Appendix 17.1: Summary of Mitigation Measures

17 INTRODUCTION

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

All mitigation which will be implemented during the various phases of the Project are presented in **Table 17.1** below. This provides an easy to audit list that can be reviewed and reported on during the project phases. The proposal for site inspections and environmental audits are set out in the Construction and Environmental Management Plan (CEMP) which is included as **Appendix 2.1** of this EIAR. Subject to planning permission being granted, Table 17.1 serves as a reporting template for site compliance audits. It can be further developed, in consultation with the relevant statutory agencies and Clare County Council, prior to the project start and during the course of the project phases.

Table 1: Summary of Significant Effects and Associated Mitigation Measures

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
Construction Phase						
Chapter 5: Population & Human Health	Personnel	Avoid accidents to personnel	Slight	• The Client shall appoint a Project Supervisor for the Design Process (PSDP) and a Project Supervisor for the Construction Stage (PSCS). The PSDP shall compile a Preliminary Safety and Health Plan (PSHP), which details general information about the project and envisaged health and safety risks. The PSHP shall be made available to the PSCS. The PSCS shall develop a Construction Stage Health and Safety Plan (CSHSP) which incorporates the information contained in the PSHP and details how safety and health will be managed during the construction of the Project. The PSCS may also develop the following documents during the pre-construction stage of the proposed Development, for implementation during the construction stage: • Construction and Environmental Management Plan (CEMP) • Emergency Response Plan • Detailed Traffic Management Plan		
Chapter 5: Population & Human Health	Infrastructure	Avoid accidents to infrastructure	Slight	The PSDP shall see that the General Principles of Prevention, outlined under the safety design advice provided by the Health and Safety Authority (HSA), are taken into account for all designs relating to the Project.		
Biodiversity - Chapter 6	All	Water quality, emissions and noise	N/A	All construction works will fully comply with Best Practice/Industry Standards such as from IFI, CIRIA and UK Pollution Prevention Guidelines, in respect of the protection of Water Quality, the reduction of emissions and the prevention of noise. All works will comply with Construction Industry Research and Information Association (CIRIA) standards as follows:		

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				• CIRIA (2001). Control of water pollution from construction sites - Guidance for consultants and contractors (C532). Construction Industry Research and Information Association, London. • CIRIA (2019). Culvert, screen, and outfall manual (C786). Construction Industry Research and Information Association, London. • CIRIA (2006) Control of Water Pollution from Linear Construction Projects – Technical Guidance (C648) • CIRIA (2006) Control of Water Pollution from Linear Construction Projects – Site Guide (C649) • CIRIA (2015) Environmental Good Practice on Site (fourth edition) (C741) • CIRIA (2016) Environmental Good Practice on Site pocket book (fourth edition) (C762)		
Biodiversity - Chapter 6	Designated Sites	Contamination	Significant	The implementation of mitigation through avoidance principles, pollution control measures, surface water drainage measures and other preventative measures have been incorporated into the project design in order to minimise potential significant adverse impacts on water quality at the Site. A 50m stream buffer zone will be implemented at the Site which will largely result in the avoidance of sensitive hydrological features. Direct discharges to surface waters of dewatered loads will not be permitted under any circumstances. This in turn will avoid or reduce the potential for adverse impacts on downstream designated sites. An Ecological Clerk of Works (ECoW) with experience in overseeing wind farm construction projects will be appointed by the Contractor for the duration of the construction phase to ensure that the CEMP is effectively implemented and that all planning conditions relating to ecology are complied with. An		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				Environmental Manager will be appointed by the Developer to oversee the environmental management of the project, advise on the environmental issues and ensure compliance by the Contractor.		
Biodiversity - Chapter 6	Watercourses	Water quality degradation	Significant	• A site-specific CEMP will be designed and implemented during the construction, commissioning, operation and final decommissioning phases to reduce the risk of pollution. • An Ecological Clerk of Works (ECoW) with experience in overseeing wind farm construction projects will be appointed by the Developer for the duration of the construction phase to ensure that the CEMP is effectively implemented. The Contractor will be required to appoint an Environmental Manager. • Mitigation by avoidance. • A 50m watercourse buffer zone will be implemented at the Site. • Direct discharges to surface waters of dewatered loads will not be permitted.		
Biodiversity - Chapter 6	Habitats	Habitat loss – including cutover bog, badgers, otters & the common frog	Significant	• A Biodiversity Enhancement and Management Plan (BEMP) is included in **Appendix 6.6** to mitigate habitat loss. • The area will have a programme of ongoing monitoring and rehabilitation during the construction phase. • On the area of cutover bog at the location of turbine T4, the area will be marked by a rope fence and with appropriate signage, and no activities of any type will be allowed outside the agreed work area. ○ The ECoW will inspect the area regularly whilst works are on-going at T4. • Excavated peat and other material will be removed to the approved storage area with no storage of spoil or materials		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				on unplanted bog or in areas immediately adjoining the bog. • Encourage revegetation by storing removed vegetated cutover bog surface (cut out as sods or 'turves'), and reuse around the turbine and hardstand margins. • The surface turves of vegetated bog will be dug out to a minimum depth of 30 cm using a dumper/digger with a bucket. Care will be taken to keep the turve as intact as possible and the vegetated side upwards (though this is not always possible). The turves will be loaded to a trailer and transported to a pre-identified storage area. The storage area will be located in an area of site (not unplanted bog) where disturbance during the storage period will not occur. The turves will be off-loaded from the trailer and placed side by side and vegetation side upwards. They will be placed in single layers, i.e. not piled on top of each other. Should storage be for prolonged periods (months), the turves may need to be watered during dry spells. • Should there be any evidence of a badger sett within the works area or within 50m of the works area, all felling work will cease immediately, and a buffer zone will be established where felling works will be restricted. Mitigation will be implemented as considered necessary. ○ Note that since closure of active setts is prohibited during the badger breeding season (December to June inclusive), appropriate scheduling of the tree's felling process is important to avoid delays. • Otters: A pre-construction survey will be required in the area where the new river crossing will be constructed in case a holt has been established near that location since the 2023 baseline survey.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				○ Should a holt be located appropriate mitigation would follow to ensure that there is no disturbance to breeding animals. ○ Water quality will be maintained in the aquatic zones to ensure that the food supplies for otters within local watercourses are not affected by contaminants generated by the project. • Common Frog: areas where construction works are due to commence during the period February to August will be checked by the ECoW for the presence of frog spawn, tadpoles and adult frogs. ○ If present, these will be removed under licence from NPWS and transferred to suitable ponds, drains or wetlands in the vicinity.		
Biodiversity - Chapter 6	Bats	Injury/death to bats	Slight	• Areas of conifer plantation should be felled in order to discourage bat species from flying close to turbines. • A buffer of 100m from blade tip to forestry edge will be implemented. • Land should be cleared and replaced with smooth grassland / bare ground that get mown annually for the lifetime of the windfarm. • Avoid artificial light where possible. • Construction operations within the wind farm site will take place during the hours of daylight where possible to minimise disturbances to faunal species at night. Some works along the cable route and wind farm site may occur at night but the Environmental Manager/ECoW shall limit night-time works to sections of the route / site which avoid sensitive features (e.g. mature treelines). • Where lighting is required, directional lighting, i.e. lighting which only shines on work areas and not nearby countryside, will be used to prevent overspill. This can be achieved by the design of the luminaire and by using		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				accessories such as hoods, cowls, louvers and shields to direct the light to the intended area only. • Pre-construction roost surveys will be undertaken to identify and protect any bats occupying roosts in trees ear-marked for removal. • Prior to construction further surveys including emergence / re-entry surveys and / or roost inspections at-height (using endoscopes and thermal imaging cameras) will be conducted by a suitably qualified and experienced ecologist with roost disturbance and inspection camera licences. • Should a bat roost be found where tree removal is proposed, the survey findings will inform the licence process (to the NPWS and Clare County Council) to undertake appropriate mitigation actions, to ensure conservation of the bat species. Such actions could include measures to exclude bats from potential roost holes prior to tree removal and provision of alternative roost sites. • Trees will be 'soft felled' ○ This procedure must be carried out in suitable weather conditions, at an appropriate time of year, and involves:- ○ Removing the tree in sections, starting with the top branches and then working down the trunk trying to avoid cutting through cavities; ○ Any sections with roost features must be lowered with care and laid on the ground with potential entrances to roosts orientated upwards to allow bat to vacate the roost; and ○ Sections must be left in situ for at least 24 hours in suitable weather conditions to allow any bats to disperse.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• For any occupied roost sites where tree removal is not proposed, an exclusion zone will be implemented to prevent disturbance during times of occupancy.		
Chapter 7: Aquatic Ecology	Surface waters & aquatic ecology	Degradation of quality	Moderate	• The mitigation measures have been incorporated into a Construction and Environmental Management Plant (CEMP) for the development which includes Construction Method Statements for key works. The CEMP includes a Surface Water Management Plan (SWMP), and a Peat Spoil Management Plan (WMP). • Prior to construction, consultation is required with all relevant statutory agencies (e.g. IFI, OPW)) to confirm the proposed mitigation methodologies. • The CEMP, SWMP, and WMP will require mandatory adherence by all parties involved in the construction of the Development (including any sub-contractors) in order to protect aquatic conservation interests within the study area. • The development of the mitigation measures and all method statements for watercourse crossings follows all relevant guidance and current best practice as detailed in: ○ CIRIA (2001). Control of water pollution from construction sites - Guidance for consultants and contractors (C532). Construction Industry Research and Information Association, London. ○ CIRIA (2019). Culvert, screen and outfall manual (C786). Construction Industry Research and Information Association, London. ○ DHPLG (2019). Draft Revised Wind Energy Development Guidelines. Department of Housing, Planning and Local Government. December 2019 ○ Enterprise Ireland (unknown). Best Practice Guide (BPGCS005) Oil storage guidelines.		

