



GALETECH
ENERGY SERVICES

Islandmore Wind Farm

Environmental Impact Assessment
Report

Annex 1.7: Schedule of Mitigation
Measures

Islandmore Wind Farm Limited

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1.0 INTRODUCTION

Galetech Energy Services (GES) has prepared this collated and consolidated Schedule of Mitigation Measures in respect of the Islandmore Wind Farm ('the project').

The project is located in north County Roscommon; c. 2km north of Ballaghaderreen, c. 13km east of Charlestown (Co. Mayo) and c. 6km southwest of Gorteen (Co. Sligo); and is located in close proximity to the county boundaries between counties Roscommon, Sligo and Mayo. In summary, the project comprises the following main components:-

- 10 no. wind turbines with an overall height of 185m (3 no. turbines) and 150m (7 no. turbines) and all associated ancillary infrastructure;
- All associated and ancillary site development, excavation, construction, landscaping and reinstatement works, including provision of site drainage infrastructure and forestry felling;
- Works to the public road network along the turbine component haul route; and,
- 110kV electricity substation and installation of c. 7km of underground electricity line to facilitate connection of the wind farm to the existing Tonroe 110kV electricity substation at Ballaghaderreen, County Roscommon.

1.1 PURPOSE OF THIS REPORT

This report has been prepared to provide a concise document of all mitigation measures proposed within the Environmental Impact Assessment Report (EIAR) and Natura Impact Statement (NIS).

Article 8(a)(4) of the Environmental Impact Assessment (EIA) Directive 2014/52/EU states:-

'...Member States shall ensure that the features of the project and/or measures envisaged to avoid, prevent or reduce and, if possible, offset significant adverse effects on the environment are implemented by the developer...'

This document therefore provides a list of all mitigation measures proposed within **Volume I** of the EIAR (**Section 1.3** below) and NIS (**Section 1.4**) which will be implemented during the pre-construction, construction and operational phases of the project.

1.2 IMPLEMENTATION OF MITIGATION MEASURES

Islandmore Wind Farm Limited ('the Developer') can confirm that all mitigation measures outlined below, in addition to the measures inherent to the design of the project as described at **Chapter 3**, will be implemented except as may be required in order to comply with conditions of consent.

It should be noted that a number of the below measures will be supervised and overseen by personnel who have not yet been appointed. Such personnel will include:-

- Project Supervisor for the Construction Stage (PSCS);
- Civil Works Contractor;

- Electrical Works Contractor;
- Ecological Clerk of Works;
- Environmental Manager;
- Geotechnical Clerk of Works;
- Archaeological Clerk of Works;
- Acoustics Consultant; and,
- Shadow Flicker Consultant.

1.3 ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) MITIGATION MEASURES

Environmental Impact Assessment Report – Schedule of Mitigation Measures		
Topic	Mitigation Measure	Phase of Development for Implementation
Population & Human Health	A series of measures has been agreed with the involved landowners regarding the management of agricultural activities during the construction phase and will be implemented in full.	Construction
Invasive Species	Medium and high impact invasive species such as cherry laurel, Rhododendron and Japanese knotweed were recorded within the project site (species recorded included scheduled and non-scheduled invasive species. Due to the passage of time from initial site surveys to the start of construction works, a preconstruction invasive species survey must be carried out to determine baseline conditions for the presence of invasive species. Results of this survey will be presented in a site-specific Invasive Species Management Plan (ISMP) which will be prepared by the Appointed Contractor. The management plan will set out strict biosecurity measures with reference to Best Practice guidance to ensure there is no potential for the spread of alien invasive species during the construction works. Measures within the ISMP will include (but are not limited to) 1) A Method Statement for avoidance of invasive species within the project site; 2) if avoidance is not possible then removal and treatment measures will be required to be used to prevent the spread of invasive species; and 3) A specialist invasive species contractor will be employed during the project life to ensure all removal and treatment is carried under the appropriate licensing and guidance. While the ISMP will contain specific measures (relevant to specific species) to be employed on site subject to the outcome of the pre-construction invasive species, the following measures will be employed as a matter of course:- • An invasive species management plan will be developed and implemented. This will include the general prevention and containment measures and species-specific treatment measures as may be required; • An Ecological Clerk of Works will be employed for the duration of the construction period to make contractors aware of any invasive and non-native species sensitivities of the project and to undertake pre-construction surveys, enforcing any exclusion zones and mitigation measures as required; • Use of toolbox talks as part of site introduction to workers, including what to look out for and what procedures to follow if invasive species are observed; • Signs will be used to warn workers of invasive species contamination; • Only planting and sowing of native species if any reinstatement works are required or where invasive plant species are physically removed; • Unwanted material contaminated with invasive species will be transported offsite by an appropriate licenced waste contractor and disposed of at a suitably licenced facility (NRA, 2010); • Good hygiene practices will be adhered to including the removal of build-up of soil on equipment; keeping equipment clean; washing vehicles exiting the site using a pressure washer to prevent the transport of seeds; storing wastewater from washing facilities securely and treating to prevent spread of invasive species; checking footwear and clothing of workers for seeds, fruits or other viable material before leaving the site;	Pre-Construction & Construction

