys identify a new breeding site and exclusion is required, a derogation licence must be in place from the NPWS.		
MM35	Badger	Ch. 6: Biodiversity	**Disturbance/Mortality** Prior to the commencement of any construction works associated with the Proposed Wind Farm, Proposed Grid Connection Route and Turbine Delivery Route, the following measures will be undertaken for the avoidance of disturbance and/or direct mortality to badger and to ensure no additional setts have been established since the original surveys undertaken. The following measures are in line with *Guidelines For The Treatment Of Badgers Prior To The Construction Of National Road Schemes* (TII 2009).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• From a precautionary basis, a pre-commencement badger survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works to determine whether the identified sett is still in use and to ensure that no additional setts in close proximity to proposed infrastructure have been established. In the event that a badger sett is identified within or immediately adjacent to the Proposed Project footprint, mitigations as per the above referenced TII document will be implemented for the new sett. In relation to the identified setts in close proximity to Proposed Wind Farm road infrastructure, an exclusion of the existing setts will be carried out to ensure no badgers are present within the setts during construction works. The exclusion will be carried out in line with TII guidelines as follows: • Local NPWS staff will be informed in advance of the exclusion works. • The exclusion will not take place during badger breeding season (December to June inclusive) • One way exclusion gates will be installed on each sett entrance. • The one-way gates will be left in place for a period of 21 days and works will proceed immediately after once exclusion of badgers has been confirmed by an Ecologist. • An Ecologist will monitor the gates every 3 to 5 days during the 21-day period to ensure badgers do not succeed in re-entering the sett. • If badgers succeed in re-entering during the 21-day period, the exclusion process and 21-day period must start again. All of the above works will be undertaken or supervised by an appropriately qualified ecologist.		
MM36	Marsh Fritillary	Ch. 6: Biodiversity	**Direct Effects/Mortality** Construction works will occur within approximately 50m of identified marsh fritillary populations west of Turbine 3 and the associated proposed road infrastructure. The following mitigations will be applied at these construction locations:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› A pre-commencement survey for marsh fritillary larvae will be undertaken at the suitable time of year in advance of construction throughout footprint areas of the Proposed Wind Farm. › If active larval webs are recorded within the Proposed Project footprint, these webs will be translocated by a suitably qualified ecologist to adjacent suitable existing foraging habitat outside of the Proposed Project footprint. This will be achieved by translocating a sod of earth with entire, intact devils' bit scabious plants upon which the larvae are feeding. › Larval webs and associated food plants would only be translocated by the ECoW to existing breeding areas. › Existing breeding areas will be fully fenced off with a minimum exclusion zone distance of 5 metres near Turbine 3. › ECoW supervision will be required for construction of components near existing breeding areas (Turbine 3 and the associated proposed access road infrastructure). › Where suitable marsh fritillary habitat occurs in close proximity to Proposed Wind Farm infrastructure, side casting of material will be to the opposite side of the proposed infrastructure to where the suitable habitat occurs.		
MM37	Red Squirrel/ Pine Marten	Ch. 6: Biodiversity	**Disturbance/Mortality** Due to time that can elapse between the original surveys, any future planning consent and construction, a pre-construction survey for pine marten/red squirrel will be carried out to identify the presence of any new breeding sites. These surveys will focus on areas of conifer plantation to be felled and all suitable habitat within 50m of the felling blocks. Any potential breeding sites should be monitored to ascertain if they are active breeding sites. Surveys will be undertaken in line with Nature Scotand NRA guidelines. Should active dreys/dens be identified within the blocks to be felled, the following mitigations and best practice procedures will be followed to ensure that no breeding site for either red squirrel or pine marten are impacted:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Felling works within 50m of any drey or den to be undertaken in October–January inclusive, this will avoid the main breeding season (February-September) when vulnerable young are most likely to be found within breeding sites for both species. › Any breeding sites within forestry identified within the 50m buffer that wouldn't be directly affected by felling works but may be affected by disturbance related impacts should be clearly marked out with an exclusion zone and works/access through these areas avoided as much as possible. › Plant machinery will be turned off when not in use. › Operating machinery will be restricted to the Proposed Wind Farm works site area (and outside any exclusion zone)		
MM38	Bats	Ch. 6: Biodiversity	**Loss of, or Damage to, Roosts** On a precautionary basis, a pre-commencement inspection of the trees proposed for trimming along the TDR will be undertaken prior to works to reassess their baseline condition and ensure no significant potential roosting features have developed over time. This measure is in line with best practice guidance to assess any changes in baseline given the likely lapse in time from when the surveys were undertaken and when the construction phase will take place.		
Construction Phase					
MM39	Surface Watercourses and Sensitive Aquatic Faunal Species	Ch. 4: Description of the Proposed Project Ch. 6: Biodiversity Ch.9 Hydrology & Hydrogeology	Mitigation measures addressing surface watercourses and sensitive aquatic faunal species are dealt with in Section MM13.		
MM40	Bats	Ch. 6: Biodiversity Appendix 6-2	The below describes the best practice and site-specific mitigation measures that are in place to avoid and reduce the potential for significant effects on local bat populations. **Noise Restrictions**		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001, as amended). **Lighting Restrictions** Where lighting is required, directional lighting will be used to prevent overspill on to woodland/forestry edges. Exterior lighting post construction, will be designed to minimize light spillage, thus reducing the effect on areas outside the Development, and consequently on bats i.e. Lighting will be directed away from mature trees/treelines located within the Wind Farm Site boundary to minimize disturbance to bats. Directional accessories can be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands. Any proposed lighting around the Wind Farm Site will be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/23 Bats and artificial lighting at night. In addition, the applicant commits to the use of lights during operation and decommissioning (such that they are necessary) in line with the following guidance that is provided in the Dark Sky Ireland Lighting Recommendations: › Every light needs to be justifiable, › Limit the use of light to when it is needed, › Direct the light to where it is needed, › Reduce the light intensity to the minimum needed, › Use light spectra adapted to the environment, › When using white light, use sources with a “warm” colour temperature (less than 3000K). With regard to the potential for lighting to increase collision risk, it is noted that there will be some illumination of the turbines in the form of aviation lighting. Post-construction monitoring		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			will be carried out to assess any potential changes in bat activity patterns and collision risk. Significant effects as a result of lighting are not anticipated; however, if in the course of this monitoring, any potential for significant effects on bats is identified, specific measures including curtailment, will be implemented to avoid any such impacts. **Bat Felling Buffers** In accordance with NatureScot (2021) and NIEA (2021) guidance, a minimum 50 m buffer is applied between turbine blade tips and habitat features used by bats (e.g. hedgerows, treelines). Although increased buffers of 100–200m are recommended around woodland by Eurobats Publication No. 6 and NIEA, these recommendations are not currently supported by empirical evidence from the UK or Ireland and are not routinely applied in wind farm planning. For the Proposed Wind Farm, a 50 m buffer between turbine blade tip and the nearest habitat feature has been implemented, based on a conservative worst-case turbine specification (the turbine model to be installed on the Proposed Wind Farm site will have an overall ground-to-blade tip height of 185m, rotor diameter of 163m, and hub height of 103.5m). Buffer distances were calculated using the Natural England formula (NatureScot, 2021) and have been incorporated into the turbine layout.		
MM41	Marsh Fritillary	Ch. 6: Biodiversity Ch. 10: Air	**Dust Mitigation** The following mitigation applies to construction areas within 20m of recorded marsh fritillary larval webs (in line with Table 4 of Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction 2024): › Groundworks (i.e. works with potential to create dust) associated with Turbine 3 will be fully supervised by an ECoW. › The ECoW will regularly monitor adjacent marsh fritillary larval web areas on a daily basis for potential signs of dust deposition or any other habitat degradation. › Dust level thresholds and weather will also be monitored.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› If any signs of habitat degradation are noted, the dust-producing works will be immediately halted and further mitigation to protect larval web areas from dust will be implemented in advance of resuming work. › The ECoW will have power to halt construction works if required as outlined above. › Standard dust suppression measures are outlines in Chapter 10: Air, in addition to measures outlines in the CEMP (Appendix 4-2).		
MM42	Invasive Species – Site Hygiene and Biosecurity Measures	Ch. 6: Biodiversity Appendix 6-5	› All works in relation to the invasive species will be supervised by an ECoW. › All staff will be given a Toolbox Talk, by a suitably qualified person or ecologist, on invasive species removal in relation to Japanese Knotweed, Giant Knotweed, Giant Hogweed, and Rhododendron and their management on site. › The contractor will assign a member of their team as Environmental Officer to ensure the management plan is adhered to throughout the proposed works. › A designated bio-secure area/exclusion zone will be set up at recorded invasive species locations to prevent disturbance in these areas. Invasive species will be marked with hazard tape in order to identify the species prior to vegetation clearance works and to keep it separate from other brash material. › All machinery should be thoroughly cleaned down prior to arriving on the site to avoid the potential spread of invasive species from elsewhere. › Machinery that is used for excavation and onsite removal of invasive material will not be used for any other works until they are fully cleaned down and then visually inspected by a specialist to ensure no fragments of invasive plant material are present. › Prior to leaving the invasive species exclusion zones, all boots and clothing will be thoroughly brushed down to remove any contaminated material prior to leaving the area. › As a precautionary measure, machinery will be thoroughly cleaned down before exiting the Site to prevent potential spread of invasive species elsewhere. › Clean down will be carried out using brushes and shovels and power washing will be avoided insofar as possible. This is to prevent potentially contaminated run-off spreading outside the Site.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Material used for tracking machinery out of the contaminated areas onsite e.g. plywood will be thoroughly cleaned down under supervision of the ECoW prior to removal off site. › Any soil and topsoil required on the Site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present. › Any material (excluding soil and topsoil, which is covered in the above measure) imported to the Site should be screened for invasive species by a suitably qualified ecologist before transportation to the Site.		
			Operational Phase		
MM43	Bats	Ch. 6: Biodiversity Appendix 6-2	**Blade Feathering** NIEA Guidelines also recommend that, in addition to buffers applied to habitat features, all wind turbines are subject to 'feathering' of turbine blades when wind speeds are below the cut-in speed of the proposed turbine. This means that the turbine blades are pitched at 90 degrees or parallel to the wind to reduce their rotation speed to below two revolutions per minute while idling. This measure has been shown to significantly reduce bat fatalities (by up to 50%) in some studies (NIEA, 2021). In accordance with NIEA Guidelines, blade feathering will be implemented as a standard across all proposed turbines when wind speeds are below the cut-in speed of the turbine. **Operational Monitoring** **Year 1:** **Bat Activity Surveys -** The post-construction surveys will be carried out as per the pre-construction survey effort. Static monitoring will take place at each turbine during the bat activity season (between April and October) (NatureScot, 2021, NIEA, 2021). Full spectrum recording detectors will be utilised for the same duration as during pre-application surveys and at the same density (NatureScot, 2021). The assessment of bat activity levels will include the use of 'Ecobat' (or similar alternative), a web-based interface, allowing uploaded activity data to be contrasted		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			with a comparable reference range, allowing objective and robust interpretation. Walked survey transects will also be conducted. Key weather parameters and other factors that are known to influence collision risk will be monitored and shall include: › Windspeed in m/s (measured at nacelle height) › Temperature (°C) › Precipitation (mm/hr) **Carcass Searches -** Carcass searches, to monitor and record bat fatalities, shall be conducted at each turbine in accordance with most recent guidance (NatureScot/NIEA). This shall include searcher efficiency trials and an assessment of scavenger removal rates to determine the appropriate correction factor to be applied in relation to determining an accurate estimate of collision mortality. Surveys should cover all activity seasons and the use of a trained dog detection team will be carried out to ensure maximum efficiency. **Years 2 & 3:** Monitoring surveys shall continue in Year 2 and 3, and where a curtailment requirement has been identified, the success of the curtailment strategy shall be assessed in line with the baseline data collected in the preceding year(s). The performance of the curtailment programme in terms of its ability to respond to the changes in bat abundance based on temperature and wind speed shall be analysed to confirm it is neither significantly over- nor under- curtailing during different periods of bat activity. At the end of each year, the efficacy of the mitigation/curtailment programme shall be reviewed, and any identified efficiencies incorporated into the programme. The requirement for continued post-consent monitoring will also be considered. Should no bat fatalities be recorded in Year 1, curtailment (where applicable) in Year 2 and Year 3 could be reduced/re-evaluated or removed with monitoring continuing to inform this strategy.		
Decommissioning Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM44	Decommissioning Phase	Ch. 6: Biodiversity	The same mitigation to prevent significant impacts on water quality and associated aquatic fauna and other terrestrial fauna during construction will be applicable to the decommissioning phase. It can be concluded that following the implementation of preventative mitigation, there is no potential for the decommissioning of the Proposed Project to result in significant effects on biodiversity.		
Ch. 7: Birds					
Pre-Construction Phase					
MM45	Design of the Proposed Project	Ch. 7: Birds	› Hard standing areas have been designed to the minimum size necessary to accommodate the turbine model that is selected. › The Proposed Project avoids wildlife refuge sites (e.g. waterbodies) › The Proposed Grid Connection routes have been selected to utilise built infrastructure for the majority of its length (i.e. cables to be laid within public roads). Cables will be laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds.		