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				○ IFI (2016). Guidelines on Protection of Fisheries during Construction Works in and adjacent to waters. Inland Fisheries Ireland, Dublin. ○ IWEA (2012). Best Practice Guidelines for the Irish Wind Energy Industry. Guidance prepared by Fehily Timoney & Company for the Irish Wind Energy Association. ○ Kilfeather, P.K. (2007). Maintenance and protection of the Inland Fisheries resource during road construction and improvement works. Southern Regional Fisheries Board. ○ Murphy, D.F. (2004). Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. Eastern Regional Fisheries Board. ○ NRA (2008). Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. National Roads Authority. ○ SNH (2019). Good Practice during Wind Farm Construction (4th edition). Scottish Natural Heritage. • There will be no instream works permitted. • The use of Sustainable Drainage Systems (SuDS) on site will eliminate risk to watercourses from sedimentation during the construction and operational phases of the proposed development. • Surface water management measures, including the installation of silt fencing and delineation of buffers will be put in place in advance of the development of the internal road network. • All other measures including the following key elements which are described in detail within the Surface Water Management Plan:		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				○ Open Constructed drains for development run-off collection and treatment; ○ Collection Drains for upslope "clean" water collection and dispersion; ○ Filtration Check Dams to reduce velocities along sections of road which run perpendicular to contours; ○ Settlement Ponds, Settlement Lagoons and Buffered Outfalls to control and store development runoff to encourage settlement prior to discharge at Greenfield runoff rates. • There will be no direct site run-off to watercourses during the construction phase with all outflows from drainage via settlement ponds from which treated surface water is released by diffuse overland flow at appropriate locations. • To reduce the amount of silt laden water to be treated, clean water drains will be created upstream of the works area to divert water away from construction areas, thereby lessening the volume of water to be treated onsite.		
Chapter 8: Soils and Geology	Soils / Geology	Significant soil and slope stability issues leading to mass movement or landslides	Slight	• Peat Stability Risk Assessment (Chapter 8: *Soils and Geology* - Technical Appendix 8.1) indicates that the risk of significant peat or slope stability issues arising on the site is very low. • Mitigation by avoidance.		
Chapter 8: Soils and Geology	Soils / Geology	Localised stability issues arising from excavation activities and vehicular movement (Localised displacement)	Moderate	• Vehicular movements will be restricted to the footprint of the proposed Development. • Vehicular traffic on Site is reduced through the re-use of excavated material on Site which will reduce the need to source material from external quarries. • Localised areas of landscaping will be sealed and levelled using the back of an excavator bucket to prevent erosion. • Temporary stockpiles will be limited to 1m height and removed for reuse/remediation purposes or disposed		

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				offsite as soon as possible. It is envisaged that all material will be reused on site, unless contaminated (for example; due to accidental hydrocarbon/fuel spill). Therefore, the risk posed by the management of material in terms of peat and slope stability is dramatically reduced if not avoided completely. • Ancillary machinery will be kept on established Turbine Hardstands, and no vehicles will be permitted outside of the footprint of the Development and will not move onto land that is not proposed for the Development if it can be avoided. • Where vehicular movements are necessary outside of the Development, ground conditions will be maintained as well as possible. This includes for example replacing sods, smoothing over with excavator bucket etc. Where ground conditions are poor, or prolonged works, temporary access measures will be deployed, for example floating platforms / floating access track. • Floating tracks are applied directly to peatlands and remove the need to excavate any peat. • For the Grid Connection route, before starting construction, the area around the edge of each joint bay which will be used by heavy vehicles will be surfaced with a terram cover (if required) and stone aggregate to minimise ground damage. Furthermore, with a view to applying the precautionary principle, the following procedures will be adopted as best practice mitigation measures at the Site. • All Site excavations and construction will be supervised by a geotechnical engineer/ engineering geologist. • The excavation material for the construction of access track will not progress ahead of actual track construction.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• The Contractor's * methodology statement and risk assessment will comply with the CEMP and will be reviewed and approved by a suitably qualified geotechnical engineer/engineering geologist prior to Site operations. (*Contractor here refers to the chosen or contracted construction company at the commencement stage of the proposed Development). • Particular attention and pre-construction assessment (developer / sub-contractor site specific risk assessment and method statement (RAMS) and on-site toolbox talks etc.) and mitigation planning will be given to any new infrastructure, for example, the proposed Site tracks, culverted watercourse crossings and hardstand associated with the like. • Groundwater level (pore water pressure) will be kept low at all times (excavation dewatering) to avoid ground stability risks (subsidence) associated with peat and careful attention will be given to the existing drainage and how structures might affect it. Draining water from the construction area will be done through advanced dewatering techniques. In particular, ponding of water will not be allowed to occur in recent excavations, particularly in any areas encountered where peat is >1m. All deliberate or incidental sumps will be drained to carry water away from the sump following rainfall. Otherwise, this water will increase hydraulic heads locally (or increased bog water or groundwater levels), increase pore water pressure and can potentially lead to instability. • In areas of saturated peatlands, prior to excavation, drains will be established to effectively drain grounds prior to earthworks. Such drains will be positioned at an oblique angle to slope contours to ensure ground stability. Drains on areas of the Site with minimal risk of bog failure as		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				identified by Site Investigations will be positioned at a more acute angle to the slope contour in order to reduce the velocity of surface water drainage. It is noted that deeper (>2.0 m) peat at the site is generally confined to isolated pockets and the need for measures such as sheet piling is very low. • Peat will be carefully managed particularly when in temporary storage. Temporary storage areas will be isolated from the receiving environment by means of temporary infrastructure such as boundary berms comprised of subsoils sourced at the site, or similar material. There is potential for large volumes of bog water draining from new stockpiles which will also be managed. Mitigation will include removal of gross solids from runoff prior to bog water intercepting the wind farm drainage network. Temporary measures such as dewatering and pumping through silt bags will be employed to assist this process. Draining of stockpiled peat, in a controlled manner is recommended, with a view to reducing the weight and mobility of the material, therefore reducing risk in terms of localised stability. Similar measures will be applied to the management of subsoil arisings at the site. • Peat is required for reinstatement, therefore acrotelm peat (top living layer, c. 0.5m) will be stripped off the surface of the bog and placed carefully at the margins of the Development along the Site track and hardstand margins. • Relatively high impact construction activities (e.g., excavations, movement of soils / subsoils / rock) are acceptable to be carried out throughout the year, when taking into account the various restrictions of the Development, (for example, breeding bird seasons). However, considering the variability of metrological conditions and the potential for significant events to occur		

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				at any stage of the year, the construction phase will be limited to favourable meteorological conditions. In order to mitigate for particular earth works tasks and suitable meteorological conditions, construction activities will not occur during periods of sustained significant rainfall events, or directly after such events (allowing time for work areas to drain excessive surface water loading and discharge rates reduce). • From examination of factual evidence to date, the majority of landslides occur after an intense period of rainfall. Stability issues at a localised scale will be similarly impacted by rainfall events, particularly when dealing with exposed soils or open excavations. An emergency response system will be developed for the construction phase of the project, particularly during the early excavation phase. This, at a minimum, will involve 24-hour advance meteorological forecasting (Met Eireann download) linked to a trigger-response system. When a pre-determined rainfall trigger level is exceeded (e.g. one in a 100-year storm event or very heavy rainfall at >25mm/hr), planned responses will be undertaken. These responses will include; cessation of construction until the storm event including storm runoff has passed over. Following heavy rainfall events, and before construction works recommence, the Site will be inspected and corrective measures implemented to ensure safe working conditions, for example dewatering of standing water in open excavations, etc. • Vehicular access to any areas of deep peat (>1m) during construction will be restricted to low ground pressure vehicles, with all construction vehicles travelling on existing access tracks whenever possible.		

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				• A Geotechnical Clerk of Works will be employed during the construction phase in order to continuously monitor areas of peat. Ongoing physical stability checks and calculations will be undertaken in order to verify that safety standards are being met. • Excavated peat will only be moved short distances from the point of extraction and will be used locally for landscaping. Landscaping will be sealed and levelled using the back of the excavator bucket to prevent erosion. • Where possible, soil and rock will be re-used on site immediately, thereby reducing the need for double handling, and will also reduce the requirements to stockpile soil. • Generally excavated rock will be used will be used immediately for Site Access Track construction. • Best practice will be applied during construction which will minimise the amount of soil and excavation. • Whenever possible stockpiles will be avoided. • Peat will only be stockpiled in areas of thin or absent peat and only in areas which have been assessed for stability by a suitably experienced geotechnical engineer.		
Chapter 8: Soils and Geology	Forestry	Impacts of forestry felling	Slight	• A felling licence will be obtained before any tree felling will be allowed. A NIS will be required to secure approval of a felling licence. • As the trees are of such a low yield class and quality, from a cost benefit analysis point of view the cost to extract the trees post harvesting would not seem advantageous. • This will allow the harvesting machine to use more brash under the machine when harvesting, while also eliminating the need for forwarding machinery to enter the site to further traverse the brash matts to extract timber. This will reduce any risk of soil erosion and impaction.		

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				• Felling and extraction, if economical, of timber will, as far as possible, be undertaken at the same time as currently licensed extraction activities in order to minimise traffic and noise disturbance.
				• Felling and extraction of timber will only be permitted by experienced and fully trained operators.
				• All Forest Service guidelines will be adhered to during all harvesting activities.
				• A harvest site plan including extraction routes, fuelling areas, stacking areas, turning areas and drain crossings etc. and HIRA will be designed and implemented during all harvesting operations.
				• All drains crossed during extraction, if necessary, will be cleared of any debris to ensure no drainage issues will occur for the remining trees, which can be a major attributor to windblow.
				• Felling and extraction of timber will be undertaken in dry weather conditions.
				• All timber harvesting, construction of forest tracks, including the creation of buffer zones and roadside drainage, will comply with the appropriate edition of the following specification, which have been developed by the Forest Service:
				  ○ Forest Protection Guidelines
				  ○ Forestry and Water Quality Guidelines
				  ○ Forest Harvesting and Environmental Guidelines
				  ○ Forestry and Freshwater Pearl Mussel Requirements - Site Assessment and Mitigation Measures
				  ○ Forest Biodiversity Guidelines
				  ○ Forestry and The Landscape Guidelines
				  ○ Forestry and Archaeology Guidelines		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
Chapter 8: Soils and Geology	Subsoil and Bedrock	Geotechnical and hydrological balance	Moderate	• Locate turbines in areas where the existing infrastructure is utilised, peat is shallow, and the topography is favourable. • Use engineered cut and fill extents. • All works will be managed and carried out in accordance with the CEMP. • Use appropriate engineering controls, such as the drainage of the peat along the proposed Site tracks in advance of excavation activity (1 month in advance where possible) so as to reduce pore water content and thus instability of the peat substrate prior to excavation. • Drains will not be positioned parallel to slope contours, that is, a gradient more than zero. • In those parts of the Site where excavation may intercept areas of peat that are >1.0m depth, a geotechnical engineer/engineering geologist will be onsite to supervise and manage the excavation works and confirm the necessity for supporting newly excavated peat exposures or redirect initial construction phase drainage to maintain ground stability. • Bedrock will be re-used for construction of Site Access Track, where possible. • Peat, overburden, and rock will be reused where possible on Site to reinstate excavated areas where appropriate. • Where possible, the upper vegetative layer 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 landscaped peat. These measures will prevent the erosion of peat in the short and long term. • Subsoil and bedrock which are excavated as part of the initial construction (and potential decommissioning) phase(s) will be reused onsite where possible.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• Excess bedrock will be reused as backfill in areas previously excavated, or as backfill in cut and fill operations, for example, Site Access Roads and Turbine Hardstands. Using the local bedrock as fill will ensure that impacts to hydrochemistry are minimised. • Geotechnical testing on imported material will be carried out prior to its reuse onsite particularly for reuse as a running or load bearing surface and will only be reused for those purposes if the suitability of same is conforms to relevant standards. • Peat material excavated will be reused as backfill in areas previously excavated as much as possible, and/or for reinstatement works elsewhere on the Site. To facilitate this the acrotelm (living layer) and the catotelm (lower layer) will be treated as two separate materials. Catotelm peat will be used to backfill, for example around turbine foundation pads once established. Acrotelm peat will be used as a dressing on top of deposited catotelm peat in order to promote and re-establish flora and ensure the acrotelm layer becomes relatively cohesive in terms of localised peat stability (vegetated). • Identification of suitable temporary set down areas which will be located within the Development footprint and will consider and avoid geo-constraints. • On completion of the Construction Stage, reinstate areas not required for the Operation Stage • No permanent stockpiles will remain onsite. • Best practice will be applied during construction which will minimise the amount of soil and rock excavation and therefore also reduce storage and stockpile requirements. • Where possible, soil and rock will be re-used on the Site immediately thereby reducing the need for double handling, thus reducing the requirements of stockpiles.		