	any plant material arising from cleaning equipment, footwear and clothing will be carefully disposed of following (NRA, 2010) guidelines in such a manner not to cause the spread of invasive species; • A pre-construction walkover survey of the project will be undertaken during the growing season (April to August). This will search for invasive and non-native species, which could change over time. The extent of invasive plant species will be physically marked out if there have been any changes since baseline surveys; and, • If any are identified, then appropriate exclusion zone(s) will be implemented. A buffer will be used to cordon off invasive species outside the works footprint.	
Biodiversity	Due to the presence of suitable habitat for otter and badger within the project site and within the Zol of the project site, and the mobile nature of these species, a pre-works ecological constraints walkover survey will be carried out by an appropriately qualified Ecologist. If breeding otter holts are discovered, then construction must stop within 150m until the holt is no longer in use. NPWS can be consulted to obtain a derogation, but this process and criteria is frequently changing and may be difficult to obtain. The following mitigation measures will be applied to avoid disturbance to badgers:- • Where possible, no works will be undertaken within 50m of active badger sett(s), as measured from all the entrances to burrows; • Where this is not possible, a method statement will be drafted based on pre-construction badger surveys carried out on site by a suitably qualified Ecologist a minimum of –4-6 months prior to site works. Seasonal restrictions and badger sett closures (temporary or permanent) may be required. And all such work would require approval from the Local Authority and local NPWS ranger; • Ideally, all heavy machinery will be excluded from areas within 30m of active badger sett(s), as measured from all the entrances to burrows; • TII guidance and mitigation: 'Guidelines for the Treatment of Badgers Prior to the construction of National Road Schemes' will be followed and form the best practice guidance; • Exclusion zone buffers of 30m around all sett entrances will be marked off prior to commencement of construction works to ensure protection of these locations. Buffer zones will be appropriately signposted and will be marked out using fencing posts and rope; and, • To avoid the period of time when badgers are particularly sensitive to disturbance (birthing and raising young cubs); no heavy construction works, including tree felling will be undertaken during the badger breeding season (December to June inclusive) if occurring near an active badger sett. This will be assessed by the appointed ECoW 4-6 months prior to works commencing. Disturbance to foraging mammals will be avoided by:- • Construction works being largely limited to daylight hours allowing nocturnal animals like badgers and otters to forage through the night; and, • Minimising the risk of mammals becoming trapped if falling into excavated holes and trenches through the provision of egress points, e.g. placing escape planks or spoil runs. In addition, the length of time holes will be exposed will be limited.	Pre-Construction & Construction