Chapter 7: Birds					
Construction Phase					
MM46	Birds (Construction Phase)	Ch. 7: Birds	Works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Any requirement for construction works to run into the subsequent breeding season following commencement will be informed by construction phase bird surveys		
MM47	Birds (Construction Phase)	Ch. 7: Birds	The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Act 1976 – 2022. Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM48	Birds (Construction Phase)	Ch. 7: Birds	During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. All plant and equipment for use will comply with the European Communities (Noise Emission By Equipment For Use Outdoors) Regulations, 2001, as amended (SI 632/2001). Plant machinery will also be turned off when not in use.		
MM49	Birds (Construction Phase)	Ch. 7: Birds Ch 9: Hydrology & Hydrogeology	Water protection measures will be implemented around existing watercourses as outlined in Chapter 9 of this EIAR, to protect the use of watercourses by birds"		
MM50	Birds (Construction Phase)	Ch. 7: Birds	If winter roosting or breeding activity of birds of high conservation concern are identified, the roost or nest site will be located and no works shall be undertaken within a species-specific disturbance buffer in line with industry best practice (e.g. Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied."		
MM51	Birds (Construction Phase)	Ch. 7: Birds	An Environmental Clerk of Works and Project Ecologist will be appointed. Duties will include: › Organise the undertaking of a pre-construction and construction phase walkover bird survey to ensure that significant effects on birds will be avoided. Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Wind Farm site. › Oversee management of ornithological issues during the construction period and advise on ornithological issues as they arise. › Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. › Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress as necessary		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM52	Birds (Kestrel Nest Boxes)	Ch. 7: Birds	As per the RSPB recommendations, the following are prerequisites for the programme of kestrel nest box installation: › The nest boxes will be built of an exterior grade plywood or other robust timber. Preservative can extend the life of the box but will only be applied to the outside of the box. Only use selected water-based preservatives, which are known to be safe for animals, such as Sadolin. CCA pressure-treated timber will not be used. The nest box design should follow the RSPB design recommendations: https://www.rspb.org.uk/birds-and-wildlife/advice/how-you-can-help-birds/nestboxes/nestboxes-for-owls-and-kestrels/kestrel-nestboxes/ › As previously outlined, the nest boxes must be in place the winter before the first breeding season of the construction phase. › The nest box should be located with clear flight paths on a pole specifically erected for the purpose away from woodland edges to avoid predation of nests by pine martens, with the entrance facing away from the prevailing wind direction. › The nest boxes should be securely attached and sited a minimum of 5m high. › Angle the box so that the floor slopes slightly away from the entrance. To ensures that the eggs remain in the sheltered end of the box should they roll. › The floor panel of the nest box should be replaced if it shows signs of rotting. › Annual monitoring will be scheduled to record information on occupancy, to inform the installation of additional nest boxes and to clean out a build-up of debris as required		
Operational Phase					
MM53	Birds (Operational Phase Surveys)	Ch. 7: Birds	No significant operational phase impacts requiring mitigation were identified		
Decommissioning Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM54	Decommissioning	Ch. 7: Birds	During the decommissioning phase, disturbance limitation measures will be as per the construction phase		
Ch. 8: Land, Soils and Geology Land, Soils & Geology					
Construction Phase					
MM55	Effects on Land / Land-Take	Ch. 8: Land, Soils and Geology	› Following the construction phase areas of the Proposed Wind Farm site will be replaced by hardstand areas with a permanent development footprint of 21.6ha. This represents a change in landcover of 3.14%. › The loss of coniferous forestry (51.6ha) and grassland (13.94ha) will not have a significant effect on land at the Proposed Wind Farm site due to the small development footprint. The loss of this land is minimal on a local and regional scale and therefore, the effects of land loss is negligible. The loss will be offset by the works proposed as part of the Proposed Biodiversity Enhancement and Management Plan. › All felling operations will be completed in line with the Forest Service's published policy and will be subject of a Limited Felling Licence (LFL). The Forest Service policy requires replacement or replanting on a hectare for hectare basis for the footprint of the infrastructure developments. Therefore, while the loss of coniferous forestry will be a permanent change to the land at these locations, all forestry lost will be replaced elsewhere within Ireland as per the Forest Service felling policy		
MM56	Soil, Subsoil and Bedrock Excavation (Proposed Wind Farm:)	Ch. 8: Land, Soils and Geology	› Placement of turbines and associated infrastructure in areas with suitable ground conditions where appropriate (based on detailed site investigation data); › The soils and subsoils which will be removed during the construction of turbine hardstands will be localised to the turbine locations. The soil/subsoil will be placed/spread locally alongside the excavations or stored within the 3 no. designated spoil management areas and 2 no. borrow pits; › Excavated subsoils shall be excavated and stored separately to topsoil; this will prevent mixing of materials and facilitate reuse afterwards;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› At the identified spoil management areas, the vegetative topsoil layer will be removed to allow for spoil to be placed and upon reaching the recommended height, the vegetative topsoil layer will be reinstated; › The spoil placed within the spoil management areas will be restricted to a maximum height of 1m and then capped with topsoil; › The placement of spoil within the spoil management areas will require the use of long reach excavators, low ground pressure machinery and possibly bog mats in particular for drainage works; › It will be ensured that the surface of the placed spoil will be shaped to allow efficient run-off of surface water. Shaping of the surface of the spoil will be carried out as placement of spoil at management area progresses. This will reduce the likelihood of debris run-off and reduce the risk of instability of the placed spoil; › Finished/shaped side slopes in the placed spoil will be not greater than 1 (v): 3 (h). This slope inclination will be reviewed during construction, as appropriate; › Where available, the topsoil will be placed on the finished surface with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the placed spoil within the management areas; › Supervision by the Project Geotechnical Engineer will be carried out for the works; and, › An interceptor drain will be installed upslope of the designated spoil management areas to divert any surface water away from these areas. This will help ensure stability of the placed spoil and reduce the likelihood of debris run-off. (interceptor drains will not be required at all areas as the existing drainage network can function as interceptor drains – silt fences will be installed upgradient of the spoil management areas in these locations).		
MM57	Soil, Subsoil and Bedrock Excavation (Proposed Grid Connection)	Ch. 8: Land, Soils and Geology	› Any overburden excavated from the cable trench will be transported to the spoil management areas; and, › Some excess spoil material or pavements materials containing tar generated during the cable route construction will be transported by permitted waste contractors to a suitable permitted/licensed site for disposal/recovery.		
MM58	Contamination of Soil/Subsoil	Ch. 8: Land, Soils and Geology	› On-site re-fuelling will be undertaken using a refuelling truck with spill kits kept on site for accidental leakages or spillages; › Only designated trained operatives will be authorised to refuel plant on-site;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
	by Leakages and Spillages	Appendix 4-3	› Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; › All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; › Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage; › The electrical control building and BESS (at the substation) will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. › The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, › An emergency response plan for the construction phase to deal with accidental spillages is contained within the Construction and Environmental Management Plan (Appendix 4-3)		
MM59	Erosion of Exposed Subsoils	Ch. 8: Land, Soils and Geology	› Soil and subsoils removed from the development locations and access roads will be reinstated within the Proposed Wind Farm site; › The upper vegetative layer (where still present) of excavated soil will be stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the stored spoil within the borrow pits and spoil repository areas; Re-seeding and spreading/planting will also be carried out in these areas; and, › Brash/bog mats will be put in place to support vehicles on soft ground, reducing soil and subsoil erosion and avoiding the formation of rutted areas, in which surface water ponding can occur.		
MM60	Potential Effects from the Proposed Biodiversity Enhancement and	Ch. 8: Land, Soils and Geology	All proposed habitat management and enhancement works will be in accordance with the best practice Forest Service regulation, policies and strategic guidance documents as well as Coillte, DAFM and NatureScot guidance documents to ensure minimal potential negative effects on the local soil and subsoil environment. › Given the nature of the restoration measures the following mitigation measures are proposed:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
	Management Plan		› Before any works are completed silt fences will be installed to limit the movement of entrained sediment in surface water runoff; › Proposed off-road routes will be walked in advance of any machinery; › All machinery operators will be experienced; › The Proposed Wind Farm site will be walked before a machine goes off-road; › Bog mats will be used where the excavator is required to travel over wet ground; and, › A low ground pressure excavator with wide tracks (1.9m or greater) will be used to reduce compaction of the soil and subsoils.		
MM61	Potential Effects from Turbine Delivery Route Works	Ch. 8: Land, Soils and Geology	› All works are minor and localised and cover very small areas; › These works are distributed over a wide area; and, › All works are temporary in nature.		
			Operational Phase		
MM62	Site Road Maintenance	Ch. 8: Land, Soils and Geology	› Use of aggregate from authorised quarries for use in road and hardstand maintenance.		
MM63	Site Vehicle/Plant Use	Ch. 8: Land, Soils and Geology Appendix 4-3	› Vehicles used during the operational phase will be refuelled off site before entering the site; › No fuels will be stored on-site during the operational phase; › Spill kits will be available in all site vehicles to deal with an accidental spillage and breakdowns; and, › An emergency plan for the operational phase to deal with accidental spillages and breakdowns will be contained in the Construction and Environmental Management Plan (Appendix 4-3).		
MM64	Use of Oils in Transformers	Ch. 8: Land, Soils and Geology	› All transformers and substation areas will be bunded to 110% of the volume of oil used in each transformer/substation; › An emergency plan for the operational phase to deal with accidental spillages will be contained in the Construction and Environmental Management Plan; and,		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The BESS compound will be bunded for capture of any potential chemical leaks.		
			Decommissioning Phase		
MM65	Decommissioning Phase	Ch. 8: Land, Soils and Geology	The potential impacts associated with decommissioning of the Proposed Project will be similar to those associated with construction but at a reduced magnitude due to the reduced scale of the works. Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant. Some of the impacts will be avoided by leaving elements of the Proposed Project in place, including the bases which will be rehabilitated by covering with local topsoil/peat in order to regenerate vegetation which will reduce runoff and sedimentation effects. Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.		
			Ch. 9: Hydrology & Hydrogeology		
			Construction Phase		
MM66	Clear Felling of Coniferous Plantation	Ch. 9: Hydrology & Hydrogeology	Forestry operations will conform to current best practice Forest Service regulations, policies and strategic guidance documents as well as Coillte and DAFM guidance documents, including the specific guidelines listed below, to ensure that felling, planting and other forestry operations result in minimal potential negative effects to the receiving environment. › Forestry Standards Manual (Forest Service, 2015) › Environmental Requirements for Afforestation (Forest Service, 2016a) › Land Types for Afforestation (Forest Service, 2016b) › Forest Protection Guidelines (Forest Service, 2002) › Forest Operations and Water Protection Guidelines (Coillte, 2013) › Forestry and Water Quality Guidelines (Forest Service, 2000b) › Forestry and the Landscape Guidelines (Forest Service, 2000c) › Forestry and Archaeology Guidelines (Forest Service, 2000d) › Forest Biodiversity Guidelines (Forest Service, 2000e)		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Forests and Water, Achieving Objectives under Ireland's River Basin Management Plan 2018-2021 (DAFM, 2018) › Coillte Planting Guideline SOP › A Guide to Forest Tree Species Selection and Silviculture in Ireland (Horgan et al., 2003) › Management Guidelines for Ireland's Native Woodlands. Jointly published by the National Parks & Wildlife Service (Cross and Collins, 2017) › Native Woodland Scheme Framework (Forest Service, 2018) › Code of Best Forest Practice (Forest Service, 2000) <u>Mitigation by Avoidance:</u> › There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document "Forestry and Water Quality Guidelines" are shown in **Error! Reference source not found.**		
MM67	Earthworks Resulting in Suspended Solids Entrainment in Surface Waters	Ch. 4: Description of the Proposed Project Ch. 9: Hydrology & Hydrogeology Appendix 4-3 CEMP Section 3	Proposed Mitigation Measures: <u>Mitigation by Avoidance</u> › The key mitigation measure during the construction phase is the avoidance of sensitive hydrological features where possible, by application of suitable buffer zones (i.e. 50m to main watercourses) at the Proposed Wind Farm site. › From **Error! Reference source not found.** it can be seen that all of the key areas of the Proposed Wind Farm infrastructure are actually significantly away from the 50m delineated buffer zones with the exception of access road watercourse crossing locations (8 no. proposed new crossings and 2 no. existing crossings proposed for upgrade). The hardstand at proposed turbine location T5 partially encroach the 50m buffer zone. › The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operate effectively. The proposed buffer zone will:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Avoid physical damage (river/stream banks and river/stream beds) to watercourses and associated release of sediment; › Avoid excavations within close proximity to surface watercourses; › Avoid the entry of suspended sediment from earthworks into watercourses; and, › Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone. <u>Mitigation by Design</u>: › Source controls: › Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems. › Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas. › In-Line controls: › Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems. › Treatment systems: › Temporary sumps and ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems. › It should be noted for this site that an extensive network of forestry and agricultural drains already exists, and these will be integrated and enhanced as required and used within the wind farm development drainage system. The integration of the existing drainage network and the Proposed Wind Farm network is relatively simple. The key elements being the upgrading and improvements to existing water treatment elements, such as in line controls and treatment systems, including silt traps, settlement ponds and buffered outfalls. › The main elements of interaction with existing drains will be as follows:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction, and attenuation for flow management) of runoff from the proposed wind farm drainage into the existing site drainage network. This will reduce the potential for any increased risk of downstream flooding or sediment transport/erosion; › Silt traps will be placed in the existing drains upstream of any streams where construction works / tree felling is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area; › Runoff from individual turbine hardstanding areas will be not discharged into the existing drain network but discharged locally at each turbine location through settlement ponds and buffered outfalls onto vegetated surfaces; › Buffered outfalls which will be numerous over the site will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site; and, › Drains running parallel to the existing roads requiring widening will be upgraded, widening will be targeted to the opposite side of the road. Velocity and silt control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt fences will be used during the upgrade construction works. Regular buffered outfalls will also be added to these drains to protect downstream surface waters. › It should be noted that 2.6km of the Proposed Wind Farm roads already exist (as forestry tracks) and are proposed for upgrade. The upgrading of these roads, albeit presents a potential short-term potential non-significant effect on surface water quality during construction, will be a positive effect in the long-term with regard to improved drainage controls. Pre-commencement Temporary Drainage Works › Prior to the commencement of road upgrades (or new road/hardstand or turbine base installs) the following key temporary drainage measures will be installed: › All existing dry forestry or agricultural drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using check dams/silt traps; › Clean water interceptor drains will be installed upgradient of the works areas; › Check dams/silt fence arrangements (silt traps) will be placed in all existing drains that have surface water flows and also along existing roadside drains; and,		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zone. Silt Fences: › Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids such as those present in the glacial tills that overlie the site. This will act to prevent entry to water courses of sand and gravel sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. Double silt fences will be placed within drains down-gradient of all construction areas inside the hydrological buffer zones. Silt Bags: › Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, the majority of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats Sediment entrapment mats, consisting of coir or jute matting, will be placed at the silt bag location to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure. Settlement Ponds: › The Proposed Wind Farm infrastructure footprint has been divided into drainage catchments (based on topography, outfall locations, and catchment size) and stormwater runoff rates based on the 10-year return period rainfall event were calculated for various catchment areas in order to size the settlement ponds as shown in **Error! Reference source not found.** below. › The 10-year return period rainfall event is a recommendation of the IFI relating to a previous application in County Clare (i.e. Cahermurphy 2 Wind Farm, Co. Clare - Planning Ref P20/658) and has been applied to this current application also.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The location and dimensions of proposed settlement ponds are shown on the Proposed Wind Farm site drainage plan drawings (Appendix 4-3).		