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				• The Peat and Spoil Management Plan will ensure that the material arising from any excavation will have a predetermined plan and route for re-use / remediation, or disposal if all potential for reuse / remediation have been exhausted. • For the grid connection route: stockpiles will be restricted to less than 2m in height and will be subject to approval by the Site Manager and Project Ecological Clerk of Works (ECoW). • Any excavated material will be later used to backfill the trench where appropriate, any surplus material will be transported to a licensed facility		
Chapter 8: Soils and Geology	Soils / Geology	Compaction, erosion and degradation of peat arising from vehicular movement	Slight	• Vehicular movements will be restricted to the footprint of the Development and advancing ahead of any constructed hardstand will be minimised in so far as practical and will not move onto land that is not proposed for the Development if it can be avoided. • Where vehicular movement are necessary outside of the Development, ground conditions will be maintained as well as possible. This includes for example replacing sods, smoothing over with excavator bucket etc. Where ground conditions are poor, or prolonged works, temporary access measures will be deployed, for example floating platforms / floating access track. • Floating tracks are applied directly to peatlands and remove the need to excavate any peat. The weight of the track structure will gradually lead to subsidence of the material, and compression of underlying peat, namely the acrotelm potentially resulting in reduced transmittance of runoff and impacting on baseline hydrological regime at the site. This can lead to excessive wetting upgradient and peatland drying and chronic degradation of water supply down gradient of tracks. Proposed drainage as part of the		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				Development has been designed to maintain the baseline hydrological regime as far as practical. • Vehicular traffic on Site is reduced through the re-use of excavated material on Site which will reduce the need to source material from external quarries, thus reducing vehicular movement. • For the Grid Connection Route, before starting construction, the area around the edge of each joint bay which will be used by heavy vehicles will be surfaced with a terram cover (if required) and stone aggregate to minimise ground damage. • All works will be managed and carried out in accordance with the CEMP which will be updated by the civil engineering contractor and agreed prior to any Site works commencing.		
Chapter 8: Soils and Geology	Soils / Geology	Wastewater Sanitation contamination	Slight	• Wastewater/sewerage from the Temporary Construction Compound will be collected and held in a sealed storage holding tank, fitted with a high-level alarm, which will be emptied periodically. • Chemicals will likely be used to reduce odours. • The sealed storage holding tank will be fitted with a high-level alarm so that when it reaches a certain capacity an alarm will warn that the tank will need to be emptied. • All wastewater will be emptied periodically, tankered off-site by a licensed waste collector to the local Kilrush wastewater sanitation plant for treatment. There will be no onsite treatment of wastewater. A wastewater or sewerage leakage is not anticipated in a properly managed Site.		
Chapter 8: Soils and Geology	Soils / Geology	Soil Contamination - Hydrocarbon contamination	Slight	• No fuel storage should occur at the Site whenever feasible and refuelling of plant and equipment should occur off site at a controlled fuelling station.		