Biodiversity	Mitigation for bats on a precautionary basis will be applied in the form of pre-construction tree inspections to identify and protect any bats potentially occupying roosts in vegetation designated for removal. Vegetation removal will also be carried out, where possible, during the period when bats are least likely to be using tree roosts (November to March) to further diminish the likelihood of any roosting bats being present. For any occupied or likely occupied roost sites where vegetation removal is not proposed (around F.1), an exclusion zone will be implemented to prevent disturbance during times of occupancy. provides optimal time periods for works depending on the roost type, and therefore by extension restrictive periods for construction works, during which the exclusion zone for construction work would be applicable. Reporting of pre-construction bat surveys and action taken will be required to demonstrate due diligence regarding avoidance of disturbance to roosting bats. The principal mitigation measure incorporated into the design of the proposed development to reduce the potential risk of bat collision and barotrauma is the application of bat feature buffers between turbines and habitats used by bats for foraging and commuting. In accordance with the guidance Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation (NatureScot <i>et al.</i>, 2021), a precautionary separation distance has been applied between turbine rotor-swept areas and identified bat habitat features. The required separation distance is calculated based on turbine dimensions and the height of adjacent vegetation or habitat features. NatureScot guidance recommends that a minimum buffer of 50 m is maintained between the rotor-swept area and features likely to be used by bats, including woodland edges, treelines, hedgerows and other linear landscape features. The buffer distance is measured from the outermost tip of the turbine blade to the nearest bat habitat feature. Bat feature buffers for the proposed development were calculated using the NatureScot methodology and have informed the turbine layout and vegetation management requirements. Where required, vegetation removal has been incorporated into the design to achieve compliance with the recommended stand-off distances and thereby reduce collision risk for bats during the operational phase. The calculated bat feature buffers for each turbine are presented below, and the methodology used to derive the buffers is illustrated in the NatureScot guidance document. Implementation of these buffers forms a key element of the project's bat mitigation strategy and contributes to reducing operational collision and barotrauma risk to levels that are not significant. <table data-bbox="488 1102 1451 1396"> <tr> <th rowspan="2">Turbine model</th><th rowspan="2">Feature height (m)</th><th>Turbine buffer distance (m)</th></tr> <tr> <th>NatureScot (50m)</th></tr> <tr> <td rowspan="3">Turbine T1-T3 – Vestas V162</td><td>0</td><td>80</td></tr> <tr> <td>3</td><td>83</td></tr> <tr> <td>5</td><td>86</td></tr> </table>	Turbine model	Feature height (m)	Turbine buffer distance (m)	NatureScot (50m)	Turbine T1-T3 – Vestas V162	0	80	3	83	5	86	Pre-Construction & Construction
Turbine model	Feature height (m)			Turbine buffer distance (m)									
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Biodiversity	Mitigation measures provided in respect of freshwater ecology comprise:- • Avoidance of sensitive aquatic areas where possible by implementing a 50m construction zone buffer; • As described in Chapter 7 (Water), specific mitigation measures, incorporated into the design of the development and through implementation of best practice methodologies will be employed where work inside buffer zones is proposed for the watercourse crossings required; • Any works for stream crossings will be carried out during the working window for instream works. This working window is defined by Inland Fisheries Ireland (IFI) as 01 July to 30 September to avoid vulnerable spawning salmonids/lamprey that may be present in downstream environments outside of this window. Any works outside of this period would require a derogation under the Local Authorities (Works) Act, 1949 and permissions from Inland Fisheries Ireland after consultation; • Work in areas liable to sediment erosion to be carried out only during dry conditions and no excavations to take place during forecasted yellow or higher rain warnings. Topsoil stripping and peat removal to be carried out only during dry conditions. All other work to be undertaken in dry conditions wherever possible, and no works (other than monitoring) to be carried out during heavy rain or snowmelt; • There will be no crossing of rivers or streams by machinery during the construction phase, other than by constructed access routes, and all machinery must remain within the works corridor and utilise designated access routes. Constriction machinery to access the project site via alternative means to the river crossing wherever possible; • There will be no direct dewatering to watercourses during the construction phase. All outflows from drainage associated with construction will be by diffuse overland drainage at appropriate locations and through settlement ponds/tanks/silt socks; • For works taking place within watercourse buffer zones, enhanced sediment control measures including double silt fencing and additional filtration controls will be implemented where required in accordance with	Pre-Construction & Construction																					