MM68	Effects on Groundwater Levels during Excavation Works	Ch. 9: Hydrology & Hydrogeology	Impact Assessment/Proposed Mitigation Measures by Design: The proposed 2 no. borrow pits are located in competent SILTSTONE/SANDSTONE bedrock which is generally unproductive in terms of groundwater flow. Similar bedrock types underlie the proposed turbine locations. Also, the topographical and hydrogeological setting of the proposed borrow pits and turbine locations means no significant groundwater dewatering is anticipated to be required during the operation of the borrow pit or turbine base construction. Moreover, direct rainfall and surface water runoff will be the main inflows that will require water volume and water quality management. For the avoidance of doubt, we would generally define dewatering as a requirement to permanently drawdown the local groundwater table by means of over pumping, e.g. as would be required for the operation of a bedrock quarry in a valley floor. We consider that this example is very different in scale and operation from the proposed operation of a temporary shallow borrow pit on the side of a hill. In order to explain this thoroughly we will outline our reasoning in a series of bullet points as follows: › Firstly, the proposed borrow pit areas are located on the top of hills/ridges where the ground elevation is between 250 and 320m OD; › All proposed turbine locations are at elevations in excess of 200m OD; › These elevations are well above the elevations of the local valleys and streams; › The proposed borrow pits will be between approximately 8 – 10mbgl which is notable. However, in the context of the topographical/elevated setting of the proposed borrows pits, this depth range is relatively shallow; › The local bedrock comprises SILTSTONE/SANDSTONE and is confirmed to have low intrinsic permeability due to the competency of the rock. This means that groundwater flows will be limited to seepages at worst;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The flow paths (i.e. the distance from the point of recharge to the point of discharge) in this type of geology is short, localised, and will also be relatively shallow; › No regional groundwater flow regime, i.e. large volumes of groundwater flow, will be encountered at these elevations; › Therefore, shallow groundwater inflows will largely be fed by recent rainfall, and possibly by limited groundwater seepage form localised shallow bedrock; › The sloping nature of the ground/ridges on the hills where the borrow pits is proposed along with the coverage of soil means groundwater recharge is going to be very low; › As such the shallow groundwater flow system will be small in comparison to the expected surface water flows from the bog surface; › This means that there will be a preference for high surface water runoff as opposed to groundwater recharge and flow; and, › Hence, we consider that the management of surface water will form the largest proportion of water to be managed and treated. › Similarly, no significant groundwater dewatering is anticipated to be required during the construction of the turbine bases.		
MM69	Surface Water Quality from Excavation Dewatering	Ch. 4: Description of the Proposed Project Ch. 9: Hydrology & Hydrogeology Appendix 4-3 CEMP Section 3	Management of excavation inflows and subsequent treatment prior to discharge into the drainage network will be undertaken as follows: › Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place; › If required, pumping of excavation inflows will prevent build-up of water in the excavation; › The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters; › The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a silt bags or silt buster; › There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur; › Daily monitoring of excavations by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken; › At the turbine locations and borrow pits adequately sized settlement ponds will be constructed to treat pumped water prior to discharge into a local manmade drain; and,		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› A mobile 'Siltbuster' or similar equivalent specialist treatment system can be made available at turbine locations for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if needed		
MM70	Hydrocarbons	Ch. 4: Description of the Proposed Project Ch. 9: Hydrology & Hydrogeology CEMP Section 3 Appendix 4-5: Surface Water Management Plan	Mitigation measures proposed to avoid release of hydrocarbons at the Site are as follows: › On site re-fuelling of machinery will be carried out using a dedicated fuel truck. The fuel truck will also carry fuel absorbent material and pads in the event of any accidental spillages; › Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations; › On-site refuelling will be carried out by trained personnel only; › A permit to fuel system will be put in place; › Fuels stored on site will be minimised. Fuel storage areas if required will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor; › The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, › An emergency plan for the construction phase to deal with accidental spillages will be included within the Construction and Environmental Management Plan (Appendix 4.3). Spill kits will be available to deal with and accidental spillage in and outside the re-fuelling area		
MM71	Effects due to new Watercourses along the Proposed Grid Connection	Ch. 9: Hydrology & Hydrogeology	› All proposed 9 no. new stream crossings and 2 no. upgrades will be bottomless or clear span structures, and the existing banks will remain undisturbed. No in-stream excavation works are proposed and therefore there will be no direct impact on the stream at the proposed crossing location; › Where the proposed cable route follows an existing road or road proposed for upgrade, the cable will pass over or below the culvert within the access road;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland[1] is incorporated into the design of the proposed crossings; › As a further precaution, near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites", i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI); › During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; › All new river/stream crossings will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent; and, › All crossings will be designed to accommodate a 100-year design flood with allowance for 300mm freeboard		
MM72	Use of Cement Based Products	Ch. 4: Description of the Proposed Project Appendix 4-5: Surface Water Management Plan CEMP Section 3	› No batching of wet-concrete products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place; › Where possible pre-cast elements for culverts and concrete works will be used; › Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined concrete washout ponds; › Weather forecasting will be used to plan dry days for pouring concrete; and, › The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.		

[1] *Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		Ch. 9: Hydrology & Hydrogeology			
MM73	Effects on Designated Sites	Ch. 9: Hydrology & Hydrogeology	Drainage mitigation measures for surface water quality protection during the construction phase are summarised again below: (Please refer to Sections **Error! Reference source not found.**, **Error! Reference source not found.**, **Error! Reference source not found.**, **Error! Reference source not found.** and **Error! Reference source not found.** and above for the full description of these measures and how they will be applied). › The proposed mitigation measures which will include 50m buffer zones for avoidance of sensitive hydrological features (streams and rivers); › Pre-construction drainage control measures (Section **Error! Reference source not found.**); › Robust drainage control measures (i.e. interceptor drains, swales, settlement ponds and treatment trains such as Siltbuster) will ensure that the quality of runoff from Proposed Development areas will be very high; and, › Best practice measures with regard use of oils, fuels (Section **Error! Reference source not found.**) and cement based compounds (Section **Error! Reference source not found.**).		
MM74	Effects on Local Groundwater Well Supplies from Excavations	Ch. 9: Hydrology & Hydrogeology	We are satisfied that the Proposed Project will not impact in any significant way on any potential down-gradient private wells for the following reasons: › The large set back distances between turbine locations/borrow pit locations and downstream potential well locations (>700m); › The elevation difference between turbine locations/borrow pit locations and downstream potential well locations (>50m); › The short groundwater flowpath distances (30 – 300m); › The Proposed Wind Farm will involve relatively shallow excavations (3.5m - 8mbgl) which are typically located on elevated ground where thereby lessens the true depth of the excavation;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The moderate - low permeability of the glacial deposits in which the turbine gravity base foundations will be constructed; › The low permeability and low recharge characteristics of the underlying SILTSTONE/SANDSTONE aquifer that underlies the Proposed Wind Farm site; › Localised groundwater flow patterns in the glacial deposits which is towards local streams that flow through the Proposed Wind Farm site; › Groundwater flow patterns are expected towards the internal watercourses that drain the proposed Wind Farm site; and, › The shallow excavation depths required for Proposed Grid Connection cable and joint bays		
MM75	Surface Water Quality Effects of the Proposed Grid Connection Earthworks Works and Watercourse Crossings	Ch. 9: Hydrology & Hydrogeology	Pre-commencement Temporary Drainage Works: Prior to the commencement of 110kV substation or cable trenching the following key temporary drainage measures will be installed: › All existing roadside drains (where present) that intercept the proposed works area will be temporarily blocked down-gradient of the works using check dams/silt traps; › Culverts, manholes and other drainage inlets (where present) will also be temporarily blocked; › A double silt fence perimeter will be placed along the road verge on the down-slope side of works areas that are located inside the watercourse 50m buffer zone on the Levally Stream tributary. The following mitigation measures are proposed for the underground cabling watercourse crossing works: › No stock-piling of construction materials will take place along the grid route; › No refuelling of machinery or overnight parking of machinery is permitted in this area; › No concrete truck chute cleaning is permitted in this area; › Works will not take place at periods of high rainfall, and will be scaled back or suspended if heavy rain is forecast; › Local road drainage, culverts and manholes will be temporarily blocked during the works; › Machinery deliveries will be arranged using existing structures along the public road;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› All machinery operations will take place away from the stream and ditch banks, apart from where crossings occur. Although no instream works are proposed or will occur; › Any excess construction material will be immediately removed from the area and sent to a licenced waste facility; › No stockpiling of materials will be permitted in the constraint zones; › Spill kits will be available in each item of plant required to complete the stream crossing; and, › Silt fencing will be erected on ground sloping towards watercourses at the stream crossings if required. Fracture Blow-out (Frac-out) Prevention and Contingency Plan for HDD: › The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e. Clear Bore Drilling Fluid or similar will be used); › The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags to contain any potential spillage; › One or more lines of silt fencing will be placed between the works area and the adjacent river; › Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility; › Adequately sized skips will be used where temporary storage of arisings are required; › The drilling process / pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse; › This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped; › Any frac-out material will be contained and removed off-site; › The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and, › If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location		
MM76	Siltbuster and Effect on	Ch. 9: Hydrology & Hydrogeology	Measures employed to prevent overdosing and potential chemical carryover:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
	Downstream Surface Water Quality (Proposed Project)		› The siltbuster system comprises an electronic in-line dosing system which provides an accurate means of adding agents so overdosing does not occur; › Continued monitoring and water analysis of pre and post treated water by means of an inhouse lab and dedicated staff, means the correct amount of chemical is added by the dosing system; › Dosing rates of chemical to initiate settlement is small, being in the order of 2-10 mg/L and the vast majority of the chemical is removed in the deposited sediment; › Final effluent not meeting the discharge criteria is recycled and retreated, which has a secondary positive effect of reducing carryover; and, › Use of biodegradable chemical agents can be used at very sensitive sites		
MM77	Effects on Surface Water and Groundwater WFD Status (Proposed Project)	Ch. 9: Hydrology & Hydrogeology	Mitigation measures relating to the protection of surface water drainage regimes and surface water quality at the Proposed Project site have been detailed in Section **Error! Reference source not found.** (clear felling), Section **Error! Reference source not found.** (suspended solids), Section **Error! Reference source not found.** (hydrocarbons), Section **Error! Reference source not found.** (cement-based products) and Sections **Error! Reference source not found.** & **Error! Reference source not found.** (hydromorphological changes). Similarly, mitigation measures for the protection of groundwater quantity and quality have been detailed in Section **Error! Reference source not found.** (groundwater levels), Section **Error! Reference source not found.** (hydrocarbons) and Section **Error! Reference source not found.Error! Reference source not found.** (cement-based products). The implementation of these mitigation measures will ensure the protection of downstream SWBs and underlying GWBs		
MM78	Effects on Public Water Supplies (Surface Water and Groundwater)	Ch. 9: Hydrology & Hydrogeology	Impact Assessment Proposed Mitigation Measures: There is no Proposed Project infrastructure located inside the Ironmills PWS and therefore no potential for alteration of groundwater flowpaths or groundwater quality effects. As described in Section **Error! Reference source not found.** above, investigations carried out on the source have not identified a strong hydraulic connection between the Multeen River and abstraction boreholes and therefore potential indirect effects via surface water pathways are not likely.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Therefore, the likelihood of the Multeen River acting as a pathway for contaminants (i.e. runoff) between the Proposed Wind Farm site and the source is very low. Nonetheless, the Proposed Wind Farm drainage mitigation as described in Sections **Error! Reference source not found.** and **Error! Reference source not found.** will ensure the protection of downstream surface waters including the Multeen River. Also, the filtering effects of the sand and gravel deposits that surround the source boreholes means any suspended sediments in the Mulkear River would not be able to enter the well during pumping. The Proposed Grid Connection cable passes through the Doon WS source protection area for approximately 150m within the carriageway of the R505. However, due to the fact that cable will be laid within the R505 carriageway along with the shallow nature of the trench excavation no effects on groundwater flowpaths sustaining the spring will occur. There is an existing watermain within the public road which was placed without disrupting the spring. The R505 carriageway is elevated some 8m above the elevation of spring, therefore shallow groundwater flowpath underneath the R505 carriageway are not likely. It is understood from the source protection that groundwater levels upslope of the spring are 2 – 3m below ground level, which is deeper than the proposed cabling earthworks (~1.2mbgl). Spills and leaks of fuels hydrocarbons do however present a risk to the source spring during the Proposed Grid Connection construction phase. To mitigate this risk, no refuelling or handling of fuels/oil/lubricants/chemicals will be permitted within 100m of the mapped source protection area boundary. In addition, to present potential leaching of cement from the cable trenching, a geotextile liner will be placed around the founding layer (lean mix concrete) where concrete is to be poured. Also, there will be clear signage in place inside the source protection area to remind construction workers that the area is inside a drinking water protection area and that there are restrictions around the use of fuels/oil/lubricants/chemicals.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Due to the large downstream distance to the surface water DWPAs in the Suir and Shannon, along with the proposed drainage control and pollution prevention mitigation no effects on these surface water abstractions will occur.		