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				• In instances where on Site refuelling is unavoidable, then the bunded on Site designated refuelling area must be used. The designated refuelling area must be impermeable and bunded to 110% volume capacity of fuels stored at the Site. • Refuelling procedures for the site will be detailed in the site induction and in toolbox talks. • All oil and chemical storage facilities will be bunded to 110% volume capacity of fuels stored at the site. A "fuel station" will be designated for the purpose of safe fuel storage and fuel transfer to vehicles, located at the Temporary Contractor's Compound. • An Emergency Response Plan (ERP) and Fuel Management Plan form part of the CEMP (Appendix 2.1). • Assets (plant, vehicles, fuel bowsers) will be checked on a regular basis during the construction phase of the Development. • Construction activities will be restricted to the footprint of the Development. • Hydrocarbon contamination incidents will be dealt with immediately as they arise, and the cessation of works in the area of the spillage until the issue is resolved. • Hydrocarbon spill kits will be prepared and kept in vehicles associated with the construction phase of the Development. • Spill kits will also be established at proposed construction areas, for example, a spill kit will be established and mobilised as part of the turbine erection materials and equipment. • Staff will be trained in the use of spill kits. • No material, contaminated or otherwise will be let on the Site.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• In the event of a significant or catastrophic hydrocarbon spillage, emergency responses will be escalated accordingly. Escalation can include measures such as the installation of temporary sumps, drains or dykes to control the flow or migration of hydrocarbons, excavation and disposal of contaminated material. • Any accidental spillage of introduced materials, such as concrete, will be removed from the Site. • Mobile bowsers, tanks and drums will be stored in secure, impermeable storage area, away from drains and open water. • Fuel containers will be stored within a secondary system e.g. bund for static tanks or drip tray for mobile stores. • Ancillary equipment such as hoses and pipes will be contained within the bund. • Taps, nozzles or valves will be fitted with a lock system. • Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage. • Only designated trained operators will be authorized to refuel plant on site. • Good Site practice and a robust CEMP will also result in less traffic and a lower potential for fuel spills and leakages. • Any vehicles coming onto the Site will be required to be inspected and cleaned before leaving the Temporary Construction Compound before advancing to the destined construction area.		
Chapter 8: Soils and Geology	Soils / Geology	Construction Material contamination	Slight	• Concrete washout will be undertaken in a controlled area of the Site. • Precast concrete will be used wherever possible. • Cement / concrete contamination incidents will be dealt with immediately as they arise.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• Vehicles will undergo a visual inspection prior to being permitted to drive onto the proposed site or progress beyond the contractor's yard. • Emergency contact numbers for the Local Authority Environmental Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the vicinity of works. • Spill kits will also be established at proposed construction areas, for example, a spill kit will be established and mobilised as part of the turbine erection materials and equipment. Suitable receptacles for cementitious materials will also be at hand. • In the event of a significant contamination or pollution incident e.g., discharge or accidental release of hydrocarbons / fuel to surface water systems, contamination occurrences will be addressed immediately, this includes the cessation of works in the area of the spillage until the issue is resolved. The relevant authorities, noted above, and stakeholders will also be promptly informed. • Chutes of the trucks will be cleaned prior to leaving the site and will take place at a designated area at the Temporary Compound. • All construction materials will be stored in secure areas. Any hazardous materials will be correctly stored within properly bunded areas in accordance with good Site practice and in accordance with the Site Management Plan. • Bedrock will be re-used for construction of Site Access Tracks wherever possible. • Peat, overburden, and rock will be reused where possible on Site to reinstate excavated areas where appropriate.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• All materials used on Site and wastes generated on Site will be reduced by good Site practice and attention to the CEMP. A policy of reduce, re-use and recycle will apply. All waste will be segregated and re-used where possible or removed from Site for recycling. Any waste which is not recyclable or compostable will be properly disposed of landfill. Whenever possible, excavated materials will be re-used close to the area of excavation. Careful design will result in minimal excess soil and rock. • Any shuttering installed to contain the concrete during pouring will be installed to a high standard with minimal potential for leaks. Additional measures could be taken to ensure this, for example the use of plastic sheeting or other sealing products at joints. • Concrete will be poured during periods of minimal precipitation. This will reduce the potential for surface water run off being significantly affected by freshly poured concrete. This will require limiting these works to dry meteorological conditions i.e., avoid foreseen sustained rainfall (any foreseen rainfall event longer than 4-hour duration) and/or any foreseen intense rainfall event (>3mm/hour). This also will avoid such conditions while concrete is curing, in so far as practical. • Ground crew will have a spill kit readily available, and any spillages or deposits will be cleaned/removed as soon as possible and disposed of appropriately. • Pouring of concrete into standing water within excavations will not be undertaken. Excavations will be prepared before pouring of concrete by pumping standing water out of excavations to the buffered surface water discharge systems in place.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• No surplus concrete will be stored or deposited anywhere on site. Such material will be returned to the source location or disposed of off-site appropriately.		
Chapter 9: Hydrology and Hydrogeology	Surface water & groundwater quality	Entrainment of suspended solids during earthworks	Moderate to Significant	• The drainage, attenuation and other surface water runoff management systems will be installed concurrent with the main construction activities to control increased runoff and associated suspended solids loads in runoff during intensive construction activities e.g., excavation of Turbine Foundation. • Vehicular movements will be restricted to the footprint of the Development and advancing ahead of any constructed hardstand will be minimised in so far as practical. • Drainage infrastructure will be installed during meteorologically dry ground conditions. Diffuse surface water runoff will be managed as follows: • With reference to Section 5, Surface Water Management Plan in Appendix 2.1, collector drains and/or soil berms will be established to direct/divert surface water runoff from development areas, including temporary stockpiles, and direct same into established treatment trains including stilling ponds, buffered discharge points or other surface water runoff control infrastructure as appropriate. This is particularly important for effective surface water management associated with proposed infrastructure within the varied surface water buffer zones. The drainage system will be permanent (see also Appendix 9.4 for conceptual graphics). • Silt fences will be established along the perimeter of source areas e.g., stockpiles, within the drainage network, and in existing natural drains and degraded		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				peat areas which are likely to receive surface water runoff. Section 5.5 of the Surface Water Management Plan in Appendix 2.1 describes this in more detail. This will reduce the potential for surface water runoff loaded with suspended solids to rapidly infiltrate towards and be intercepted by drainage or significant surface water features. Where possible multiple silt fences will be installed at multiple locations in drains / treatment trains discharging to the surface water network. Double silt fences / screens will be deployed at outfalls within surface water buffer areas. Silt fences will be temporary features but will remain in place for a period following the completion of the construction phase until such time that Site conditions are stable. Waters arising as a product of excavation activities will be managed as follows: • Waters arising from dewatering practices during excavation works will be significantly loaded with suspended solids. As such, constructed stilling ponds followed by buffered outfalls may be insufficient in controlling the release of suspended solids to the surface water network. Routine monitoring will prevent the possibility of clogging from significant volumes of settled or attenuated solids. Therefore, any water pumped from excavations, or any waters clearly heavily laden with suspended solids will be contained and managed and pumped through the preestablished active management treatment train (Appendix 9.4 – Tile no. 8 and 9). This will include continuous active monitoring of water quality by turbidity measurement on an hourly basis.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				Waters (likely loaded with suspended solids) intercepted by the established drainage network will be managed as follows: • In line Stilling Ponds will buffer the run-off discharging from the drainage system during construction, by retaining water, thus reducing the hydraulic loading to watercourses. Stilling ponds are designed to reduce flow velocity to 0.3m/s at which velocity, silt particle settlement occurs. Stilling ponds will be permanent (life of Development at minimum). The locations of stilling ponds have been specified as a part of the drainage design, refer to Site Layout Plans 6777-JOD-BKWF-XX-DR-C-1100 to 6777-JOD-BKWF-XX-DR-C-1104 planning drawings. Flow control devices such as weirs and baffles will facilitate achieving better attenuation, particularly when considering fluctuating runoff rates. • In line Check Dams will be constructed across drains Section 5.6 of Surface Water Management Plan in Appendix 2.1). Check dams will reduce the velocity of run-off in turn facilitating the settlement of solids upstream of the dam. Check dams will also reduce the potential for erosion of drains. Rock filter bunds may be used for check dams however, wood or straw/hay bales will also be used if properly anchored, that is; supported with rock or fitted timber to reduce potential for material to be swept away by incoming water. Multiple check dams will be installed, particularly in areas immediately downgradient of construction areas. Check dams will only be constructed in drainage infrastructure and not in significant surface water features i.e., streams or rivers. Check dams (comprised of rock) established will be permanent. The following will be implemented in the		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				design of check dams and their deployment (CIRA, 2004): • Permanent rock filter bunds are preferred as this will ensure that rapid surface water runoff is mitigated against for the life of the Development. • Check dams will be installed at c. 20m intervals within the length of drainage channels. This is dependent on the slope angle and height of check dams constructed, refer to Appendix 9.4 – Tile no. 3 and 3a. • Check dams will include a small orifice / pipe at the base to allow the flow of water during low flow conditions i.e., maintain hydrological regime during low flow conditions. Note: the use of coarse aggregate will facilitate some infiltration. • Erosion protection will be established on the downstream side of the check dam i.e., cobbles or boulder (100-150mm diameter) extending at least 1.2m. • Check dams will be constructed as part of the drain i.e., reduce the potential for bypassing between the drain wall and check dam. • Further details and design considerations are presented in Appendix 9.4 – Tile no. 3 to 6, refer also to Section 5.6 of Surface Water Management Plan, Appendix 2.1. • Surface water runoff will be discharged to land via buffered drainage outfalls (refer to Appendix 9.4 Tiles 7, 13 and 14, see also Figure 5.2 in Surface Water Management Plan, Appendix 2.1). Buffered drainage outfalls will contain hard core material of similar or identical geology to the bedrock at the Site to entrap suspended sediment. In addition, these outfalls promote sediment percolation through vegetation in the buffer zone, removing sediment loading to acceptable levels at any adjacent watercourses and avoiding direct		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				discharge to the watercourse. A relatively high number of discharge points / buffered outfalls have been established as part of the design, thus decreasing the loading on any particular outfall. Discharging at regular intervals mimics the natural hydrology by encouraging percolation and by decreasing individual hydraulic loadings from discharge points. • Outfalls will not be positioned in areas with extensive existing erosion and exposed soils. Buffered outfalls will be fanned and be comprised of coarse aggregate (cobbles / boulders) (Appendix 9.4 – Tile 13). These structures will be akin to rip raps (coastal erosion defences/ outfall erosion defences). Silt fences (Appendix 9.4 – Tile 16 Section 5 of Surface Water Management Plan, Appendix 2.1) will be established downstream of buffered outfalls with a view to ensuring the effectiveness of the attenuation train, particularly during elevated flow events. Buffered outfalls established will be permanent. • Straw bales (similar to stone check dams) (Appendix 9.4 - Tile 15), and silt fences (discussed under diffuse runoff) can also be used within drainage channels for the purposes of attenuating runoff and entrained suspended solids, however these measures should be considered temporary and will be used mainly in managing potential acute contamination incidents (e.g. additional features to control runoff during excavation works) or to facilitate temporary works (e.g. corrective actions, discussed in later sections). Note; the installation of straw bales or silt fences will be checked on a daily basis by the Contractor's Environmental Manager and supervised by the ECoW to ensure the bypassing does not occur.