	the CEMP and SWMP; • Cement leachate, hydrocarbon oils and other toxic poisonous materials will require full containment and will not be permitted to discharge to any waters, and control measures to be place will include:- ○ Appropriate bunded storage area for storage of fuels/oils, with onsite storage of hydrocarbons to be kept to a minimum; ○ Mobile double skinned fuel bowser will be used for re-fuelling on-site; ○ No refuelling will be permitted at works locations within the 50m hydrological buffer; ○ Spill kits will be readily available to deal with any accidental spillage; ○ There is an outline emergency plan for the construction phase to deal with accidental spillages; ○ Ready-mixed concrete will be brought to site, with no batching of wet-cement products occurring on site; ○ Where possible pre-cast products will be installed, including all watercourse crossings; ○ Use of wet-cement products within the hydrological buffer will be avoided, insofar as possible; ○ Lined cement washout ponds will be used for chute cleaning, with minimal use of water take will be imported to the project site; ○ No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be permitted; and, • Wastewater emanating on-site (sewage, wastewater from site office) will be taken off-site for disposal/treatment at controlled facilities. To this effect, welfare facilities for construction site workers will include self-contained port-a-loos with an integrated waste holding tank. No water will be sourced on the project site, nor will any wastewater be discharged to the project site. Foul drainage from the temporary site offices and facilities is to be properly stored and removed to a suitable treatment facility. Storage facilities should be robust enough to ensure no spillage or leakage occurs. Chapter 7 (Water) also provides details of the Sustainable Drainage Systems (SuDS) that will be implemented to manage surface water taking account of water quantity (flooding), water quality (pollution) and associated ecological receptors. The drainage design will incorporate the following key elements: • Clean water interceptor drains to collect and divert upslope runoff away from construction areas and prevent unnecessary contamination; • Swales and drainage channels to collect and convey runoff from construction and operational infrastructure; • A treatment train approach comprising interception, attenuation, settlement and controlled discharge measures in accordance with the SWMP (Annex 3.4) • Check dams and other flow attenuation measures to reduce runoff velocities, promote settlement and minimise erosion. • Settlements ponds and buffered outfalls to provide attenuation and treatment of runoff prior to diffuse discharge at greenfield runoff rates. No direct discharge of untreated runoff to mapped watercourses will be permitted. The project site drainage and attenuation system will be installed prior to the main construction activities and includes excavation of drainage ditches and installation of settlement ponds and soakaways. The site-specific	
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	drainage scheme is required to attenuate, hydraulically (flow) and hydro-chemically (pollutants), the projected increase in runoff of ca. 63 m³/day (worst-case scenario) that will arise from the creation of additional areas of hardstanding. Chapter 7 (Water) also provides details of management of soil/peat deposition areas to avoid impacting on water quality including:- • Spoil deposition areas are located outside the 50m stream buffer zone; • Silt fences, straw bales and biodegradable matting will be used to control surface water runoff for deposition areas; and, • Deposition areas will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. Other measures include:- • To avoid run-off of silt-laden water impacting upon water quality within surface water features adjacent to the works corridor, reinstatement works including measures to re-vegetate disturbed areas through re-seeding and/or placement of saved turves will be carried out immediately after construction works; • During construction, turves will be stored separately from spoil (soil/rock). Separate storage of turves will ensure vegetation is not significantly damaged and that turves can be replaced as a top mat to facilitate rapid re-instatement of the surface vegetation, thereby significantly reducing the likelihood of soil erosion and the likelihood of silt laden surface waters affecting water quality; • To ensure control measures are implemented appropriately, an Environmental Manager as part of the construction team will be employed for the duration of the construction works; also an independent Ecological Clerk of Works (ECoW) will be auditing the project site intermittently to report on the efficacy of mitigation measures put in place by the appointed contractor; and, • Water quality monitoring will be undertaken before, during and following construction works in accordance with the Water Quality Monitoring Plan and SWMP (Annex 3.4). Monitoring will include regular visual inspections, field hydrochemistry measurements and water quality sampling at agreed monitoring locations.	
Biodiversity	All construction activities at T10 will be scheduled when marsh fritillary butterfly are on the wing (May-July) (NIEA, 2017) insofar as practicable. Adult butterflies only fly in warm, sunny conditions, so construction activities at T10 will only take place in favourable weather conditions between 10.30 and 16.30 (NIEA, 2017), where possible, following a site check by the appointed Ecological Clerk of Works. Construction works must be designed to avoid the peak larval development period (August-April) in order to minimise incidence of mortality (NIEA, 2017). An ECoW will be present to survey for any larval webs within suitable habitat within the project footprint, and will have authority to stop works should marsh fritillary larva be present.	Construction
Biodiversity	As such, a standard 50m buffer zone with all (FW4) Drainage ditches cannot be implemented across the project site. Where works/infrastructure interfaces with drainage design, appropriate design measures will be implemented to minimise the effect on the habitat and to avoid any hydraulic change to the channel.	Pre-Construction & Construction
Biodiversity	To avoid construction damage from excavation or compaction to the roots of plants in hedgerows, treelines and woodlands adjacent to the proposed infrastructure that will be retained post-construction, appropriate root protection area (RPAs) will be implemented, in accordance with best practice guidance (NRA 2006). To this effect an appropriately qualified arboriculturist will undertake a pre-construction assessment to ensure impacts to	Pre-Construction & Construction