MM79	Biodiversity Enhancement and Management Plan (BEMP) and Potential Hydrological /Water Quality Effects	Ch. 9: Hydrology & Hydrogeology	All proposed habitat management and enhancement works will be in accordance with the best practice Forest Service regulation, policies and strategic guidance documents as well as Coillte, DAFM and NatureScot guidance documents to ensure minimal potential negative effects on the local peat, soil and subsoil environment. Given the nature of the restoration measures the following mitigation measures are proposed: › Before any works are completed silt fences will be installed to limit the movement of entrained sediment in surface water runoff; › Proposed off-road routes will be walked in advance of any machinery; › All machinery operators will be experienced; › The Proposed Wind Farm site will be walked before a machine goes off-road; › Bog mats will be used where the excavator is required to travel over wet ground; and, › A low ground pressure excavator with wide tracks (1.9m or greater) will be used to reduce compaction of the peat and subsoils.		
MM80	Potential Effects from Turbine Delivery Route Works (Proposed Wind Farm)	Ch. 9: Hydrology & Hydrogeology	› All works are minor and localised and cover very small areas; › These works are distributed over a wide area; › All works are temporary in nature; › All areas will be reinstated shortly after the works and reseeded; and, › Application of the Pre-Construction Drainage Measures (see Section **Error! Reference source not found.**) for surface water quality protection.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Operational Phase		
MM81	Replacement of Natural Surfaces with Lower Permeability Surfaces	Ch. 4: Description of the Proposed Project Ch. 9: Hydrology & Hydrogeology Appendix 4-3 CEMP Section 3	**Proposed Mitigation by Design:** The operational phase drainage system of the Proposed Project will be installed and constructed in conjunction with the road and hardstanding construction work as described below and as shown on the Drainage drawings submitted with this planning application (**Appendix 4-3**): › Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader; › Swales/road side drains will be used to collect runoff from access roads and turbine hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling; › On steep sections of access road transverse drains ('grips') will be constructed in the surface layer of the road to divert any runoff off the road into swales/road side drains; › Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock; › Settlement ponds, emplaced downstream of road swale sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and, › Settlement ponds have been designed in consideration of the greenfield runoff rate. › As described above the proposed integration of the wind farm drainage with the existing forestry drainage is a key component of the proposed drainage management within the development. By integration we mean maintaining surface water flowpaths where they already exist, avoid creation of new or altered surface water flowpaths, and maintaining the drainage regime (i.e. normal flow) within each forestry compartment. Critically, there will be no alteration of the catchment size contributing to each of the main downstream watercourses. All wind farm drainage water captured within individual site sub-catchments will be attenuated and released within the same sub-catchments that it was captured.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM82	Effects from Surface Water Runoff	Ch. 4: Description of the Proposed Project Ch. 9: Hydrology & Hydrogeology CEMP Section 3	The mitigation measures outlined in Sections **Error! Reference source not found.** and **Error! Reference source not found.** will ensure all surface water runoff from upgraded roads and new road surfaces (including hardstand, turbine base areas and substation) will be captured and treated prior to discharge/release. Settlement ponds, checks dams and buffered outfalls will prevent roads acting as preferential flowpaths by providing attenuation and water quality treatment. It is proposed that bedrock from on-site borrow pits will be used to construct the sub-base layer of proposed upgraded and new access roads, hardstand areas and turbine base areas. Once installed the subbase layer will be overlain by a clean capping layer of high-grade stone material which will be sourced from local quarries also		
MM83	Runoff Resulting in Contamination of Surface Waters	Ch. 9: Hydrology & Hydrogeology	Mitigation measures for sediment control are the same as those outlined above for the construction phase. Mitigation measures for control of hydrocarbons during maintenance works are similar to those outlined in Section 9.5.2.5		
MM84	Potential Water Quality Effects from BESS Fire Water Contamination	Ch. 9: Hydrology & Hydrogeology Appendix 4-4	The proposed fire-water retention design (refer to Appendix 4-4 for the Fire Risk Management & Emergency Response Plan) for the proposed BESS compound will include capture, contain, and hold contaminated runoff from the worst-credible fire scenarios while keeping it away from drains, groundwater, and off-site receptors. The objectives of the fire water containment are to: › Contain all firewater and contaminated rainfall from a worst-case BESS fire without uncontrolled release; › Segment the compound so a single incident doesn't flood the entire compound or escape the boundary with necessary bunding; › Provide positive isolation of surface water drains (automatic/manual penstocks), defaulting to "closed on alarm."; and,		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Be chemically compatible with expected contaminants (HF, metals, electrolytes, plastics by-products) and allow safe sampling, treatment, and removal. Dedicated Firewater Retention Tank(s) will provide the most effective and suitable measure for retaining firewater. The tanks will be rendered impermeable by the use of an appropriate liner and integrity tested. All integrity testing of the tanks will be completed by a suitably qualified competent person and be in line with the Environmental Protection Agency's (EPA) guidance. All the BESS compound drainage systems will divert automatically to the firewater retention tanks on activation of the site fire detection and alarm system. If storm water management is being used for the dual purpose with firewater retention, then the outlet will be fitted with an automatic valve linked to the fire detection system. Automatic shut-off valves will be tested and maintained as per the site's Safety Statement and Maintenance Procedures. The fire water retention tanks will be kept clean, and free of debris. After the fire, the retained water will be sampled, treated, or removed by licensed hazardous-waste contractors		
Decommissioning Phase					
MM85	Decommissioning Phase	Ch. 9: Hydrology & Hydrogeology	The potential impacts associated with decommissioning of the Proposed Project will be similar to those associated with construction but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works in comparison to construction phase works. Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.		
Ch. 10: Air Quality					
Construction Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM86	Exhaust Emissions	Ch 10	› All construction vehicles and plant used onsite during the construction phase will be maintained in good operational order. If a vehicle requires repairs this work will be caried out, thereby minimising any emissions that arise. › Turbines components will be transported to the Site on specified routes only, unless otherwise agreed with the Planning Authority. › All machinery will be switched off when not in use. › Users of the Site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum. › The majority of aggregate materials for the construction of the Proposed Project will be obtained from the borrow pits on site. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements. › The Materials Recovery Facility (MRF) facility will be local to the Proposed Wind Farm site to reduce the amount of emissions associated with vehicle movements. The nearest licensed waste facility to the Proposed Wind Farm site is Cashel Recycling Centre located approximately 15.8km to the southeast of the Proposed Wind Farm site. Thurles Recycling Centre is located approximately 16.1km to the northeast of the Proposed Wind Farm site.		
MM87	Dust Emissions	Ch 10	› Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. › Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff. › All plant and materials vehicles shall be stored in dedicated areas within the Proposed Wind Farm site. › Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. › Turbines and construction traffic will be transported to the Site on specified haul routes only. › Proposed Grid Connection infrastructure will be transported to the Site on specified haul routes only. › Construction materials for the Proposed Grid Connection and a small volume for the proposed Wind Farm site will be sourced locally from licenced quarries.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The agreed haul route road adjacent to the Proposed Wind Farm site will be regularly inspected for cleanliness and cleaned as necessary. › The roads adjacent to the Site entrances will be checked weekly for damage/potholes and repaired as necessary. › The transportation of materials from the borrow pits around the Proposed Wind Farm site will be covered by tarpaulin or similar covered vehicles where necessary. › The transportation of construction materials from locally sourced quarries for the Proposed Grid Connection infrastructure and a small volume for the Proposed Wind Farm site will be covered by tarpaulin where necessary. › If necessary, excavated material will be dampened prior to transport to the spoil management areas. › Waste material will be transferred to a licensed/permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Proposed Project to reduce the amount of emissions associated with vehicle movements. › A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3). The CEMP includes dust suppression measures		
Operational Phase					
MM88	Exhaust Emissions	Ch 10	› Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise. › When stationary, delivery and on-site vehicles will be required to turn off engines		
MM89	Dust Emissions	Ch 10	› Maintenance vehicles brought onsite during the operational phase will be maintained in good operational order, thereby minimising any dust emissions that arise.		
Decommissioning Phase					
MM90	Decommissioning	Ch 10	The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
Ch. 11: Climate					
Construction Phase					
MM91	Greenhouse Gas Emissions	Ch. 10: Air Quality Ch.11: Climate Ch. 15: Material Assets Appendix 4-3	› All construction vehicles and plant will be maintained in good operational order while on-site, thereby minimising any emissions that arise. › When stationary, delivery and on-site vehicles will be required to turn off engines. › Turbines and construction materials will be transported to the Site on specified routes only unless otherwise agreed with the Planning Authority. Please see Chapter 15 Material Assets for details. › It is intended to obtain the majority of materials for the construction of the Proposed Wind Farm from the proposed on-site borrow pits (with some material being imported from local licenced quarries as needed). This will significantly reduce the number of delivery vehicles accessing the Site, thereby reducing the amount of emissions associated with vehicle movements. › A Construction and Environmental Management Plan (CEMP) (Appendix 4-3) will be in place throughout the construction phase. › The CEMP (Appendix 4-3) includes a Waste Management Plant (WMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material. • The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort. • Section 4.3.4.7 of Chapter 4 for this EIAR refers to the methodology that will be utilised to manage on-site waste. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor, • The MRF facility will be local to the Proposed Project site to reduce the amount of emissions associated with vehicle movements. › Where applicable, low carbon intensive construction materials will be sourced and utilised on-site.		
Operational Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM92	Greenhouse Gas Emissions	Ch. 11: Climate Appendix 6-1	› Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while on-site, and, when stationary, be required to turn off engines thereby minimising any emissions that arise. › As detailed in Appendix 6-1, a BMEP, for the Proposed Wind Farm has identified biodiversity enhancement and management activities such as the protection and maintenance of species rich grassland habitat within the Proposed Wind Farm site, native woodland management and riparian woodland planting and linear connectivity.		
			Decommissioning Phase		
MM93	Decommissioning Phase	Ch. 11: Climate	Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less impact. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.		
			Ch. 12: Noise and Vibration Noise & Vibration		
			Construction Phase		
MM94	Construction Phase (Noise)	Ch. 12: Noise and Vibration	The contract documents will specify that the Contractor undertaking the works will be obliged to take specific noise abatement measures and comply with the recommendations of British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise. To ameliorate any potential noise impacts that may present during the construction phase, a schedule of noise control measures has been formulated in accordance with best practice guidance. These are outlined in the Construction and Environmental Management Plan (CEMP) that has been prepared for the Proposed Project. The following list of measures will be considered, where necessary, to ensure compliance with the relevant construction noise criteria: › Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Establishing channels of communication between the contractor/developer, Local Authority and residents; › Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; › Selection of plant with low inherent potential for generation of noise and/ or vibration where practical; › Placing of noise generating / vibratory plant as far away from sensitive properties as practical within the site constraints, and; › The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Friday and 07:00 to 13:00 Saturday. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e. concrete pours, turbine component deliveries) it could occasionally be necessary to work out of these hours. Where rock breaking is employed in relation to the proposed borrow pit location or other locations across the Site, the following are examples of measures that will be employed, where necessary, to mitigate noise emissions from these activities: › Fit suitably designed muffler or sound reduction equipment to the rock breaking tool to reduce noise without impairing machine efficiency. › Ensure all leaks in air lines are sealed. › Use a dampened bit to eliminate ringing. Air overpressure from a blast is difficult to control, however, because of its variability much can be done to reduce the effect. A reduction in the amount of primer cord used, together with the adequate burial of any that is above the ground, can give dramatic reduction to air overpressure intensities especially in the audible frequency range. Most complaints are likely to be received from an area downwind of the blast site, and therefore, if air blast complaints are a continual problem, it would be advisable to postpone blasting during unfavourable weather conditions if possible. As air blast intensity is a function of total charge weight, then a reduction in the total amount of explosives used can also reduce the air overpressure value.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Further guidance will be obtained from the recommendations contained within BS 5228: Part 1 and the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1988 in relation to blasting operations. The methods used to minimise impacts will consist of the following: › Restriction of hours within which blasting can be conducted (e.g. 09:00 – 18:00hrs). › The firing of blasts at similar times to reduce the 'startle' effect. › On-going circulars informing people of the progress of the works. › The implementation of an onsite documented complaints procedure. › The use of independent monitoring for verification of results. › Trial blasts in less sensitive areas to assist in blast designs and identify potential zones of influence.		