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				Coarse stone / boulders could be used in conjunction with these measures to address such issues. • Management of excavated material – A Peat and Spoil Management Plan will be prepared. This Plan will incorporate provision on materials management with a view to establishing material balance (reuse of excavation arisings) during the proposed construction phase, thus minimising the potential for or the length of time excavated materials are exposed and vulnerable to entrainment by surface water runoff. • No permanent or semi-permanent stockpiles will remain on the Site during the construction or operational phase of the Development. Spoil to be taken off site to the designated spoil storage area, i.e. Borrow Pit. • Earthworks will be limited to seasonally dry periods and will not occur during sustained or intense rainfall events. An emergency response system has been developed for the construction phase of the project particularly during the early excavation phase. This involves 24-hour advance meteorological forecasting (downloadable from Met Éireann) linked to a trigger-response system. When a pre-determined rainfall trigger levels is exceeded (e.g., sustained rainfall (any foreseen rainfall event longer than 4-hour duration) and/or any yellow or greater rainfall warning (>25mm/hour) issued by Met Éireann), planned responses will be undertaken. These responses will include; ○ Cessation of all construction works during and until such storm events (yellow warning, Met Éireann), including storm runoff passing over; ○ Following heavy rainfall events, and before construction works recommence, the Site construction areas and infrastructure will be		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				inspected by and Environmental Clerk of Works to confirm no additional escalation of response is required; ○ Corrective measures will be implemented to ensure safe working conditions, for example, dewatering of standing water in open excavations and repair works to drainage features if necessary. • Exposed soils/peat (exposed temporary stockpiles) will be covered with plastic sheeting during all heavy rainfall / storm events and during periods where works have temporarily ceased before completion at a particular area (e.g., weekends, overnight, etc). • Sediment fencing will be erected along proximal and paralleling areas of watercourses, channels and drains spanned by the works to reduce the potential for sediment laden run-off to reach sensitive receptors. • No direct flow paths between stockpiles and watercourses will be permitted at the Site. • All drainage infrastructure required for the management of surface water runoff or draining peat ahead of excavation works will be established before excavation works commence. Similarly, mitigation measures related to surface water quality will be implemented before excavation works commence. • Conceptual and information graphics presented in **Appendix 9.4 – Tile no. 7, 8 and 9** present indicative layout and specification for both passive treatment trains (clean water interceptor drains), active management treatment trains (management and treatment of construction water) and emergency response and intervention.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				The Grid Connection Route will require excavation of cable trenches in existing roadways as well as potential forestry tracks and private lands. With reference to general excavation practices discussed above, excavation of cable trenches in close proximity to surface water features will require special consideration in terms of managing movements, spoil arising from excavations, and entrainment of solids and contaminants in surface water runoff. Mitigation measures to reduce the potential for adverse impacts arising from earth works and management of spoil include the following: • In sensitive areas, excavation of material will be conducted in a controlled manner whereby any temporary deposit of the material in buffer zones can be minimised. For example, vacuum excavation techniques or similar will be used for excavations within Surface Water Buffer zones and other sensitive areas (constraints) (**Figure 9.12a & 9.12b**). Excavated soil will be removed to temporary storage areas. • Management of excavated material will adhere to the measures related to the management of temporary stockpiles outlined in **Chapter 8: Soils and Geology**, a Peat and Spoil Management Plan has been established and forms part of the CEMP with a view to establishing material balance during the proposed construction phase, thus minimising the potential for, or the length of time excavated materials are exposed and vulnerable to entrainment by surface water runoff. No permanent, or semi-permanent stockpile will remain on the site during the construction or operational phase of the Development. • All spoil from trenches in public roadways will be removed from Site as it is excavated and transported to a licenced facility for soil and stones.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• Earthworks will be limited to meteorologically dry periods and will not occur during sustained or intense rainfall events. Similar to measures outlined in relation ground stability during excavation works (**Chapter 8: Soils and Geology**), and as discussed in this chapter, an emergency response system has been developed for the construction phase of the project, particularly during the early excavation phase. This, at a minimum, will involve 24 hour advance meteorological forecasting (Met Éireann download) linked to a trigger-response system. When a pre-determined rainfall trigger level is exceeded (e.g., 1 in 100 year storm event or very heavy rainfall at >25mm/hr), planned responses will be undertaken. These responses will include cessation of construction until the storm event including storm runoff surge has passed over. Following heavy rainfall events, and before construction works recommence, the site will be inspected and corrective measures implemented to ensure safe working conditions, for example dewatering of standing water in open excavations and transfer to treatment train.		
Chapter 9: Hydrology and Hydrogeology	Surface water	Increased hydraulic loading	Imperceptible	Use appropriate environmental engineering controls and mitigation measures, i.e. attenuation features, these potential impacts can be significantly reduced. For example, the following model will be applied at a proposed Turbine Hardstand locations: • Collector drains; allowing for 0.5m depth, 1.0m width, presume semi-circular, sectional area; c. 0.4m^2. Presume 100m length of collector drain; up to 40m^3 capacity per 100m, by 50% allowing for gradient equates to 20m^3. Collector drains are not intended to store runoff, however the in-line attenuation features, such as check dams and flow regulators will serve to reduce discharge rates		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				dramatically, effectively backing up water and regulating the rate of discharge. The actual attenuation capacity of the drainage network and treatment trains will be calculated during the detailed design phase of the Development. • Check dams at regular intervals throughout the drainage network (existing, new clean collector and new dirty collector drains) will attenuate runoff intercepted by respective drainage channels. • Dirty water collector drains (associated with construction areas) will direct runoff to established stilling ponds. Stilling ponds will reduce the velocity of runoff, further reducing the hydrological response to rainfall. • Buffered outfalls to vegetated areas will utilise the infiltration capacity of the ground prior to the rejected rainfall eventually being intercepted by the receiving surface water system. • Clean water collector drains will intercept clean runoff (upgradient of construction areas) and will direct runoff around construction areas. The runoff will be attenuated by means of check dams and intermittent buffered outfalls (**Appendix 9.4 – Tile 3a, Tile 13 and Tile 14**).		
Chapter 9: Hydrology and Hydrogeology	Surface water	Increased entrainment of contaminants and other impacts arising due to localised stability issues	Moderate to Significant	• Mitigation outlined above for designated sites and water quality. • Sections 5.3-5.10 of the outline CEMP. • Section 8.5 of Chapter 8: *Soils and Geology* • Section 9.5 of Chapter 9: *Hydrology and Hydrogeology*		
Chapter 9: Hydrology and Hydrogeology	Surface water	Catastrophic impacts arising from significant stability issues (Landslide – worst case)	Significant to Profound	• Peat Stability Risk Assessment (Chapter 8: *Soils and Geology* - Technical **Appendix 8.1**) indicates that the risk of significant peat or slope stability issues arising on the site is very low. • Mitigation by avoidance.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
Chapter 9: Hydrology and Hydrogeology	Surface & Ground Water	Dewatering - Water quality impacts	Significant	Mitigation measures to reduce the potential for adverse impacts arising from earth works / management of spoil and associated entrainment of solids in runoff and construction water will include the following: • Conceptual and information graphics presented in **Appendix 9.4 – Tiles no. 7, 8 and 9** present indicative layout and specification for Active Management treatment trains (containment, management and treatment of construction water) and emergency response and intervention (recycling or diversion of poor-quality runoff to the Active Management portion of the treatment train). Continuous real time monitoring is also detailed. • Management of excavations, that is areas of soil / subsoils to be excavated will be drained ahead of excavation works by sumps, in a stepped / phased approach whenever necessary, with the aim of temporarily lowering groundwater levels to allow excavation to be carried out in dry and stable conditions. For example, saturated areas of peat, thus reducing the volumes of water encountered during excavation works. • Engineered drainage and attenuation features (discussed in following sections) will be established concurrent with excavation works. • Dewatering flow rate or pumping rate will be controlled by an inline gate valve or similar infrastructure (**Appendix 9.4- Tile 8**) This will facilitate reduction of loading on the receiving drainage and attenuation network, thus enhancing the attenuation and settlement of suspended solids. All pumped water will be discharged to constructed drainage and in line treatment train or to a vegetated surface through a silt bag (**Appendix 9.4 – Tile 12**) outside of surface water buffer		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				zones (**Figure 9.12a, Surface Water Management Plan, Appendix 2.1 and Appendix 9.4 – Tiles 7 and 8**). Dewatering is a dynamic process and will require continuous monitoring and modification depending on conditions encountered (**Appendix 9.4 – Tile 8**). • In some areas of the Development constraints related to construction activities within the prescribed buffer zones, will likely limit the potential for installation of engineered attenuation features. In such instances water arising from dewatering activities will be directed or pumped to a settlement tank (**Appendix 9.4 – Tile 11**) before being discharged to the receiving drainage network, or pumped to an area of the site where the installation of attenuation features is suitable. Areas with such constraints are presented in **Figure 9.12a Figure 9.12b.** • No extracted or pumped water will be discharged directly to the drainage or surface water network associated with the Site (This is in accordance with the Local Government (Water Pollution) Act, 1977 as amended). • All pumps, tanks, settlement ponds, dewatering bags and check dams used in the dewatering process will be regularly inspected and maintained as necessary to ensure surface water run-off is appropriately treated.		
Chapter 9: Hydrology and Hydrogeology	Surface water and Groundwater	Hydrocarbon contamination	Significant to potentially profound	• Refuelling of vehicles will be carried out off site to the greatest practical extent. This refuelling policy will mitigate the potential for impacts by avoidance. Due to the remote location nature of the Site, it is unlikely that implementation of this refuelling policy will be practical in all circumstances. In instances where refuelling of vehicles on Site is unavoidable, a designated and controlled refuelling area will be established at the Site. The designated refuelling area will enable low risk refuelling and storage practices to be carried out during		