	vegetation are avoided.	
Biodiversity	To avoid widespread disturbance to (PB4) Cutover bog and other habitats, access within the project site will be restricted to the proposed works corridor. No access between different parts of the infrastructure will be permitted, except via the proposed works corridor. An experienced and suitably qualified ECoW will be employed for the pre-construction, during and completion of construction works. They will be tasked with monitoring work practices, which will ensure that construction activities are tightly constrained to the works corridor and the project footprint, and that all mitigation is appropriately applied on site. They will have the power to stop works and can proposed suitable amelioratory action as required during the works.	Pre-Construction & Construction
Biodiversity	To minimise ecological impacts associated with the direct loss of (WS1) Scrub, clearance works within woody vegetation will be scheduled outside the bird breeding season (March 1 st to August 31 st , inclusive) insofar as possible, and an ECoW will survey such habitat before it's removal. The ECoW will check for the resting places of protected species in accordance with best practice and legal requirements under the Wildlife Act 1976 (as amended). They will also confirm where scrub removal is absolutely necessary and aim to avoid removing habitat where it is not likely to be impacted by the project footprint.	Construction
Biodiversity	The contractor will be required to implement the following standard practice construction methods and mitigation measures for release of dust:- • Preparing and maintaining the project site; • Plan construction compound layout so that machinery and dust causing activities are located away from receptors, as far as is possible; • Erect a 2m minimum site hoarding around all construction/ contractor compounds; • Keep site fencing, barriers and scaffolding clean using wet methods; and, • Cover, seed or fence stockpiles to prevent wind whipping.	Construction
Biodiversity	Trees requiring felling and identified as having roost suitability, where surveying proves that features are unoccupied, will be soft felled, as outline in with the National Roads Authority guidelines (NRA, 2005). This procedure involves:- • Where tree removal is extensive (T2 and T3), instigate staggering or phasing felling over several days or weeks to reduce sudden loss of habitat and allow for gradual dispersal; • 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 PRFs 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 <i>in situ</i> for at least 24 hours in suitable weather conditions to allow any bats to disperse. In addition to leaving sections in situ for 24 hours, reattaching or storing felled PRF-containing sections in adjacent retained woodland would act as artificial roost opportunities.	Pre-Construction & Construction
Biodiversity	The contractor will be required to implement standard practice construction methods and mitigation measures for in-stream or near-stream works. The following measures are to be read and implemented in conjunction with the Construction Environmental Management Plan (CEMP) and Surface Water Management Plan (SWMP) (Annex	Pre-Construction & Construction