MM95	Construction Phase (Vibration)	Ch. 12: Noise and Vibration	The assessment presented in Section **Error! Reference source not found.** has demonstrated that there will be no significant vibration impacts associated with the construction of the Proposed Project and that no specific mitigation measures are required, it is recommended that vibration from construction activities will be limited to the values set out in Section **Error! Reference source not found.**. It should be noted that these limits are not absolute but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage, these limits may need to be reduced by up to 50%. If blasting is undertaken as part of the Proposed Project, a detailed assessment will be undertaken by a specialist blast design engineer to determine the blast design parameters; all mitigation measures specified by the blast design engineer to keep vibration values within the criteria in **Error! Reference source not found.** will be implemented		
Operational Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM96	Operational Phase (Noise)	Ch. 12: Noise and Vibration	An assessment of the operation noise levels has been undertaken in accordance with best practice guidelines and procedures as outlined in Section 12.3.2.2.1 of Chapter 12. The findings of the assessment have determined that mitigation measures are required to reduce noise levels from the proposed turbines to within the criteria. Modern wind turbines can be programmed to run in reduced modes of operation (or low noise modes) to achieve the required attenuation in specific wind conditions (i.e., wind speed and direction). Operating the turbines in reduced noise modes, referred to as curtailment, typically results in a corresponding reduction in energy generation capacity for the turbine(s). For any turbine curtailment strategy that is developed, consideration must be given to the practical benefits. Such curtailment may unnecessarily reduce the electrical power generating capacity of a wind farm, for an imperceptible change to the overall turbine noise levels. When curtailing for exceedance, consideration should be given to the background noise at the specific NSL to avoid unnecessarily curtailing turbine noise when the result would yield an imperceptible change to the overall turbine noise levels. A curtailment scheme has been developed for the Proposed Project to reduce noise levels at 6 m/s for daytime periods presented in Table 12 24. Where no value is shown, the turbine operates in standard mode. This curtailment scheme would have to be verified by the manufacturer based on the control and physical limitation of the turbine. If the Proposed Wind Farm is granted, the curtailment scheme identified here will be brought forward and proven as part of the noise management plan		
Decommissioning Phase					
MM97	Decommissioning Phase (Noise)	Ch. 12: Noise and Vibration	The noise and vibration impacts associated with any decommissioning of the Site are considered to be comparable to those outlined in relation to the construction of the Proposed Project		
Ch. 13: Cultural Heritage Cultural Heritage					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
Pre-Commencement, Construction, Operation and Decommissioning					
MM98	Indirect and Direct Construction Phase	Ch. 13: Cultural Heritage	The construction of the Proposed Windfarm will not result in any direct, negative effects on the recorded archaeological, architectural or cultural heritage resource as none of these sites are located within the footprint of the development that requires excavations and ground works. The construction of the Proposed Grid Connection Route will not result in any direct negative impacts on recorded archaeological sites, although the route will pass through the Zone of Notification associated with seven sites (AH55, 56, 57, 60, 61, 62, 63). It is possible that excavations works associated with the laying of the Grid Connection may result in a direct, negative (permanent) impact on remains that may be associated with the recorded monuments. The sensitivity of the sites is high and the magnitude of impact may be high, resulting (prior to the application of mitigation) in a potential significant significance of effect. The construction of the Grid Connection Route will not result in direct impacts on bridges BH5, BH17, BH24 and the bridge within BH25. At these locations the Grid Connection Route will be laid adjacent to the bridge structure and cross the watercourse by means of directional drilling. The construction of the Proposed Turbine Delivery Route will be partially located within AH64, which is a Zone of Archaeological Potential surrounding a possible Deserted Medieval Village, which also contains a number of other archaeological monuments located beyond the 50m study area. It is possible that excavations works associated with the widening of the road may result in a direct, negative (permanent) impact on remains within AH64. The sensitivity of the site is high and the magnitude of impact may be high, resulting (prior to the application of mitigation) in a potential significant significance of effect. No direct impacts are predicted on the bridge within AH64, which is a recorded monument and a protected structure (BH31/AH54). It is possible that the construction of the Proposed Wind Farm, Grid Connection Route and Turbine Delivery Route interventions, in greenfield and bogland or forested areas, will result in direct, negative (permanent) effects on previously unrecorded archaeological remains that may survive within these areas with no surface expression. Construction effects comprise topsoil stripping and excavations associated with the installation of turbines, crane pads, access roads, temporary construction compound, borrow pits, substation and launch/reception compounds.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The sensitivity of any potential sites may vary from medium to high and the magnitude of impact may vary from low to very high, resulting (prior to the application of mitigation) in potential significance of effect that may vary from slight to very significant. The construction of the Grid Connection Route will result in in direct, negative (permanent) effects on two bridges location along the proposed Grid Connection Route – CH83 and CH132. Here the cable will be laid through the bridge structures. The sensitivity off the boundaries is medium and the magnitude of impact is low, resulting in a slight significance of effect in both cases. The construction of the Proposed Wind Farm will result in five direct, negative (permanent) impacts on sections of townland boundaries (Carrowkeale, Carrow, Moheragh and Glenpaudeen). The sensitivity off the boundaries is medium and the magnitude of impact is low, resulting in a slight significance of effect in each case. The Proposed Grid Connection Route will cross 29 townland boundaries and run along 12 townland boundaries. At all but one location the cable route is located within the existing road, and as such no impacts are anticipated. A section of the townland boundary between Kishyquirk and Cloghnadromin will be removed where the Proposed Grid Connection Route runs through a section of greenfield. The sensitivity off the boundary is medium and the magnitude of impact is low, resulting in a slight significance of effect. During the construction of the Proposed Project, all topsoil stripping in greenfield areas will be subject to archaeological monitoring. This will also include any excavation works adjacent to AH55, 56, 57, 60, 61, 62, 63 and all works within AH64, along with the removal of any townland boundary sections. The laying of the Grid Connection Route through bridges CH83 and CH132 will also be subject to archaeological monitoring. All monitoring works will be carried out under licence to the National Monuments Service of the DoHLGH. If any archaeological remains are identified during the course of the works, further mitigation may be required, such as preservation by record or preservation in-situ. Any further mitigation will require approval from the National Monuments Service of the DoHLGH. POTENTIAL MITIGATION STRATEGIES FOR CULTURAL HERITAGE REMAINS		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Mitigation is defined as features of the design or other measures of the proposed development that can be adopted to avoid, prevent, reduce or offset negative effects. The best opportunities for avoiding damage to archaeological remains or intrusion on their setting and amenity arise when the site options for the development are being considered. Damage to the archaeological resource immediately adjacent to developments may be prevented by the selection of appropriate construction methods. Reducing adverse effects can be achieved by good design, for example by screening historic buildings or upstanding archaeological monuments or by burying archaeological sites undisturbed rather than destroying them. Offsetting adverse effects is probably best illustrated by the full investigation and recording of archaeological sites that cannot be preserved in situ. DEFINITION OF MITIGATION STRATEGIES ARCHAEOLOGICAL RESOURCE The ideal mitigation for all archaeological sites is preservation in situ. This is not always a practical solution, however. Therefore, a series of recommendations are offered to provide ameliorative measures where avoidance and preservation in situ are not possible. *Archaeological Test Trenching* can be defined as 'a limited programme of intrusive fieldwork which determines the presence or absence of archaeological features, structures, deposits, artefacts or ecofacts within a specified area or site on land, inter-tidal zone or underwater. If such archaeological remains are present field evaluation defines their character, extent, quality and preservation, and enables an assessment of their worth in a local, regional, national or international context as appropriate' (CIfA 2020a). *Full Archaeological Excavation* can be defined as 'a programme of controlled, intrusive fieldwork with defined research objectives which examines, records and interprets archaeological deposits, features and structures and, as appropriate, retrieves artefacts, ecofacts and other remains within a specified area or site on land, inter-tidal zone or underwater. The records made and objects gathered during fieldwork are studied and the results of that study published in detail appropriate to the project design' (CIfA 2020b).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Archaeological Monitoring can be defined as 'a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive (CIfA 2020c). *Underwater Archaeological Assessment* consists of a programme of works carried out by a specialist underwater archaeologist, which can involve wade surveys, metal detection surveys and the excavation of test pits within the sea or riverbed. These assessments are able to access and assess the potential of an underwater environment to a much higher degree than terrestrial based assessments. ARCHITECTURAL RESOURCE The architectural resource is generally subject to a greater degree of change than archaeological sites, as structures may survive for many years but their usage may change continually. This can be reflected in the fabric of the building, with the addition and removal of doors, windows and extensions. Due to their often more visible presence within the landscape than archaeological sites, the removal of such structures can sometimes leave a discernable 'gap' with the cultural identity of a population. However, a number of mitigation measures are available to ensure a record is made of any structure that is deemed to be of special interest, which may be removed or altered as part of a proposed development. *Conservation Assessment* consists of a detailed study of the history of a building and can include the surveying of elevations to define the exact condition of the structure. These assessments are carried out by Conservation Architects and would commonly be carried out in association with proposed alterations or renovations on a Recorded Structure. *Building Survey* may involve making an accurate record of elevations (internal and external), internal floor plans and external sections. This is carried out using an EDM (Electronic Distance Measurer) and GPS technology to create scaled drawings that provide a full record of the appearance of a building at the time of the survey.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Historic Building Assessment is generally specific to one building, which may have historic significance, but is not a Protected Structure or listed within the NIAH. A full historical background for the structure is researched and the site is visited to assess the standing remains and make a record of any architectural features of special interest. These assessments can also be carried out in conjunction with a building survey. *Written and Photographic record* provides a basic record of features such as stone walls, which may have a small amount of cultural heritage importance and are recorded for prosperity. Dimensions of the feature are recorded with a written description and photographs as well as some cartographic reference, which may help to date a feature		
Ch. 14: Landscape and Visual Landscape & Visual					
Construction Phase					
MM99	Landscape Effects during Construction	EIAR Chapter 14 Section 14.7.2.1	The above predicted landscape effects during construction assume the implementation of the following mitigation measures for the Proposed Wind Farm and Proposed Grid Connection Route. All construction activities will follow best practice methods to reduce impacts upon the environment and landscape of the Site. Further details are presented in the Construction and Environmental Management Plan (CEMP) contained in Appendix 4-5 of this EIAR. The following measures should be implemented to mitigate landscape effects during the construction phase of the Proposed Project: › In all circumstances, excavation depths and volumes will be minimised, and excavated material will be re-used where possible. › For the proposed Grid Connection, where the cable trench is to be located in the road verge, subsoil will be piled on-site and re-used after cabling works. Should any medium planting be removed, it should be replaced with the same or similar species whenever it is not possible to salvage and reinstate. › Any areas of bare soil remaining after the landscaping phase will be seeded as soon as possible with a grass-seed mix to minimise sediment run-off.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM 100	Visual Effects during Construction	EIAR Chapter 14 Section 14.7.2.2	General housekeeping measures, necessary for Health & Safety requirements, will ensure that the active construction areas will be kept tidy, mitigating localised visual impacts during the construction phase		
Operational Phase					
MM 101	Landscape Effects during Operation	EIAR Chapter 14 Section 14.7.3.1.3	Regarding mitigation measures to help reduce landscape effects of the Proposed Wind Farm, this LVIA points to the Biodiversity Management and Enhancement Plan (BMEP) which has been prepared as part of this EIAR (see Appendix 6-4). The BMEP will have the dual effect of providing ecological enhancement to the landscape area of the Proposed Wind Farm site as well as potential visual screening of some lower lying infrastructure of the Proposed Wind Farm, thereby also mitigating effects on landscape character during the Operational Phase. The following measures from the BMEP which have been included in the Proposed Wind Farm design are deemed to have the effect of avoiding or reducing direct effects on landscape receptors, meaning individual landscape features and the landscape character of the Proposed Wind Farm site as a whole: › New planting and management of native woodland habitat within the Proposed Wind Farm site, including new planting of advance stock native trees. › Riparian woodland planting and linear connectivity to create commuting for foraging fauna and other protected fauna. › Protection and maintenance of high diversity wet grassland habitat which occurs outside the development footprint within the Proposed Wind Farm site.		
Ch. 15: Material Assets Material Assets					
Material Assets - Traffic					
Pre-Construction, Construction and Operational Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM 102	Traffic	Ch. 15: Material Assets	**Mitigation by Design** › Selection of the most appropriate delivery route to transport the wind turbine components, requiring the minimum remedial works to accommodate the vehicles. Selection of the shortest Proposed Grid Connection diversion routes, minimising the impacts on the existing road network and traffic.		