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				the works. The designated refuelling area will contain the following attributes and mitigation measures as a minimum requirement: ○ The designated refuelling area will be located a minimum distance of 50m from any surface waters or Site drainage features. ○ The designated refuelling area will be bunded to 110% volume capacity of fuels stored at the Site. ○ The bunded area will be drained by an oil interceptor that will be controlled by a pent stock valve that will be opened to discharge storm water from the bund. ○ Management and maintenance of the oil interceptor and associated drainage will be carried out by a suitably licensed contractor on a regular basis. ○ Any oil contaminated water will be disposed of at an appropriate oil recovery plant or licensed tip site. ○ Any minor spillage during this process will be cleaned up immediately. ○ Vehicles will not be left unattended whilst refuelling. ○ All machinery will be checked regularly for any leaks or signs of wear and tear. ○ Containers will be properly secured to prevent unauthorised access and misuse. An effective spillage procedure will be put in place with all staff properly briefed. Any waste oils or hydraulic fluids will be collected, stored in appropriate containers, and disposed of offsite in an appropriate manner. • Oil absorbent booms and spill kits will be available adjacent to all surface water features associated with the Development. The controls will be positioned downstream of each construction area and at principal surface water drainage features. Oil booms deployed		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				will have sufficient absorbency relative to the potential hazard. • Spill kits will also be available at construction areas such as at turbine erection locations, the temporary site compound, on-site substation, spoils storage areas and met mast location etc. • Spill kits will contain a minimum of oil absorbent pads, oil absorbent booms, oil absorbent granules, and heavy-duty refuse bags for collection and appropriate disposal of contaminated matter. • Should an accidental spill occur during the construction or operational phase of the Development, such incidents will be addressed immediately, this will include the cessation of works in the area of the spillage until the issue has been resolved. • Spill kits will be kept in each vehicle at the Site and will be readily available to all operators. • No materials, contaminated or otherwise will be left on the Site. • Suitable receptacles for hydrocarbon contaminated materials will also be available at the Site. • A detailed spill response plan will be prepared as part of the Site specific CEMP. • In the first instance, no fuel storage should occur at the Site whenever feasible and refuelling of plant and equipment should occur off site at a controlled fuelling station. • In instances where on Site refuelling is unavoidable, then the bunded on Site designated refuelling area must be used. • A Site specific CEMP will be enforced to ensure that equipment, materials and chemical storage areas are inspected and maintained as required on a regular basis.		

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				• All other liquid based chemicals such as paints, thinners, primers and cleaning products etc. will be stored in locked and labelled bunded chemical storage units.		
Chapter 9: Hydrology and Hydrogeology	Surface water and Groundwater	Wastewater sanitation contamination	Moderate	A Temporary Construction Compound area will be constructed on-site to contain temporary facilities for the construction phase including 'port-a-cabin' structures. The Temporary Construction Compound will be constructed on a base of geo-textile matting laid at ground level. This will be stabilised with the laying of hardcore material on top. During the construction phase, foul effluent will be periodically removed for offsite disposal. Wastewater/sewerage from the staff welfare facilities located in the Temporary Construction Compound will be collected and held in a sealed storage holding tank, fitted with a high-level alarm. The high-level alarm is a device installed in the storage tank that is capable of sounding an alarm during a filling operation when the liquid level nears the top of the tank. Chemicals are likely to be used to reduce odours. • All wastewater will be emptied periodically, tankered off-site by a licensed waste collector to the local Kilrush wastewater sanitation plant for treatment. There will be no onsite treatment of wastewater. A wastewater or sewerage leakage is not anticipated in a properly managed Site.		
Chapter 9: Hydrology and Hydrogeology	Surface water and Groundwater	Contamination with construction or cementitious materials	Moderate to Significant	• The procurement, transport and use of any cement or concrete will be planned fully in advance of commencing works by the Contractor's Environmental Manager and supervised at all times by the Developer appointed EnCoW. This entails minimising quantities on site, planning delivery routes and washout stations.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• Precast concrete will be used wherever possible. Elements of the Development where the use of precast concrete will be used include structural elements of watercourse crossings (single span / closed culverts) as well as Cable Joint Bays. Although, the use of pre-cast concrete is not viable option for large structures such as Turbine foundations and joint bay pit excavations. Where the use of precast concrete is not possible the following mitigation measures will apply. ○ Lean mix concrete, often used to provide protection to main foundations of infrastructure from soil biome, can alter the pH of water if introduced, which would then require the treatment of acid before being discharged to the surrounding environment. The use of lean mix concrete will be minimized, limited to the requirement of turbine foundations. The risk of runoff will be minimal, as concrete will be contained in an enclosed, excavated area. ○ Vehicles transporting cement or concrete to the Site will be visually inspected for signs of excess cementitious material prior to being granted access to the Site. This will prevent the likelihood of cementitious material being accidentally deposited on the Site Access Tracks or elsewhere at the Site. ▪ Drivers of such vehicles will be instructed to ensure that all vehicles are washed down in a controlled environment prior to the departure of the source site, such as at concrete batching plants. • Concrete will be poured during metrological dry periods/seasons in so far as practical and reasonably foreseeable. This will reduce the potential for surface water run off being significantly affected by freshly		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				poured concrete. This will require limiting these works to dry meteorological conditions i.e., avoid foreseen sustained rainfall (any foreseen rainfall event longer than 4-hour duration) and/or any foreseen intense rainfall event (>3mm/hour, yellow on Met Éireann rain forecast maps), and do not proceed during any yellow (or worse) rainfall warning issued by Met Éireann. This also will avoid such conditions while concrete is curing, in so far as practical. • Pouring of concrete into standing water within excavations will be avoided. • Excavations will be prepared before pouring of concrete by pumping standing water out of excavations to the buffered surface water discharge systems in place. • Any required shuttering installed to contain the concrete during pouring will be fully secured around its perimeter to minimise any potential for leaks. Additional measures will be taken to ensure this, for example the use of plastic sheeting or other sealing products at joints. • No surplus concrete will be stored or deposited anywhere on Site. • Raw or uncured waste concrete will be disposed of by removal from the Site and returned to the source location or disposed of appropriately at a suitably licensed facility. • Designated washout of concrete trucks shall be strictly confined to the batching facility and will not be located within the vicinity of watercourses or drainage channels. Only the chutes will be cleaned prior to departure from Site, and this will take place at a designated area at the Temporary Site Compound. The contents will be allowed to settle, and the supernatant will be removed off site by		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				licenced generator to a licenced wastewater treatment plant. • Temporary storage of cement bound sand (if required for construction of the substation building) will be on hardstand areas only where there is no direct drainage to surface waters and where the area has been bunded e.g. using sand-bags and geotextile sheeting or silt fencing to contain any solids in run-off. • Spill kits will be readily available to Site personnel, and any spillages or deposits will be cleaned up as soon as possible and disposed of appropriately		
Chapter 9: Hydrology and Hydrogeology	Surface water and Groundwater	Release and transport of suspended solids – Water quality impacts.	Moderate to Significant	• Collector drains and soil berms will be implemented to direct and divert surface water runoff from construction areas such as temporary stockpiles into established settlement ponds, buffered discharge points and other surface water runoff control infrastructure as appropriate. The drainage system will be permanent. • Silt fences will be established along the perimeter of source areas e.g., stockpiles, within the drainage network, and in existing natural drains and degraded peat areas which are likely to receive surface water runoff. Where possible multiple silt fences will be installed at multiple locations in drains / treatment trains discharging to the surface water network. Double silt fences / screens will be deployed at outfalls within surface water buffer areas. Silt fences will be temporary features but will remain in place for a period following the completion of the Construction Phase until such time that site conditions are stable. • Waters arising from dewatering practices during excavation works will be significantly loaded with suspended solids. As such, constructed stilling ponds followed by buffered outfalls may be insufficient in		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				controlling the release of suspended solids to the surface water network. Routine monitoring will prevent the possibility of clogging from significant volumes of settled or attenuated solids. Therefore, any water pumped from excavations, or any waters clearly heavily laden with suspended solids will be contained and managed and pumped through the preestablished Active Management treatment train. This will include continuous active monitoring of water quality by turbidity measurement on an hourly basis. • This will include continuous active monitoring of water quality by turbidity measurement on an hourly basis. This will include continuous active monitoring of water quality by turbidity measurement on an hourly basis. • This will include continuous active monitoring of water quality by turbidity measurement on an hourly basis. • In line Stilling Ponds will buffer the run-off discharging from the drainage system during construction, by retaining water, thus reducing the hydraulic loading to watercourses. Stilling ponds are designed to reduce flow velocity to 0.3m/s at which velocity, silt particle settlement occurs. Stilling ponds will be permanent. • In line Check Dams will be constructed across drains. • The following will be implemented in the design of check dams and their deployment (CIRA, 2004): ○ Permanent rock filter bunds (coarse aggregate) will be used for check dams however, temporary wood or straw/hay bales can also be used if properly anchored and if the need arises. Permanent rock filter bunds are preferred as this will ensure that rapid surface water runoff is mitigated against for the life of the Development.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				○ Check dams will be installed at c. 20m intervals within the length of drainage channels. This is dependent on the slope angle and height of check dams constructed. ○ Check dams will include a small orifice / pipe at the base to allow the flow of water during low flow conditions i.e., maintain hydrological regime during low flow conditions. Note: the use of coarse aggregate will facilitate some infiltration. ○ Erosion protection will be established on the downstream side of the check dam i.e., cobbles or boulder (100-150 mm diameter) extending at least 1.2m. ○ Check dams will be constructed as part of the drain i.e., reduce the potential for bypassing between the drain wall and check dam. • Surface water runoff will be discharged to land via buffered drainage outfalls. Buffered drainage outfalls will contain hard core material of similar or identical geology to the bedrock at the site to entrap suspended sediment. A relatively high number of discharge points / buffered outfalls have been established as part of the design, thus decreasing the loading on any particular outfall. Discharging at regular intervals mimics the natural hydrology by encouraging percolation and by decreasing individual hydraulic loadings from discharge points. • Buffered drainage outfalls will be located outside of surface water buffer zones. Similarly, outfalls will not be positioned in areas with extensive existing erosion and exposed soils. Buffered outfalls will be fanned and be comprised of coarse aggregate (cobbles / boulders) • Silt fences will be established downstream of buffered outfalls with a view to ensuring the effectiveness of the		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				attenuation train, particularly during elevated flow events. Buffered outfalls established will be permanent. • Where necessary, flocculant will be used to promote the settlement of finer solids prior to redistributing to the treatment train and discharging to surface water networks. Flocculant 'gel blocks' are available and can be placed in drainage channels upstream of stilling ponds. • Straw bales (similar to stone check dams), and silt fences can also be used within drainage channels for the purposes of attenuating runoff and entrained suspended solids, however these measures should be considered temporary and will be used mainly in managing potential acute contamination incidents or to facilitate temporary works.		