	3.4):- • Maintain a minimum 50m buffer from watercourses wherever practicable and a 50m stand-off from wells and boreholes, in order to minimise the risk of impacts arising from tracks, turbine foundations, hardstandings, spoil storage areas and other construction activities. Where works are required within these buffer areas, including at identified watercourse crossings (i.e. near T4 and T9), site-specific mitigation measures will be implemented in accordance with the Water Chapter (Chapter 7) and CEMP (refer to Annex 3.4); • Spoil will be stored in line with a spoil management plan, which is included at Annex 6.2 of the EIAR; • Peat and spoil storage areas will be located outside watercourse buffer zones and managed using silt fencing, straw bales, biodegradable matting and settlement infrastructure. Storage areas will be stabilised and revegetated as soon as practicable following placement to minimise sediment mobilisation and erosion. • For works occurring within 50m of a watercourse, weather conditions will be continuously monitored (e.g. via Met Éireann) and earthworks scaled back or suspended where forecast rainfall exceeds the trigger thresholds set out in the SWMP, including high-intensity rainfall events (>10mm/hr) and prolonged heavy rainfall (>25mm in 24 hours); • In the event of heavy rainfall, open excavations or peat storage works will be secured, and emergency drainage measures will be implemented to prevent water backup and pollution; • It will be ensured that the site drainage system does not discharge directly into watercourses, but rather through a riparian buffer area of intact vegetation. • All outflows from drainage associated with construction activities will be treated through temporary settlement ponds and associated drainage controls prior to discharge. Treated water will be discharged via buffered outfalls and diffuse overland flow across vegetated areas, in accordance with the SWMP (see Annex 3.4), thereby preventing direct discharge of untreated runoff to mapped watercourses; • Watercourse crossings will be constructed during low-flow periods, adhering to any working period restrictions imposed, with filtration measures installed downstream to trap sediments; • Silt traps and fencing will be placed in working areas that have the potential to carry silt-laden material from the working area to aquatic environments; • Refuelling of machinery will take place in bunded enclosures, at a minimum of 50m away from watercourses to prevent runoff into nearby watercourses. All machinery must carry an onboard spill kit in the event of an oil/fuel spill during all phases; • A complete mechanical check of all hoses and fluid reservoirs of machinery will be carried out by a competent member of the construction team before the machinery arrives at the project site; • To reduce the amount of silt-laden water to be treated, temporary cut-off drains will be created to divert water away from dirty water and construction areas. This will lessen the volume of water to be treated onsite; • Deposition areas for spoil will be enclosed with silt fencing to prevent mobilisation of solids during adverse weather conditions and no drainage from these areas will be directed into the temporary drainage systems (see CEMP in Annex 3.4). A Sustainable Urban Drainage System (SUDS) will be implemented to allow controls to be designed for the retention of large volumes of water that may arise from spoil deposition areas; • Surface water runoff will be managed through a treatment train comprising interceptor drains, swales, check	
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	dams, silt traps and settlement ponds, with treated water discharged via buffered outfalls and diffuse overland flow in accordance with the project SWMP (Annex 3.4). • Re-seeding of all areas of bare ground or the placement of jute matting will take place as soon as practicable to prevent run-off; and, • All onsite welfare facilities will be installed and managed as per regulations to prevent nutrient overloading of aquatic environments.	
Biodiversity	Earthworks and exposed areas/soil stockpiles will be re-vegetated to stabilise surfaces as soon as practicable, using appropriate native plant (e.g. heather brash) seed from a local source; Hessian, mulches or tackifiers will be used where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and, Vegetation removal and exposure of soils will be minimised as far as possible, with only areas being actively worked on being exposed, to minimise silt mobilisation.	Construction
Biodiversity	Translocations of larval webs are not supported as a mitigation measure by Butterfly Conservation Ireland, due to the high rate of failure. However, in an effort to mitigate the risk of direct mortality, following a pre-construction survey in Mid-August/September/October (by a suitably experienced Ecologist) to update the location of webs, the turves supporting the larval webs at turbine T10 will be removed in November-February when the larvae hibernate and become less sensitive to light disturbance (DAERA, 2023). The turves will be translocated to an alternative area, which supports abundant devil's-bit scabious, located to the east of T1. This condition of the habitat in this area was assessed as suitable under-grazed.	Pre-Construction & Construction
Biodiversity	Additionally, approximately 460m of hedgerow habitat and 5m of treeline will be removed as a result of the project. It is proposed that the planting of c. 700m of new and enhanced hedgerow habitat to offset for the direct loss of these features will similarly provide sufficient mitigation for indirect impact upon terrestrial (non-volant) mammal IEFs foraging and commuting within the project site. Replacement planting will occur along lengths removed to facilitate the construction of temporary enlarged access where appropriate on the approaches to T6 and T10. Additional new planting along historic field boundary lengths to the east of the access towards T6 and adjacent peat storage.	Construction
Biodiversity	As a short-term mitigation measure, the installation of bat boxes within the woodland and treelines outside of the bat buffer zones (and outside of the project footprint) will take place prior to construction works. To replace potential roosting features being lost, eight Schwegler 2F (or similar woodcrete alternatives) bat boxes will be installed on suitably mature trees. Boxes will be installed at a height of around 3m under the supervision of a Bat Ecologist. In the long-term mitigation, there will be a like-for-like replacement of treelines lost as a result of the proposed infrastructure or required to be felled in order to achieve sufficient buffers to avoid potential impacts on bats. It is acknowledged that there will be a time lag for replanted treelines to compensate fully for the established treelines that will be removed, therefore compensatory planting will take place as early as possible.	Pre-Construction, Construction & Operation
Biodiversity	Monitoring will be carried out post-construction at each of the turbine locations and will involve monitoring at height to assess the level of post-construction activity for collision risk species. Over the first three years of operation	Operation