MM 103	Traffic	Ch. 15: Material Assets	› The successful completion of the Proposed Project will require significant coordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction stage of the Proposed Project in order minimize the effects of the additional traffic generated. A detailed Traffic Management Plan (TMP), incorporating all the mitigation measures included as Appendix 15-2 of this EIAR, will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the roads authority and An Garda Síochána prior to construction works commencing on Site. In addition, the traffic management measures proposed for the following construction traffic scenarios are set out for the grid connection in Appendix 15-2:		
MM 104	Delivery of abnormal loads	Ch. 15: Material Assets	The detailed TMP will include the following: › Traffic Management Coordinator – a competent Traffic Management Co-ordinator will be appointed for the duration of the construction of the Proposed Development and this person will be the main point of contact for all matters relating to traffic management. › Delivery Programme – a programme of deliveries will be submitted to Tipperary County Council and other relevant authorities in advance of deliveries of turbine components to the Proposed Project site. Liaison with the relevant local authorities including the roads sections of local authorities that the delivery routes traverse and An Garda Siochana, during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required. › Information to locals – Locals in the area will be informed of any upcoming traffic related matters e.g. delivery of turbine components at night, via letter drops and posters in public places. Information will include the contact details of the Contract Project Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number will also be provided.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› A Pre and Post Construction Condition Survey – A pre-condition survey of roads associated with the Proposed Development will be carried out prior to construction commencement to record the condition of the road. A post construction survey will be carried out after works are completed. Where required the timing of these surveys will be agreed with the local authority. › Implementation of temporary alterations to road network at critical junctions – At locations where required highlighted in Section 15.1.9. › Identification of delivery routes – These routes will be agreed and adhered to by all contractors. › Travel plan for construction workers to Proposed Project site– While the assessment above has assumed the worst case that construction workers will drive to the Proposed Project site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of a routes to / from the site and identification of an area for parking. › Travel plan for construction workers to underground electric cabling route – Due to the transient nature of the underground grid connection construction site which will generally be on a section of the public road, construction workers will be transported to and from the site by the construction company at the beginning and end of each shift. › Drivers conduct – All drivers will follow normal rules of the road and will receive toolbox talk regarding the delivery route and planned holding points prior to any deliveries. › Standard permitted axial loads – Will not be exceeded. › Temporary traffic signs – As part of the traffic management measures temporary traffic signs will be put in place at all key junctions, including the access junction on the L58333 during the 12 month construction period. All measures will be in accordance with the "Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works" (DoT now DoTT&S) and "Guidance for the Control and Management of Traffic at Roadworks" (DoTT&S). A member of construction staff (flagman) and signage will be present at access		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			junctions B, J, K and L on days used during the construction period. › Delivery times of large turbine components – The management plan will include the delivery of large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage. › Re-instatement works – All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers. All works will be done in accordance with the Guidelines for the Opening, Backfilling and Reinstatement of › Openings in Public Roads, DTToS, September 2015. › Additional measures – Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including wheel washing facilities on Site and sweeping / cleaning of local roads as required. › It is confirmed that details for the Traffic Management Plan for the Proposed Project will be agreed with the Road Section of Tipperary County Council, Limerick County Council and TII prior to construction and contact will be maintained with the Road and Traffic Section throughout the construction phase		
MM 105	General Traffic Management	Ch. 15: Material Assets	› Due to the very low volumes of traffic forecast to be generated during this stage no mitigation measures are required		
Decommissioning Phase					
MM 106	Decommissioning Phase	Ch. 15: Material Assets	In the event that the Proposed Project is decommissioned after the 35 years of operation, a decommissioning plan, will be prepared for agreement with the local authority. This plan will include a material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning, in accordance with Scottish Natural Heritage report (SNH) *Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms* (SNH, 2013).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
Material Assets - Other					
Construction Phase					
MM 107	Electricity	Ch. 15: Material Assets	› Goal posts will be established under overhead lines for the entirety of the construction phase. They will not exceed a height of 4.2 metres, unless specifically agreed with ESB Networks › The suitability of machinery and equipment for use near power lines will be risk assessed. › All staff will be trained on the routes and operating voltages of overhead electricity lines running across the proposed main site entrance. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the sites are made aware of the location of lines before they come on to site. › Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire. › Prior to the delivery of turbines to the Proposed Project site, a dry run of the route using vehicles with similar dimensions will occur. Please see Section 15.1.9 above for details. › When activities must be carried out beneath overhead lines, e.g. component delivery or grid cable laying, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used is undertaken prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required. › Information on safe clearances will be provided to all staff and visitors. › Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on site.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan. › All health and safety measures as detailed in Section 5 of Construction Environment Management Plan and Chapter 5 Population and Human Health will be adhered to during the construction, operation and decommissioning phases. › Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works. › Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified. › Excavation permits will be completed, and all plant operators and general operatives will be inducted and informed as to the location of any services. › The contractor must comply with and standard construction codes of practice in relation to working around electricity, gas, water, sewage and telecommunications networks		
MM 108	Water	Ch. 15: Material Assets	› In advance of any construction activity, the contractor will undertake pre-commencement surveys to confirm the presence or otherwise of any services such as water supply. If found to be present, the relevant service provider will be consulted with in order to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works. In the event that water mains are encountered the water supply will be turned off by the utility so work can commence on diverting the service. The section of existing pipe will be removed and will be replaced with a new pipe along the new alignment of the service. The works will be carried out in accordance with the specifications of the relevant utility provider.		
MM 109	Broadband	Ch. 15: Material Assets	› Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified. › Excavation permits will be completed, and all plant operators and general operatives will be inducted and informed as to the location of any services. › The contractor must comply with and standard construction codes of practice in relation to working around electricity, gas, water, sewage and telecommunications networks.		
Operational Phase					
MM 110	Telecommunications	Ch. 15: Material Assets Appendix 15-5	Prior to the operational phase of the Proposed Wind Farm, a testing exercise will be carried out to determine there are no impacts on any radio links which traverse the Site. AI Bridges, as outlined in Appendix 15-4 and Appendix 15-5, listed a series of mitigation measures in the event that there is an impact on a link. It should be noted that in both telecommunication impact assessments, for EIR and Enet, it was concluded that there will be no impacts to any links based on the current position of the proposed turbines and their distances from existing links. Listed within the Letter of Reliance Appendix 1 of Appendix 15-4 'Carrow Wind Farm EIR Telecommunications Impact Assessment Report', the following mitigation measures are presented: › Eir would be re-consulted in the event of a successful planning application. › During the Construction Phase of the wind farm, it would be proposed that wind turbine T03 would be constructed and yaw wind turbine T03 on a perpendicular, worst-case-scenario, bearing into the microwave radio link. › Eir would then monitor the telecommunications radio link performance to check for interference / loss of performance. › Eir would provide evidence-based demonstrable results of any wind turbine interference impacts. › If interference is detected and can be demonstrated to be attributable to the wind turbine T03, then the mitigation measure as described in the Report should be implemented to the agreement of Eir.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› It would be an agreed condition of planning that wind turbine T03 would not become operational until all impacts from wind turbine T03 would be remediated according to the agreed mitigation measure proposal. All costs of the mitigation measure strategy would be borne by the developer. The findings of the Carrow Wind Farm EIR Telecommunications Impact Assessment Report shows that mitigation measures are not likely to be required. The results of the 3D analysis indicate that the proposed turbines will not obstruct any of the Eir microwave radio links. Listed within the Letter of Reliance Appendix 1 of Appendix 15-5 'Carrow Wind Farm Enet Telecommunications Impact Assessment Report', the following mitigation measures are presented: › Enet would be re-consulted in the event of a successful planning application. › During the Construction Phase of the wind farm, it would be proposed that wind turbine T09 would be constructed and yaw wind turbine T09 on a perpendicular, worst-case-scenario, bearing into the microwave radio link. › Enet would then monitor the telecommunications radio link performance to check for interference / loss of performance. › Enet would provide evidence-based demonstrable results of any wind turbine interference impacts. › If interference is detected and can be demonstrated to be attributable to the wind turbine T09, then the mitigation measure as described in the Report should be implemented to the agreement of Enet. › It would be an agreed condition of planning that wind turbine T09 would not become operational until all impacts from wind turbine T09 would be remediated according to the agreed mitigation measure proposal. All costs of the mitigation measure strategy would be borne by the developer. The findings of the Carrow Wind Farm Enet Telecommunications Impact Assessment Report shows that mitigation measures are not likely to be required. The results of the 3D analysis indicate that the proposed turbines will not obstruct any of the Enet microwave radio links.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM 111	Aviation	Ch. 15: Material Assets	› The scoping response from the IAA and DoD sets out lighting requirements for turbines as detailed above. These requirements will be complied with for the Proposed Project and any further details will be agreed in advance of construction with the IAA, i.e. crane erection. The coordinates and elevations for built turbines will be supplied to the IAA, as is standard practice for wind farm developments.		
MM 112	Electricity	Ch. 15: Material Assets	› All waste generated on-site will be contained in waste skip at a waste storage area on Site. This waste storage area will be kept tidy with skips clearly labelled to indicate the allowable material to be disposed of therein. The expected waste volumes generated on Site are unlikely to be large enough to warrant source segregation at the Site. Therefore, all waste streams generated on site will be deposited into a single waste skip. The waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licenced waste contractor where the waste will be sorted into individual waste stream for recycling, recovery or disposal. › Site personnel will be instructed at induction that under no circumstances can waste be brought on to Site for disposal in the on-site waste skip. It will also be made clear that the burning of waste material on Site is forbidden.		
MM 113	Telecommunications	Ch. 15: Material Assets	The *'Wind Energy Development Guidelines for Planning Authorities'* (Department of the Environment, Heritage and Local Government, 2006) state that interference with broadcast communications can be overcome by the installation of deflectors or repeaters where required. Developers are advised to contact individual local and national broadcasters and mobile phone operators to inform them of proposals to develop wind farms. This consultation has been carried out by MKO as part of the assessment of the Proposed. Both the adopted 2006 and the 2019 draft *'Wind Energy Development Guidelines for Planning Authorities'* produced by the Department of the Environment, Heritage and Local Government (DOEHLG) state that interference with broadcast communications can be overcome by the installation of deflectors or repeaters where required 2rn (formerly RTÉ Transmission Network Ltd.), replied on the 7th of February 2024 to a scoping request from MKO stating that there is no fixed linking within the area. 2rn has recommended that a protocol agreement be put in place for the Proposed Wind Farm if the Site goes ahead. The Protocol Document ensures that in the event of any interference occurring to 2rn television		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			or radio reception due to operation of a wind farm, the required measures as set out in the document, will be carried out by the developer to rectify this. The Protocol Document ensures that the appropriate mitigation is carried out in the event of any unanticipated broadcast interference arising to RTÉ television or radio reception as a result of the proposed Wind Farm.		
MM 114	Aviation	Ch. 15: Material Assets	As no impacts were identified by the IAA or DoD, no mitigation measures are required. However, the following IAA and DoD requests will be complied with should the Proposed Project be consented: Irish Aviation Authority › Agree an aeronautical obstacle warning light scheme for the wind farm development › Provide as-constructed coordinates in WGS84 format together with ground and blade tip height elevations at each wind turbine location and › Notify the Authority of intention to commence crane operations with at least 30 days prior notification of their erection. Department of Defence › All turbines should be illuminated by Type C, Medium intensity, Fixed Red obstacle lighting with a minimum output of 2,000 candela to be visible in all directions of azimuth and to be operational H24/7 days a week. Obstacle lighting should be incandescent or, if LED or other types are used, of a type visible to Night Vision equipment. Obstacle lighting used must emit light at the near InfraRed (IR) range of the electromagnetic spectrum, specifically at or near 850 nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light.		
			Decommissioning Phase		
MM 115	Decommissioning Phase	Ch. 15: Material Assets	Any impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent.		

18.2 EIAR Monitoring Measures

Table 18-2 Schedule of Monitoring

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			Pre-Construction Phase			
MX1	Drainage Maintenance	Ch. 4: Description of the Proposed Project, 9 CEMP Section 3,4 **Appendix 4-5: Surface Water Management Plan**	› Prior to commencement of works in sub-catchments across the site, main drain inspections will be competed to ensure ditches and streams are free from debris and blockages that may impede drainage. It is proposed to complete these inspections on a catchment-by-catchment basis as the construction works develop across the site, as works in all areas will not commence simultaneously. › Drainage and associated pollution control measures will be implemented onsite before the main construction works commence. Where possible drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of impact on surface waters by suspended sediment released during construction and entrained in surface run-off. › The routes of any natural drainage features will not be altered as part of the Proposed Project. Turbine locations have been selected to avoid natural watercourses. It is proposed that 9 no. new clear span watercourse crossings are required, while 2 no. crossings will be required or upgraded within the Proposed Wind Farm site. › There will be no direct discharges to natural watercourses. All discharges from the proposed works areas or from interceptor drains will be made over vegetated ground at an appropriate distance from natural watercourse and lakes. Buffer zones around the existing natural drainage features have informed the layout of the Proposed Project and are indicated on the drainage design drawings.	On going	Monthly	Project Hydrologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			› Where artificial drains are currently in place in the vicinity of proposed works areas, these drains may have to be diverted around the proposed works areas to minimise the amount of water in the vicinity of works areas. Where it may not be possible to divert artificial drains around proposed work areas, the drains will be blocked to ensure sediment laden water from the works areas has no direct route to other watercourses. Where drains have to be blocked, the blocking will only take place after an alternative drainage system to handle the same water has been put in place. › Existing artificial drains in the vicinity of existing site roads will be maintained in their present location where possible. If it is expected that these artificial drains will receive drainage water from works areas, check dams will be added (as specified below) to control flows and sediment loads in these existing artificial drains. If road widening or improvement works are necessary along the existing roads, where possible, the works will take place on the opposite side of the road to the drain.			