Chapter 9: Hydrology and Hydrogeology	Surface water	Clear felling of forestry impacting drainage	Imperceptible	• Further recommended mitigation measures in regard to the management of forestry operations include;
				• Phased felling approach,
				• Minimising erosion by use existing tracks and use of brash for off track areas,
				• Follow all relevant forestry guidance and policies, including;
				  ○ Forest Protection Guidelines
				  ○ Forestry and Water Quality Guidelines
				  ○ Forest Harvesting and Environmental Guidelines
				  ○ Forestry and Freshwater Pearl Mussel Requirements - Site Assessment and Mitigation Measures
				  ○ Forest Biodiversity Guidelines
				  ○ Forestry and The Landscape Guidelines
				  ○ Forestry and Archaeology Guidelines
				• Harvest site plans including extraction routes, fuelling areas, stacking areas, turning areas and drain crossings etc. and Hazard Identification and Risk Assessment		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				(HIRA) will be designed and implemented during all harvesting operations. • All drains, either mound drains, culverts, water crossings crossed during extraction, if necessary, will be cleared of any debris to ensure no drainage issues will occur for the remining trees, which can be a major attributor to windblow. • Felling and extraction of timber will, are to be undertaken in dry weather conditions. • Harvesting operations are scheduled according to the nature of the soil with sites being categorised into winter and summer sites depending on ground conditions. Also, best practice is to suspend mechanised harvesting operations during and immediately after periods of particularly heavy rainfall. • Waterways are particularly vulnerable to the effects of harvesting as silt from the movement of machinery can enter streams and rivers causing blockage of gravels which affects insect and fish life. Also, nutrients released from decaying branches, particularly from large clearfelled sites, can cause enrichment of the waters which in turn causes pollution. To counteract these effects careful planning is required in carrying out harvesting operations. Some of the measures taken to avoid impacts include: ○ Limiting the size of the areas to be felled which reduces the amount of nutrients and silt released. ○ Minimising the crossing of drains and streams, but where necessary installing temporary structures (log bridges, pipes etc) to avoid machines entering the water; ○ Establishing buffer zones around waterways from which machines are excluded.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
Chapter 9: Hydrology and Hydrogeology	Surface water (Moyasta River)	Water quality pollution at Water crossings	Significant	• Consultation with relevant statutory authorities (e.g. IFI, OPW) to agree/confirm proposed works is required • The design will facilitate adequate hydraulic capacity**.** This ensures that the design will maintain the existing channel and will facilitate peak discharge events (storm events) without flow being constrained and contributing to flooding or other issues. • The design facilitates adequate freeboard to OPW requirements of 300mm. • Abutments for single span structures will be set back from the river channel and banks to allow the continuation of the riparian corridor underneath the structure. • Discharging of construction water (trade effluent) directly to surface waters is a licenced activity. No extracted or pumped or treated construction water from the isolated construction area will be discharged directly to the surface water network associated with the Site (This is in accordance with Local Government (Water Pollution) Act, 1977 as amended). • No instream works are permitted. • Works in relation to watercourse crossings will be carried out during periods of sustained dry meteorological conditions and will not commence if sustained wet conditions or if wet conditions are forecast • Works in relation to watercourse crossings will be planned and carried out as efficiently as possible. This means work plans are agreed fully and all equipment and materials are prepared fully before in stream works commence. Works will be completed as quickly as possible and will not pause for the duration of the in stream works e.g., Installation of culverts (24 hour as necessary), with the exception of circumstances related to meteorological and/or health and safety conditions.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
Chapter 9: Hydrology and Hydrogeology	Groundwater	Water quality contamination		• No fuel storage should occur at the Site whenever feasible and refuelling of plant and equipment should occur off site at a controlled fuelling station. • In instances where on Site refuelling is unavoidable, then the bunded on Site designated refuelling area must be used. The designated refuelling area must be impermeable and bunded to 110% volume capacity of fuels stored at the Site. • The bunded area will be drained by an oil interceptor that will be controlled by a pent stock valve that will be opened to discharge storm water from the bund. • Management and maintenance of the oil interceptor and associated drainage will be carried out by a suitably licensed contractor on a regular basis. • Any oil contaminated water will be disposed of at an appropriate oil recovery plant or licensed off-Site facility. • Any minor spillage during this process will be cleaned up immediately. • Vehicles will not be left unattended whilst refuelling. • For large machinery such as cranes, drip trays will be used, and spill kits will be on hand. • A Site-specific CEMP will be enforced to ensure that equipment, materials and chemical storage areas are inspected and maintained as required on a regular basis. The following mitigation measures are recommended in relation to non-hydrocarbon potential contamination of groundwater: • All other liquid based chemicals such as paints, thinners, primers and cleaning products etc. will be stored in locked and labelled bunded chemical storage units.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• Sanitation facilities used during the construction phase will be self-contained and supplied with water by tank trucks. These facilities will not interact with the existing hydrological environment in any way, and they will be maintained and serviced throughout the construction phase. • The controlled attenuation of suspended solids in settlement ponds and check dams etc. will result in inorganic nutrients (if present in elevated concentrations) such as phosphorus and nitrogen being absorbed and retained by the solids in the water column. This will allow for a reduction of peak inorganic discharges in a controlled and stable run off rate. It is noted that the presence of elevated contaminants were detected during the four surface water quality monitoring rounds. • It is considered that there is a low risk of mobilising trace metals that may naturally be present in low concentrations in the baseline environment. The potential for mobilising trace metals is most likely to result from enhanced water percolation associated with excavated bedrock substrate. To mitigate against this potential impact, water quality should be monitored for trace metal concentrations prior to, during and after the construction phase. • The potential for livestock such as cattle and sheep which have been observed grazing in the vicinity of the Site to cause bacteriological contamination of groundwater will be controlled through the implementation of strict grazing control zones, Site perimeter fencing and exclusion zones around all open excavations.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
Chapter 10: Noise	Humans	Noise from turbine construction	Not significant	• General guidance for controlling construction noise through the use of good practice given in BS 5228 will be followed. • Construction and Decommissioning of the Development shall be limited to working times given		
Chapter 12: Air and Climate	Air	Greenhouse gas emissions, reducing air quality	Slight	• All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.		
Chapter 14: Cultural Heritage	Sub-surface archaeological features	Discovery during construction phase – potential damage	Imperceptible	Ground works during the construction phase of the Development will be subject to archaeological monitoring under licence by the National Monuments Service. In the event that any archaeological features are identified during these site investigations they will be recorded and then securely cordoned off while the National Monuments Service are consulted to determine further appropriate mitigation measures, which may include: • Preservation in situ (by avoidance), or; • Preservation by record (archaeological excavation)		
Chapter 15: Material Assets	Land use	Negative impact on forestry land use	Slight	• Mitigation measures to minimise impacts on forestry land use have been incorporated into the design stage. The construction and operational footprint of the Development has been kept to the minimum necessary to avoid impact on existing land uses and existing tracks have been used where possible. • New Site Access Tracks have been sensitively designed to minimise impact on forestry. • Electricity cables will be installed underground in or alongside Site Access Tracks to avoid and minimise negative impact.		
Chapter 15: Material Assets	Aviation	No potential effects predicted	Negligible	Although no potential effects were identified, the following mitigation measures proposed by the Irish Aviation Authority (IAA) and Kerry Airport will be implemented:		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• An aeronautical lighting scheme for the Development will be agreed with the IAA and will be installed. • As-constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location will be provided to the IAA. • The IAA will be notified of intention to commence crane operations with at least 30 days prior notification of their erection.		
Chapter 15: Material Assets	Natural Resources	Impact on source quarry's natural resources, e.g. aggregates	Slight	• Existing tracks have been used where possible and the layout was designed to minimise the length of new track required in order to reduce the requirement for such stone material. • One on-site borrow pit will provide a total volume of 32,280m^3. Rock (c. 11,590m^3 or 11.59tonnes) will be imported to construct the L6132 site entrance, temporary construction compound, access road from the L6132 site entrance leading to the onsite borrow pit, site access road and turbine hardstand surface layers and temporary and permanent works along the L6132. • Local quarries have been identified to reduce impact on transportation • The source quarry will be chosen based on stone which is chemically simar to that occurring at the Development. This will reduce hydrogeochemical impacts.		
Chapter 15: Material Assets	Environment	Construction and cementitious materials leakage	Slight	• The procurement, transport and use of any cement or concrete will be planned fully in advance of commencing works by the Contractor's Environmental Manager and supervised at all times by the Developer appointed ECoW. This entails minimising quantities on site, planning delivery routes and washout stations. • Precast concrete will be used wherever possible. Elements of the Development where the use of precast concrete will be used include structural elements of		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				watercourse crossings (single span / closed culverts) as well as Cable Joint Bays. Although, the use of pre-cast concrete is not viable option for large structures such as Turbine foundations and joint bay pit excavations. Where the use of precast concrete is not possible the following mitigation measures will apply. ○ Lean mix concrete, often used to provide protection to main foundations of infrastructure from soil biome, can alter the pH of water if introduced, which would then require the treatment of acid before being discharged to the surrounding environment. The use of lean mix concrete will be minimized, limited to the requirement of turbine foundations. The risk of runoff will be minimal, as concrete will be contained in an enclosed, excavated area. ○ Vehicles transporting cement or concrete to the Site will be visually inspected for signs of excess cementitious material prior to being granted access to the Site. This will prevent the likelihood of cementitious material being accidentally deposited on the Site Access Tracks or elsewhere at the Site. ▪ Drivers of such vehicles will be instructed to ensure that all vehicles are washed down in a controlled environment prior to the departure of the source site, such as at concrete batching plants. ○ Concrete will be poured during metrological dry periods/seasons in so far as practical and reasonably foreseeable. This will reduce the potential for surface water run off being significantly affected by freshly poured concrete. This will require limiting these works to dry meteorological conditions i.e., avoid foreseen sustained rainfall (any foreseen rainfall		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				event longer than 4-hour duration) and/or any foreseen intense rainfall event (>3mm/hour, yellow on Met Éireann rain forecast maps), and do not proceed during any yellow (or worse) rainfall warning issued by Met Éireann. This also will avoid such conditions while concrete is curing, in so far as practical. ○ Pouring of concrete into standing water within excavations will not be permitted. ○ Excavations will be prepared before pouring of concrete by pumping standing water out of excavations to the buffered surface water discharge systems in place. ○ Any required shuttering installed to contain the concrete during pouring will be fully secured around its perimeter to minimise any potential for leaks. Additional measures will be taken to ensure this, for example the use of plastic sheeting or other sealing products at joints. ○ No surplus concrete will be stored or deposited anywhere on Site. ○ Raw or uncured waste concrete will be disposed of by removal from the Site and returned to the source location or disposed of appropriately at a suitably licensed facility. ○ Designated washout of concrete trucks shall be strictly confined to the batching facility and will not be located within the vicinity of watercourses or drainage channels. Only the chutes will be cleaned prior to departure from Site and this will take place at a designated area at the Temporary Site Compound. The contents will be allowed to settle and the		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				supernatant will be removed off site by licenced generator to a licenced waste water treatment plant. ○ Temporary storage of cement bound sand (if required for construction of the substation building) will be on hardstand areas only where there is no direct drainage to surface waters and where the area has been bunded e.g. using sand-bags and geotextile sheeting or silt fencing to contain any solids in run-off. ○ Spill kits will be readily available to Site personnel, and any spillages or deposits will be cleaned up as soon as possible and disposed of appropriately		
Chapter 15: Material Assets	Telecommunications infrastructure	Potential electromagnetic interference with telecommunications signals from tall cranes	Negligible	• Compliance with the EMC Directive 2014/30/EU • Buffers from telecommunications companies (Three & Eir) incorporated into the design phase of the Development.		
Chapter 15: Material Assets	Telecommunications infrastructure	Interference	Negligible	Mitigation by design and avoidance will minimise impacts on existing electricity networks. • Confirmatory drawings for all existing services will be sought upon consultation with ESB Networks. • Immediately prior to construction taking place, the area where excavation is planned will be surveyed by CAT scan (sub-surface survey technique to locate any below-ground utilities) and all existing services will be verified. Temporary warning signs will be erected. • The as-built location of the installed ducts will be surveyed and recorded using a total station/GPS before the trench is backfilled to record the exact location of the ducts. The co-ordinates will be plotted on as-built record		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				drawings for the grid connection cable operational phase. • Clear and visible temporary safety signage will be erected all around the perimeter of the live work area to visibly warn members of the public of the hazards of ongoing construction works.		
Chapter 16: Traffic and Transport	Pedestrians and road users.	Congestion on narrow local roads.	Significant	• Prior to delivery of abnormal loads i.e. turbine components, the Applicant or their representatives, will consult with An Garda Síochána and Clare County Council to discuss the requirement for a Garda escort. The Applicant will also outline the intended timescale for deliveries and efforts can be made to avoid peak times such as school drop off times, church services, peak traffic times where it is considered this may lead to unnecessary disruption, and abnormal loads may travel at night and outside the normal construction times as may be required by An Garda Síochána. Local residents at sensitive locations along the affected route will be notified of the timescale for abnormal load deliveries. • Turbine component deliveries will be timed to avoid peak times and in particular, times when pupils will be dropped off and picked up from the various schools on the turbine component Haul Route • During the wind farm construction and decommissioning phases, road works signs in accordance with the requirements of Chapter 8 of the traffic Signs Manual will be erected at the wind farm site entrance on the N59 and at all locations on the haul route which are being modified to facilitate turbine delivery. • A survey of the Haul Route will be undertaken to identify if any overhead lines will need to be lifted along the route to allow abnormal loads such as tower sections and nacelles to be delivered.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• The majority of workers will arrive onsite in mini-buses and crew vehicles. Vehicle sharing will be actively encouraged to reduce vehicular movements. • Parking for staff will be provided at the Temporary Construction Compound on the wind farm site and at designated locations within the work zone during turbine haul route works on the public road network. No parking will be allowed for construction workers on the public road network in any other circumstance. • All works on the public road network shall be carried out under a road opening licence and traffic management plan which will accommodate pedestrians at the works locations with alternative arrangements.		
Chapter 16: Traffic and Transport	Site security	Securing / Health and safety breach	Slight	• Access to the construction site will be controlled by on Site personnel and all visitors will be asked to sign in and out of the Site by security/Site personnel on entering and exiting the site. • All Site visitors will undergo a Site induction covering Health and Safety issues at the Contractor's temporary compound and will be required to wear appropriate Personal Protective Equipment (PPE) while onsite.		
Chapter 16: Traffic and Transport	Human Health	Excess dust reducing air quality & Noise	Slight	• Wheel cleaning equipment will be used on the Site Access Track near the near the public road junction to prevent any mud and/or stones being transferred from Site to the public road network. All drivers will be required to see that their vehicle is free from dirt and stones prior to departure from the construction site. • In addition, any dust generating activities will be minimised where practical during windy conditions, and drivers will adopt driving practices to minimise the creation of dust. Where conditions exist for dust to become friable, techniques such as damping down of the potentially affected areas may be employed.		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• To reduce dust emissions, vehicle containers/loads will be covered during both entrance and egress to the Site where required.		
Chapter 12: Air and Climate	Human health	Excess dust/dirt reducing air quality	Slight	• See Chapter 16: Traffic and Transport for mitigation measures for dust • During periods of dry and windy weather, there is potential for dust to become friable and cause nuisance to nearby residences and users of the local road network. This requires wetting material and ensuring water is supplied at the correct levels for the duration of the work activity. The weather will be monitored so that the need for damping down activities can be predicted. Water bowsers will be available to spray work areas (wind turbine area and grid connection route) and haul roads to suppress dust migration from the Site. • Vehicles delivering materials to the site will be covered appropriately when transporting materials that could result in dust, e.g., crushed rock or sand. • Exhaust emissions from vehicles operating within the site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the Contractor by ensuring that emissions from vehicles are minimised through regular servicing of machinery. • All machinery will be turned off when not in use. • Ready-mix concrete will be delivered to the Site and no batching of concrete will take place on the Site. Only washing out of chutes will take place on site and this will be undertaken at a designated concrete washout facility at the contractor's compound. • Speed restrictions of 15km/h on access roads will be implemented to reduce the likelihood of dust becoming airborne. Consideration will be given to how on-site speed		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				limits are policed by the Contractor and referred to in the toolbox talks. • Stockpiling of materials will be carried out in such a way as to minimise their exposure to wind. Stockpiles will be covered with geotextiles layering and damping down will be carried out when weather conditions require it. • Earthworks and exposed areas/soil stockpiles will be re-vegetated to stabilise surfaces as soon as practicable. • An independent, qualified Geotechnical Engineer will be contracted for the detailed design stage of the project and geotechnical services and will be retained throughout the construction phase, including monitoring and supervision of construction activities on a regular basis. The methodology statement will be signed off by a suitably qualified Geotechnical Engineer. • A complaints procedure will be implemented on site where complaints will be reported, logged and appropriate action taken.		
Operational Phase						
Chapter 5: Population & Human Health	Turbine	Fault occurs – hinders the development's performance	Imperceptible	• A Supervisory Control and Data Acquisition ("SCADA") system will monitor the Development's performance. If a fault occurs, then a message is automatically sent to the operations personnel preventing emergency situations. • Warning signs and security infrastructure will be in place around the onsite switchgear and control building to provide for public safety.		
Chapter 6: Biodiversity 6.5.6.2 Operation Phase Mitigation	Bats	Disturbance / fatality to bats	Slight	• Buffer zones will be implemented surrounding each turbine to dissuade woodland bats that depend on landscape features for guidance from flying near turbines. • Feathering (reduced rotation speed when turbines are idling): The angle of the blade is rotated to present the slimmest profile possible towards the wind. Automatic		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				feathering of idling blades will be implemented to reduce rotation speed of blades to below 1 RPM while idling. • Curtailment (keeping turbines turned off when conditions are suitable for bat activity): Increasing the cut-in speed above that set by the manufacturer to reduce the potential for bat/turbine collisions. ○ Cut-in speeds will be increased where weather conditions are optimal for bat activity (see below) from 30 minutes prior to sunset and to 30 minutes after sunrise. ○ Cut-in speeds restrictions will be operated according to specific weather conditions: ▪ When the air temperature is above 10.5°C at nacelle height. ▪ At wind speeds below 5.0m/s (at nacelle height). ○ Continuous acoustic monitoring at nacelle height using full spectrum static bat detectors will be carried out from year 1 of operation to better inform the targeted need for curtailment in the following years of operation at turbine T3. In addition, key weather parameters will be recorded such as; ▪ Wind speed in m/s (measured at nacelle height) ▪ Time after sunset ▪ Month of the year ▪ Temperature (ºC) ▪ Precipitation (mm/hr) ○ Based on these results, a refined curtailment plan from year 2 will be devised (with the approval of the local authority).		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				• All turbines in the windfarm will be feathered, while turbine T3 will be curtailed.		
	Birds	Increased risk of collision	Slight	• Control vegetation at turbine locations • Areas of forest around turbines which are cleared of trees will be managed to prevent establishment of scrub and rank vegetation which would encourage small mammals and birds and attract species such as kestrel to hunt near the turbines and increase risk of collision. • This maintenance, which is anyway required as mitigation for bats, will be carried out on an annual basis by mowing or strimming.		
Chapter 8: Soils and Geology	Soils / Geology	Waste contamination - Hydrocarbon contamination	Slight	• The operational team will put in place control measures to mitigate the risk of hydrocarbon or oil spills during the operational phase of the windfarm. Any vehicles utilised during the operational phase will be maintained on a weekly basis and checked daily to ensure any damages or leakages are corrected. • Potential effects will be limited by the size of fuel tank for vehicles permitted on site.		
Chapter 9: Hydrology & Hydrogeology	Surface water	Increase in runoff of rainwater	Significant	• Collector drains; allowing for 0.5m depth, 1.0m width, presume semi-circular, sectional area; c. 0.4m^2. Presume 100m length of collector drain; up to 40m^3 capacity per 100m, by 50% allowing for gradient equates to 20m^3. Collector drains are not intended to store runoff, however the in-line attenuation features, such as check dams and flow regulators will serve to reduce discharge rates dramatically, effectively backing up water and regulating the rate of discharge. The actual attenuation capacity of the drainage network and treatment trains will be calculated during the detailed design phase of the development. The actual attenuation capacity of the		