	a combination of data collected from:- - bat activity monitoring (seasonal deployment of static bat detectors) including continuous monitoring at height; - carcass searches around turbines; and, - deployment of a fully automated weather station with 4G connectivity. The data will be used to monitor post-construction bat activity at turbine locations and to verify the effectiveness of the mitigation measures. Should monitoring identify activity levels or mortality rates that differ materially from those predicted in this assessment, the need for additional operational mitigation measures will be reviewed.	
Biodiversity	To offset each unavoidable loss of potential bat commuting and foraging habitat and to adhere to a biodiversity enhancement approach, equivalent areas for compensatory habitat enhancement and replanting have been identified on site but outside the bat buffers.	Operation
Biodiversity	To offset the effective loss of hen harrier foraging habitat through displacement within 250m of turbine locations, bog restoration will be undertaken as detailed within the HMP. There will be 1.34ha of forest to bog restoration which is further than 250m from turbine locations. In addition, there will be rewetting of degraded bog habitat present across the project site. Bog restoration will improve habitat quality and support additional small birds and mammals, thus providing greater quality foraging habitat for hen harrier. This will offset some of the effective loss of foraging habitat for hen harrier through displacement. Bog restoration will also benefit other avian IEFs and BoCCI species which nest, roost and forage within bog habitats including red grouse and snipe.	Operation
Biodiversity	The effectiveness of the freshwater ecology mitigation measures will be verified through implementation of the Water Quality Monitoring Plan and ongoing monitoring requirements contained within the CEMP and SWMP (Annex 3.4). This will include regular inspection and maintenance of the surface water management system, together with pre-construction, construction and post-construction water quality monitoring, to ensure that the drainage system is functioning effectively and that downstream water quality is protected.	Construction
Biodiversity	The turves containing marsh fritillary larval webs will be translocated to the area east of T1, which supports abundant devil's-bit scabious. This approach will need further refinement alongside NPWS (likely derogation), to ensure the microclimate is appropriate. The condition of the habitat was assessed as suitable under-grazed. The area is likely unsuitable for grazing as it is located in a deep depression resulting from historic turf cutting. As such, the habitat can be improved and enhanced for marsh fritillary by:- - Removing the encroaching scrub and non-native lodgepole pine saplings; and, - Trimming some areas of the grassy sward to improve structural diversity.	Pre-Construction
Biodiversity	To aim to avoid accidental disturbance to the resting places of protected mammals, during the construction phase of the project, including badger, otter, red squirrel and pine marten; prior to works commencing these will be preceded by a due diligence ecological walkover survey of the proposed works corridor, including the electricity line route and bat feature buffers.	Pre-Construction
Biodiversity	Ornithological monitoring surveys will as per Scottish Natural Heritage (2009) guidance, will be undertaken post-construction in years 1, 2, 3, 4, 5, 10 and 15. As species have been identified as risk of collision carcass searching	Operation