MX2	Surface Water Management Plan	Appendix 4-5: Surface Water Management Plan Ch. 9: Water	› Water quality field testing and laboratory analysis will be undertaken prior to commencement of felling and construction at the Site. › Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standard's (EQSs) and sampling will be undertaken for each stream that drains from the construction site. › Baseline sampling will be completed on at least two occasions, and these will coincide with low flow and high flow stream conditions. The high flow sampling event will be undertaken after a period of sustained rainfall, and the low flow event will be undertaken after a dry spell.	As required	As required	Project Hydrologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			› There is an existing drainage network across the Site and runoff drains relatively freely to local watercourses and streams. This existing drainage system will continue to function as it is during the pre- construction phase. › However, prior to commencement of works in sub-catchments across the Site, main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage. These inspections will be done on a catchment-by-catchment basis as the construction works develop across the Site, as works in all areas will not commence simultaneously.			
MX3	Environmental Management	CEMP Section 4	› The Project Developer will be required to engage a qualified Environmental Engineer, Environmental Scientist, or equivalent, with experience in wind farm construction to fulfil the role of Environmental Clerk of Works (ECoW) to oversee the construction works and audit the implementation of the CEMP. The ECoW will report to the Project Developer and Project Contractor but will liaise closely with the Construction Manager in relation to the Project Contractor's day-to-day implementation of the CEMP on site. › The Environmental Clerk of Works (ECoW) will be nominated by the Project Developer to oversee the Project Contractor's effective implementation of the Proposed Project's environmental requirements and obligations, as captured in the CEMP. The ECoW will be responsible for monitoring the works of the Project Contractor from an environmental perspective on behalf of the Project Developer. For the sake of expediency, the ECoW will report their ongoing audit findings, monitoring results and site observations to both the Project Developer and the Proposed Contractor, having been nominated by the developer to fulfil the role.			ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			› The level, detail and frequency of reporting expected from the ECoW for the Construction Manager, Developer's Project Manager, and any Authorities or other Agencies, will be agreed by all parties prior to commencement of construction, and may be further adjusted as required during the course of the Proposed Project.			
MX4	Invasive Species	Ch. 6: Biodiversity Appendix 6-5	Prior to the commencement of any works, the following steps will be undertaken: › A pre-commencement survey for Japanese Knotweed and Giant Knotweed will be undertaken by a suitably qualified ecologist to determine the locations and extent of the species within the Proposed Project site and record any changes in the extent of the infestation since the 2024 and 2025 surveys. It will also serve to identify if this species has established elsewhere within the Site. › The locations and extent of Japanese Knotweed and Giant Knotweed within the Proposed Wind Farm site, and along the Proposed Grid Conenction underground cabling route and TDR, should it establish, will be clearly marked out using hazard tape to ensure they are not disturbed. An exclusion zone surrounding each stand will also be identified and an appointed ecological clerk of works (ECoW) will inform the extent of the area to be treated as potentially contaminated. The exclusion zone will extend to 7m around the identified stands. › The ECoW will be appointed to supervise all works carried out within the exclusion zones, when required. › All site and turbine transport staff will receive a toolbox talk from the ECoW regarding the identification and protocols surrounding Japanese Knotweed and Giant Knotweed within the Proposed Wind Farm site.	Once	As required	Project Ecologist ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
MX5	Fauna	Ch. 6: Biodiversity	**Otter:** › Due to the time that can elapse between the original surveys, any future planning consent and construction, a pre-construction survey for otter will be carried out no more than 10 to 12 months prior to construction, as per NRA (2008) guidance, to identify the presence of any new breeding sites. The pre-construction survey will aim to ensure that adequate mitigation, as provided below under 'Disturbance, Mortality' is provided at each watercourse crossing (or other habitat of value to otters) affected by the Proposed Project. **Badger** › Due to time that can elapse between the original surveys, any future planning consent and construction, a pre-construction badger survey will be carried out to identify the presence of any setts that may have been established in the intervening period. **Red Squirrel and Pine Marten:** › Due to time that can elapse between the original surveys, any future planning consent and construction, a pre-construction survey for pine marten/red squirrel will be carried out to identify the presence of any new breeding sites. These surveys will focus on areas of Conifer plantation (WD4) to be felled and all suitable habitat within 50m of the felling blocks. Any potential breeding sites should be monitored to ascertain if they are active breeding sites. Surveys will be undertaken in line with Nature Scot and TII guidelines. **Bats:**	Once	As required	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			› Robust pre-construction bat surveys are undertaken to establish baseline activity and assess the potential risks associated with turbine operation. Survey design and impact assessment were guided by current legislation, scientific literature, and best-practice guidance, with full consideration given to spatial, temporal, and behavioural patterns relevant to bat ecology.			
MX6	Birds	Ch. 7: Birds Appendix 7-7: Bird Monitoring Programme	› It is proposed that construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs. Pre-commencement confirmatory surveys will be undertaken within one month prior to the initiation of works at the Proposed Project to identify sensitive sites (e.g. roosts). › Any requirement for construction works to run into the subsequent breeding or winter seasons following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding or roosting birds of conservation concern. These surveys will be conducted once per month during the breeding season (April to July) and once at the start of the winter season (October). The survey will aim to identify sensitive sites (e.g., nests or roosts depending on the season in question). › This monitoring will involve surveying onsite and to a 500m radius of the development footprint/works areas. Monitoring will be undertaken by a suitably qualified ornithologist. The survey period will include one month prior to the initiation of works, four visits between April and July and one visit during the winter period (October). If a sensitive area is identified, the nest/roost sites will be located, and no works shall be undertaken within a species-specific buffer in line with best practice guidance (e.g. Forestry Commission Scotland, 2006; Goodship and Furness	Once	As required	Project Ornithologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			2022; Ruddock and Whitfield, 2007). No works within the buffer zone shall be permitted until it can be demonstrated that the species is no longer reliant on the area for breeding or roosting. › All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked off using hazard-tape fencing to alert all personnel on site to the suspension of works within that area.			
MX7	Tree Felling	Ch. 9: Hydrology & Hydrogeology	Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The 'before' sampling will be conducted within 4 weeks of the felling activity commencing, preferably in medium to high water flow conditions. The "during" sampling will be undertaken once a week or after rainfall events. The 'after' sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e., where an impact has been shown). Criteria for the selection of water sampling points include the following: › Avoid man-made ditches and drains, or watercourses that do not have year-round flows, i.e. avoid ephemeral ditches, drains or watercourses; › Select sampling points upstream and downstream of the forestry activities; › It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry; › Where possible, downstream locations will be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or	As Required	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			contamination by other land-uses where impact increases at third downstream location relative to second downstream location); and, › The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed.			
Construction Phase						
MX8	Health and Safety	Ch. 4: Description of the Proposed Project CEMP Section 5	The PSCS appointed for the construction stage shall be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to): › Development of the Safety and Health Plan for the construction stage with updating where required as work progresses; › Compile and develop safety file information. › Reporting of accidents / incident › Weekly site meeting with PSCS; › Coordinate arrangements for checking the implementation of safe working procedures. Ensure that the following are being carried out: › Induction of all Site staff including any new staff enlisted for the project from time to time; › Toolbox talks as necessary; › Maintenance of a file which lists personnel on site, their name, nationality, current Safe Pass number, current Construction Skills Certification Scheme (CSCS) card (where relevant) and induction date; › Report on Site activities to include but not limited to information on accidents and incidents, disciplinary action taken and PPE compliance; › Monitor the compliance of contractors and others and take corrective action where necessary; and	Daily	Daily	PSCS

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			› Notify the Authority and the client of non-compliance with any written directions issued.			
MX9	Water Quality and Monitoring – Forestry Felling Drainage Measures	Ch. 4: Description of the Proposed Project Ch. 9: Hydrology & Hydrogeology CEMP Section 3, 4	Before the commencement of any felling works, an Environmental Clerk of Works (ECoW) will be appointed to oversee the felling and extraction works. The ECoW will have the following functions: › Attend the site for the setup period when drainage protection works are being installed and be present on site during the remainder of the forestry felling works. › Prior to the commencement of works, review and agree the positioning by the Operator of the required Aquatic Buffer Zones (ABZs), silt traps, silt fencing (see below), water crossings and onsite storage facilities for fuel, oil and chemicals (see further below). › Be responsible for preparing and delivering the Environmental Tool Box Talk (TBT) to all relevant parties involved in site operations, prior to the commencement of the works. › Conduct daily and weekly inspections of all water protection measures and visually assess their integrity and effectiveness. › Take representative photographs showing the progress of operation onsite, and the integrity and effectiveness of the water protection measures. › Collect water samples for analysis by a 3rd party accredited laboratory, adhering to the following requirements: ○ Surface water samples shall be collected upstream and downstream of the keyhole felling site at suitable sampling locations. ○ Sampling shall be taken from the stream / river bank, with no in-stream access permitted. ○ The following minimum analytical suite shall be used: pH, Electrical Conductivity, Total Suspended Solids, Biochemical Oxygen Demand, Total Phosphorus, Ortho-Phosphate, Total Nitrogen, and Ammonia.	As required	As Necessary	ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			› Review of operator's records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions. › Prepare and maintain a contingency plan. › Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed.			
MX10	Water Quality and Monitoring	Ch. 4: Description of the Proposed Project Ch. 9: Hydrology & Hydrogeology CEMP Section 4	An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any works. Daily visual inspections of drains and outfalls will also be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels measured during construction be higher than the existing levels, the source will be identified, and additional mitigation measures implemented. Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs should be undertaken for each primary watercourse along the Proposed Grid Connection Route and specifically following heavy rainfall events (i.e. weekly, monthly and event based). Inspection sheets and photographic records will be kept on site. Inspection points will include the in-situ field monitoring point locations and the laboratory analysis sampling points. Inspection points will depend on works being completed within the catchment upstream of the identified monitoring locations. Visual inspections will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period and data including photographs will be collected by visual inspections and independently assessed by the	Daily	As Necessary	ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			Project Hydrologist who will monitor and advise on the records being received. The following periodic inspection regime will be implemented: › Daily general visual inspections of site operations and inspections of all drainage infrastructure within the site and in the surrounding area by the ECoW or a suitably qualified and competent person as delegated by the ECoW; › Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify and maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter will be noted and corrective action will be implemented. High risk locations such as settlement ponds will be inspected daily. Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement; › Event based inspections by the ECoW as follows: › >10 mm/hr (i.e. high intensity localised rainfall event); › >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, › Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week). › Monthly site inspections by the Project Hydrologist/ ECoW during construction phase; › Quarterly site inspections by the Project Hydrologist/ ECoW after construction for a period of one year following the construction phase; and, › A written record will be maintained or available on-site within this Construction Environmental Management Plan (CEMP) which will be maintained on-site during the construction phase			

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
MX11	Reactive Site Drainage Management	Ch. 4: Description of the Proposed Project Appendix 4-3	In line with the requirements of the EIAR, the final drainage design prepared for the Proposed Project prior to commencement of construction will provide for reactive management of drainage measures. The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the ECoW or supervising hydrologist on-site. The contractor is solely responsible for the implementation of the detailed drainage design on site. The ECoW is responsible for monitoring the effectiveness of the drainage design as it is implemented on-site. The ECoW or supervising hydrologist will respond to changing weather, ground or drainage conditions on the ground as the Proposed Project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible. This may require the installation of additional check dams, interceptor drains or swales as deemed necessary on-site. The drainage design may have to be modified on the ground as necessary, and the modifications will draw on the various features outlined above in whatever combinations are deemed to be most appropriate to situation on the ground as a particular time. In the event that works are giving rise to siltation of watercourses, the ECoW or supervising hydrologist will stop all works in the immediate area around where the siltation is evident. The source of the siltation will be identified and additional drainage measures such as those outlined above will be installed in advance of works recommencing	As required	As Necessary	ECoW
MX12	Surface Water Drainage Measures Monitoring	Appendix 4-5: Surface Water Management Plan	Daily visual inspections of the installed drains and outfalls will be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels measured during construction, at the pre-determined sampling locations, be higher than	As required	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			the baseline levels, the source will be identified, and additional mitigation measures implemented. Inspection sheets and photographic records will be kept on site. Inspection points will include the in-situ field monitoring point locations, the laboratory analysis sampling points and continuous monitoring locations. Inspection points will depend on works being completed within the catchment upstream of the identified monitoring locations. Visual inspections will also be completed after major rainfall events, i.e., after events of >25mm rainfall in any 24-hour period and data including photographs will be collected by visual inspections and independently assessed by the supervising hydrologist who will monitor and advise on the records being received. Daily Visual Inspection locations will be confirmed by the Project Hydrologist prior to the commencement of the construction phase. A Daily Visual Check Sheet Template is included in Appendix C. Daily Visual Inspections are subject to change upon commencement of construction activity and works in progress within the catchment areas. The following periodic inspection regime will be implemented: › Daily general visual inspections of site operations and inspections of all watercourses within the site and in the surrounding area by the ECoW or a suitably qualified and competent person as delegated by the ECoW; › Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify any maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter shall be noted and corrective action shall be implemented. High risk locations such as settlement ponds will be inspected daily. Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement;			

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			› Event based inspections by the Environmental Clerk of Works as follows: › >10 mm/hr (i.e. high intensity localised rainfall event); › >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, › Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week). › Monthly site inspections by the Project Hydrologist/ Environmental Clerk of Works of the drainage measures during construction phase; › Quarterly site inspections by the Project Hydrologist/ Environmental Clerk of Works of the drainage measures after construction for a period of one year following the construction phase; and, › A written record will be maintained or available on-site within this Construction Environmental Management Plan (CEMP) which will be maintained on-site during the construction phase.			