Chapter & Section	Receptor	Predicted Effect	Potential Significance prior to Mitigation	Mitigation Proposed	Audit Result	Action required
				drainage network and treatment trains will be calculated during the detailed design phase of the development. • Check dams at regular intervals throughout the drainage network (existing, new clean collector and new dirty collector drains) will attenuate runoff intercepted by respective drainage channels. • Dirty water collector drains (associated with construction areas) will direct runoff to established stilling ponds. Stilling ponds will reduce the velocity of runoff, further reducing the hydrological response to rainfall. • Buffered outfalls to vegetated areas will utilise the infiltration capacity of the ground prior to the rejected rainfall eventually being intercepted by the receiving surface water system. • Clean water collector drains will intercept clean runoff (upgradient of construction areas) and will direct runoff around construction areas. The runoff will be attenuated by means of check dams and intermittent buffered outfalls (**Appendix 9.4 – Tile 3a, Tile 13 and Tile 14**).		

Table 2: Summary of Mitigation Measures for Non-Significant Effects

Chapter	Receptor	Predicted Effect	Significance prior to Mitigation	Mitigation	Audit Result	Action required
Chapter 12: Air and Climate	Air Quality and human health	Improved Air quality	Not Significant	• Site access tracks will be upgraded and built in the initial construction phases. These tracks will be finished with graded aggregate which compacts, preventing dust. • Approach roads and construction areas will be cleaned on a regular basis to prevent build-up of mud and prevent it from migrating around the Site and onto the public road network. • Wheel wash facilities will be provided near the Site entrance to prevent mud/dirt being transferred from the site to the public road network. The Wheel wash will be located outside the 50m watercourse buffer zone see **Appendix 2.1 CEMP Sections 5.4** and **5.5**. • Public roads along the construction haul routes will be inspected and cleaned daily. In the unlikely event that dirt/mud is identified on public roads, the roads will be cleaned. The wheel wash facility will be investigated, and the problem fixed to prevent this from happening again. • During periods of dry and windy weather, there is potential for dust to become friable and cause nuisance to nearby residences and users of the local road network. This requires wetting material and ensuring water is supplied at the correct levels for the duration of the work activity. The weather will be monitored so that the need for damping down activities can be predicted. Water bowsers will be available to spray work areas (Turbine Hardstand areas and Grid Connection route) and construction haul route roads to suppress dust migration from the Site. See **Appendix 2.1 CEMP Sections 5.4** and **5.5**. • Vehicles delivering materials to the Site will be covered appropriately when transporting materials that could result in dust, e.g., crushed rock or sand. • Exhaust emissions from vehicles operating within the Site, including trucks, excavators, diesel generators or		

Chapter	Receptor	Predicted Effect	Significance prior to Mitigation	Mitigation	Audit Result	Action required
				other plant equipment, will be controlled by the Contractor by ensuring that emissions from vehicles are minimised through regular servicing of machinery. • All machinery when not in use will be turned off and stored in a secure, bunded location (e.g. construction compound). • Ready-mix concrete will be delivered to the Site; no batching of concrete will be permitted on Site. Only washing out of chutes will take place on Site and this will be undertaken at a designated concrete washout facility at the contractor's Temporary Construction Compound see **Appendix 2.1 CEMP Section 5.4, 5.5** and **5.6**. The concrete washout facility is a lined containment system designed to prevent run-off into soil, surface water or groundwater. • Speed restrictions of 15km/h on Site access tracks will be implemented to reduce the likelihood of dust becoming airborne. Consideration will be given to how Site speed limits are policed by the Contractor and referred to in the toolbox talks. • Good practice will be applied, and care will be taken with stockpiled materials to minimise their exposure to wind; stockpiles will be covered with geotextiles layering and damping down will be carried out when weather conditions require it. • Earthworks and exposed areas/soil stockpiles will be re-vegetated to stabilise surfaces as soon as practicable. • An independent, qualified Geotechnical Engineer will be contracted for the detailed design stage of the project and geotechnical services and will be retained throughout the construction phase, including monitoring and supervision of construction activities on a regular basis. The methodology statement will be signed off by a suitably qualified Geotechnical Engineer.		

Chapter	Receptor	Predicted Effect	Significance prior to Mitigation	Mitigation	Audit Result	Action required
				• A complaints procedure will be implemented on Site where complaints will be reported, logged and appropriate action taken.		
Chapter 15: Material Assets	Telecommunications	Temporary electromagnetic emissions	Not Significant	• Embedded mitigation in the design phase. Embedded measures were undertaken in the design phase following consultation with telecommunications operators. As a result, the Development avoided interference with existing transmission links crossing the Site.		
Decommissioning Phase						
Chapter 6: Biodiversity	Birds	Disturbance	Not Significant	As the Decommissioning works will involve works similar to those involved at construction stage (albeit at a lower intensity), these could result in similar effects on birds. Hence, the mitigation that will be undertaken for minimising disturbance to nesting birds during construction will also be applied during the decommissioning phase (taking into account changes that may have occurred locally during the operational life of the Project).		
Chapter 7: Aquatic Ecology	Aquatic Ecology	Water quality effects	Not Significant	As the Decommissioning works will involve works similar to those involved at construction stage (albeit at a lower intensity), these could result in similar effects on birds. Hence, the mitigation that will be undertaken for minimising disturbance to nesting birds during construction will also be applied during the decommissioning phase (taking into account changes that may have occurred locally during the operational life of the Project). A Decommissioning and Restoration Management Plan (DRMP) has been prepared as Appendix D to Appendix 2.1 CEMP and will be updated prior to decommissioning. As the Decommissioning works will involve works similar to those involved at construction stage (albeit at a lower intensity), these could result in similar effects on birds. Hence, the mitigation that will be undertaken for minimising		

Chapter	Receptor	Predicted Effect	Significance prior to Mitigation	Mitigation	Audit Result	Action required
				disturbance to nesting birds during construction will also be applied during the decommissioning phase (taking into account changes that may have occurred locally during the operational life of the Project).		
Chapter 8: Soils and Geology	Soils and Geology	Construction material contamination	Not Significant	• After decommissioning of the wind farm, all Site Access Tracks and areas of hardstanding will be returned to as close to their natural state as possible, again if it is geotechnically and environmentally feasible.		
Chapter 9: Hydrology & Hydrogeology	Surface & groundwater	Impact water quality	Not Significant	Mitigation measures for spills of fuels hazardous chemicals as previously mentioned. • A site-specific Decommissioning Management Plan (DMP) will be developed prior to the commencement of any decommissioning activities.		
	Surface water	Soil creep associated erosion and potential entrainment of elevated suspended solids in surface water run-off	Not Significant	• Mitigation measures described in *Chapter 9 Hydrology and Hydrogeology* to reduce the potential for run-off of elevated suspended solids will be implemented. • It is recommended that sediment fences should be implemented along the perimeter of all access tracks and hardstand areas during the reinstatement works. • Additional precautions such as the implementation of check dams, secured straw bales, sandbags, or settlement ponds should be implemented at areas where surface water runoff is likely to be intercepted by both natural and artificial drainage features. • Any drains or outfalls which have the potential to draw water from reinstatement areas or promote preferential surface water runoff flow paths through reinstatement areas will be removed, blocked or decommissioned as required. • The mitigation measures for the preparation of the hardstand area surfaces prior to material being deposited discussed in *Chapter 8: Soils and Geology* will be implemented.		

Chapter	Receptor	Predicted Effect	Significance prior to Mitigation	Mitigation	Audit Result	Action required
				It is recommended that monitoring and maintenance of the reinstated areas should be conducted regularly following the initial stages of establishment to ensure that the potential for excessive surface water runoff eroding deposited material along preferential pathways is minimised.		
Chapter 10: Air and Climate	Air and Climate	Impacts to air and climate	Not Significant	Mitigation measures during the decommissioning phase will be similar to those employed during the construction phase as outlined above.		
Chapter 16: Traffic and Transport	Road users	Increased traffic	Moderate	Mitigation measures during the decommissioning phase will be similar to those employed during the construction phase as outlined above.		