MX13	Surface Water Quality and Monitoring	Ch. 9: Water CEMP Section 4	Visual inspection and monthly laboratory analysis results of water quality monitoring shall assist in determining requirements for any necessary improvements in drainage controls and pollution prevention measures implemented on site. It will be the responsibility of the Environmental Clerk of Works to present the ongoing results of water quality and weather monitoring at or in advance of regular site meetings. Reports on water quality will consider all field monitoring and visual inspections, and results of laboratory analysis completed for that period. Reports will describe how the results compare with baseline data as well as previous reports on water quality. The reports will also describe whether any deterioration or improvement in water quality has been observed whether any effects are attributable to construction activities and what remedial measures or corrective actions have been	Daily	As Necessary	ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			implemented. Any proposed alteration to sampling frequency will be agreed with Tipperary County Council in advance			
MX14	Surface Water Quality and Monitoring	Appendix 4-5: Surface Water Management Plan	The analytical determinants of the monitoring programme (including limits of detection and frequency of analysis) will be as per S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations and European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The likely suite of determinants will include: › pH (field measured) › Electrical Conductivity (field measured) › Temperature (field measured) › Dissolved Oxygen (field measured) › Alkalinity (pH measured) › Total Phosphorus › Chloride › Nitrate › Nitrite › Total Nitrogen › Orthophosphate › Total Ammonia as N › Biochemical Oxygen Demand › Total Suspended Solids › True colour › Dissolved organic carbon	As required	Monthly	ECoW
MX15	Surface Water Quality and Monitoring	Appendix 4-5: Surface Water Management Plan	Field chemistry measurements of unstable parameters, (pH, conductivity, temperature) will be taken at the surface water monitoring locations, as per water monitoring programme for the overall wind farm development and each primary watercourse along the route and also at all installed sonde locations. These analyses will be carried out by either the ECoW or the Project Hydrologist. In-situ field monitoring will be completed on a weekly basis. In-situ field	Weekly	As Necessary	ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			monitoring will also be completed after major rainfall events, i.e., after events of >25mm rainfall in any 24-hour period. The Project Hydrologist will monitor and advise on the readings collected by in-situ field monitoring			
MX16	Tree Felling	Ch. 9: Water	› Daily surface water monitoring forms (for visual inspections and field chemistry measurements) will be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection. › Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicle through watercourses will occur, as vehicles will use road infrastructure and existing watercourse crossing points. Existing drains will not be disturbed during felling works;	As Required	Monthly	ECoW
MX17	Plant and Equipment Inspections	Ch. 9: Water	› The plant used will be regularly inspected for leaks and fitness for purpose.	As Required	Monthly	ECoW
MX18	Traffic and Transport	CEMP Section 3	› The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary. › The roads adjacent to the site entrances will be checked weekly or damage/potholes and repaired as necessary.	As required	Weekly	ECoW
MX19	Biodiversity	CEMP Section 4	The Project Ecologist will be available to support the ECoW on matters relating to the protection of sensitive habitats and species encountered prior to or during the construction phase of the Proposed Project. The Project Ecologist will not be full time on site but will undertake pre-commencement surveys and visit the site as required. The responsibilities and duties of the Project Ecologist/Ornithologist will include the following:	As required	As required	Project Ecologist/Ornithologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			› Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided. › Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Site. › Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise. › Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. › Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.			
MX20	Spoil Management, Borrow Pits	Ch. 4: Description of the Proposed Project CEMP Section 4	The Geotechnical Engineer will report to the Construction Manager and is responsible for inspection and review of geotechnical aspects associated with construction of the Proposed Project. The Geotechnical Engineer will not be full time on site but will visit site at least once a month during the construction phase civil works and on a weekly basis during site preparation/groundworks. The responsibilities and duties of the Geotechnical Engineer will include the following: › Visit site regularly, or at least once a month during the construction phase, to complete geotechnical audits and reviews and report any issues to the Construction Manager; › Ensuring that identified hazards are listed in the Geotechnical Risk Register and that these are subject to ongoing monitoring; and, › Ongoing inspection and monitoring of the Proposed Project , particularly in temporary stockpile areas, through all phases of construction (including pre, during and post construction) and ensure construction is carried out as specified in the EIAR, NIS and in relevant planning conditions.	As required	As required	Geotechnical Engineer

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
	Exhaust Emissions	Ch. 10: Air Quality	All construction vehicles and plant used onsite during the construction phase will be maintained in good operational order. If a vehicle requires repairs this work will be caried out, thereby minimising any emissions that arise	As required	As required	Site Supervisor/Construction Manager
MX21	Archaeological Monitoring	Ch. 13: Cultural Heritage CEMP Section 4	› All monitoring works will be carried out under licence to the National Monuments Service of the DoHLGH. If any archaeological remains are identified during the course of the works, further mitigation may be required, such as preservation by record or preservation in-situ. Any further mitigation will require approval from the National Monuments Service of the DoHLGH	As Required	As Required	Project Archaeologist
Operational Phase						
MX22	Drainage Inspections	CEMP Section 3 Ch. 9: Water	› An inspection and maintenance plan for the on-site construction drainage system will be prepared in advance of commencement of any works. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended. Inspections will also be undertaken after tree felling. › Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. Checks will be carried out on a daily basis. During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken for each primary watercourse, and specifically following heavy rainfall events.	Monthly	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
MX23	Bats	Ch. 6: Biodiversity Appendix 6-2	To assess the effects of the Proposed Project on bat activity, at least 3 years of post-construction monitoring is proposed. Post-construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision. At the end of each year, the efficacy of any mitigation/curtailment programme shall be reviewed, and any identified efficiencies incorporated into the programme. To assess the effects of the Proposed Project on bat activity, at least 3 years of post-construction monitoring is proposed. Post-construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision. The results of post-construction monitoring shall be utilised to assess any potential changes in bat activity patterns and to monitor the implementation of the mitigation strategy. If the monitoring identifies a curtailment requirement (i.e. significant bat fatalities encountered), a curtailment programme, in line with relevant guidelines, will be devised around key activity periods and weather parameters, as well as a potential increase in buffers. At the end of each year, the efficacy of the mitigation and monitoring plan will be reviewed, and any identified efficiencies incorporated into the programme. This approach allows for an evidence-based review of the potential for bat fatalities at the Proposed Wind Farm, post construction, to ensure that the necessary measures, based on a new baseline post-construction, are implemented for the protection of bat species locally. The effectiveness of any mitigation or curtailment needs to be monitored in order to determine (a) whether it is working effectively (i.e. the level of bat mortality is incidental), and (b) whether	Years 1, 2, 3	Annually	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			the curtailment regime can be refined such that turbine down-time can be minimised whilst ensuring that it remains effective at preventing casualties. The below subsections provide additional detail on the proposed survey effort, timing, and mitigation. **Monitoring Year 1** Bat activity surveys The post-construction surveys will be carried out as per the pre-construction survey effort. Static monitoring will take place at each turbine during the bat activity season (between April and October) (NatureScot, 2021, NIEA, 2021). Full spectrum recording detectors will be utilised for the same duration as during pre-application surveys and at the same density (NatureScot, 2021). Walked survey transects will also be conducted. Key weather parameters and other factors that are known to influence collision risk will be monitored and shall include: › Windspeed in m/s (measured at nacelle height) › Temperature (°C) › Precipitation (mm/hr) Carcass searches Carcass searches, to monitor and record bat fatalities, shall be conducted at each turbine in accordance with most recent guidance. This shall include searcher efficiency trials and an assessment of			

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			scavenger removal rates to determine the appropriate correction factor to be applied in relation to determining an accurate estimate of collision mortality. Surveys should cover all activity seasons and the use of a trained dog detection team will be carried out to ensure maximum efficiency. **Monitoring Years 2&3** Monitoring surveys shall continue in Year 2 and 3, and where a curtailment requirement has been identified, the success of the curtailment strategy shall be assessed in line with the baseline data collected in the preceding year(s). The performance of the curtailment programme in terms of its ability to respond to the changes in bat abundance based on temperature and wind speed shall be analysed to confirm it is neither significantly over- nor under- curtailing during different periods of bat activity. At the end of each year, the efficacy of the mitigation/curtailment programme shall be reviewed, and any identified efficiencies incorporated into the programme. The requirement for continued post-construction monitoring will also be considered. Should no bat fatalities be recorded in Year 1, curtailment (where applicable) in Year 2 and Year 3 could be reduced/re-evaluated or removed with monitoring continuing to inform this strategy.			
MX24	Birds	Ch. 7: Birds Appendix 7-7: Bird Monitoring Programme	The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the project. Surveys will be scheduled to coincide with years 1, 2, 3, 5, 10 & 15 of the lifetime of the wind farm. Monitoring measures are based on guidelines issued by NatureScot (SNH, 2009 and NatureScot, 2025). The following individual components will be implemented: › Monthly flight activity surveys: vantage point surveys.	Years 1,2,3,5, 10 and 15	Monthly	Project Ornithologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			› Targeted bird collision surveys (corpse searches) will be undertaken with trained dogs. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust. The proposed Bird Monitoring Programme was not put forward in response to any identified significant effect but rather as a best practice measure (as per guidance outlined in NatureScot, 2009). The monitoring programme is comprehensive and considered entirely adequate in this regard. The results of this monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.			
MX25	Noise and Vibration	Ch. 12: Noise and Vibration	Prior to the commissioning of the wind farm, the developer will submit a Noise Complaint Monitoring Programme (NCMP) to the planning authority for written agreement. The NCMP will include a detailed methodology for noise measurements and procedures for recording results and a protocol for managing complaints. Compliance noise surveys will be undertaken to verify compliance with any noise conditions applied to the development. It is common practice to commence surveys within six months of a wind farm being commissioned. The guidance outlined in the IOA GPG and Supplementary Guidance Note 5: Post Completion Measurements (July 2014) will be taken into account. In the unlikely event that an exceedance of the noise criteria is identified as part of the commissioning assessment, implementation of noise reduced operational modes resulting in curtailment of turbine operation will be implemented for specific turbines in specific wind conditions to ensure turbine noise levels are within the relevant noise criterion curves/planning conditions limits. Such curtailment can be applied using the wind farm SCADA system without undue effect on	Once within six months	As Required	Noise Consultant

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			the wind turbine performance. Following implementation of these measures, noise surveys will be repeated to confirm compliance with the noise criteria.			
			Decommissioning Phase			
MX26	Decommissioning	Appendix 4-6: Decommissioning Plan Section 1	As noted in the Scottish Natural Heritage report (SNH) *Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms* (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore: *"best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm".* In this regard, this Decommissioning Plan will be reviewed and updated prior to commencement of decommissioning works to take account of the relevant conditions of the planning permission and current health and safety standards.	End of Operational Life	As Required	Developer Appointed/ Contractor
MX27	Decommissioning	Appendix 4-6: Decommissioning Plan Section 3	In general, the ECoW will maintain responsibility for monitoring the decommissioning works and Contractors/Sub-contractors from an environmental perspective. The ECoW will act as the regulatory interface on environmental matters. The Site Manager will be responsible for reporting to and liaising with GCC and other statutory bodies as required.	End of Operational Life	As Required	Site Manager/ ECoW
MX28	Decommissioning	Appendix 4-6: Decommis	The Site Manager in consultation with the ECoW will be responsible for employing the services of a suitably qualified ecologist and any	End of Operational Life	As Required	Site Manager/ ECoW

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
		sioning Plan Section 3	other suitably qualified professionals as required throughout the decommissioning works.			
MX29	Decommissioning	Appendix 4-6: Decommissioning Plan Section 3	Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of the Site to identify invasive species where any minor excavation will be required. If present in these areas, the ecologist will propose suitable management measures.	End of Operational Life	As Required	Project Ecologist
MX30	Health and Safety	Appendix 4-6: Decommissioning Plan Section 4	› Report on Site activities to include but not limited to information on accidents and incidents, disciplinary action taken and PPE compliance; › Monitor the compliance of contractors and others and take corrective action where necessary; and › Notify the Authority and the client of non-compliance with any written directions issued.	End of Operational Life	As Required	PSCS
MX31	Birds	Appendix 7-7: Bird Monitoring Programme	› It is proposed that decommissioning works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs. Pre-commencement confirmatory surveys will be undertaken within one month prior to the initiation of works at the Proposed Project to identify sensitive sites (e.g. roosts). › Any requirement for decommissioning works to run into the subsequent breeding or winter seasons following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding or roosting birds of conservation concern. These surveys will be conducted once per month during the breeding season (April to July) and once at the start of the winter season (October). The survey will aim to	End of Operational Life	As Required	Project Ornithologist

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			identify sensitive sites (e.g., nests or roosts depending on the season in question). › This monitoring will involve surveying onsite and to a 500m radius of the development footprint/works areas. Monitoring will be undertaken by a suitably qualified ornithologist. The survey period will include one month prior to the initiation of works, four visits between April and July and one visit during the winter period (October). If breeding or roosting activity is identified, the nest/roost sites will be located, and no works shall be undertaken within a species-specific buffer in line with best practice guidance (e.g. Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007). No works within the buffer zone shall be permitted until it can be demonstrated that the species is no longer reliant on the nesting or roosting areas. › All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked off using hazard-tape fencing to alert all personnel on site to the suspension of works within that area.			