	will form part of the ornithological post construction monitoring. Predicted collisions for IEF species are very low, other than for golden plover during the non-breeding season. Post-construction monitoring will include carcass searches to assess observed collision rates and compare these against collisions predicted in CRM, subject to land access, health and safety requirements, and the findings of the adaptive monitoring programme. Monthly carcass searches will be carried out at operational turbines using trained sniffer dogs. In line with guidance on conducting bird carcass searches at onshore wind farms (NatureScot, 2009 and Caryl <i>et al.</i>, 2016) searches will be undertaken at a proportion of operational turbines within a defined search radius surrounding each selected turbine. Based on the turbine dimensions and the medium to large size of species likely to be present within the project site, carcass searches of 50% of operational turbines within a 100 m radius of each selected turbine is considered appropriate. Roosting Raptor Surveys will be undertaken to understand operation phase impacts and habitat management on hen harrier. Surveys for roosting hen harrier will follow NatureScot (2025) guidance and use methods outlined by Hardey <i>et al.</i> (2013). Surveys will cover the project site and a 500m buffer. Monitoring will be undertaken in years 1-3, 5, 10 and 15 in line with NatureScot monitoring guidance (2009).	
Biodiversity	A pre-construction assessment of hedgerows, treelines and woodland adjacent to works corridor, targeting sections that will be retained post-construction, will be undertaken by an appropriately qualified arboriculturist. This will identify Root Protection Areas (RPAs) if present, where construction activities will be limited, excavation and compaction in particular, to avoid impacts on the health of trees/shrubs adjacent to the works corridor.	Pre-Construction
Biodiversity	Initially, regular monitoring will be conducted in years 1, 2 and 3 post-construction to ensure that vegetation clearance measures and ongoing management efforts result in the desired habitat conditions. Following the initial three-year monitoring period, habitat-feature buffers will continue to be maintained through the Habitat Management Plan. Annual compliance checks in spring (April) and late summer (August) will be undertaken during the first three years of the operational phase. Thereafter, periodic inspections at intervals of up to 10 years will be undertaken to ensure that habitat-feature buffers are maintained in suitable condition. The three-year post-construction monitoring program will also include bat activity monitoring using static detectors and carcass searching. Bat activity monitoring in years 1, 2 and 3 will involve three seasonal deployments of five static bat detectors operating for a minimum of 10 nights under compliant weather conditions. Four detectors will be deployed with one at each of the turbine locations. Deployment will cover the following periods:- • early May and mid-June; • mid-June and mid-August; and, • early September. A continuously recording bat detector will be deployed at height, operating between the start of May and the end of October, to simultaneously monitor bat activity at ground level (c. 2m) and at height (c. 50m). Similar to pre-construction surveys, weather data will be collected. This can be supplemented with wind speed data collected from wind turbines.	Operation
Biodiversity	The project will be monitored for activity levels and potential bat fatalities during years 1, 2, 3 post construction. The requirement for any additional monitoring thereafter should be informed by the findings of the initial	Operation

	monitoring period and discussed with the relevant regulatory authorities where necessary. A comprehensive onsite fatality monitoring programme is to be undertaken. The primary components of the mortality programme are outlined below:- • Carcass removal trials to establish levels of predator removal of possible fatalities. This will be done following best recommended practice and with due cognisance of published effects such as predator swamping, whereby excessive placement of carcasses increases predator presence and consequently skews results. No turbines which are used for carcass removal trials will be used for subsequent fatality monitoring; • Turbine searches for fatalities will be undertaken following best practice in terms of search area (minimum search radius equivalent to hub height) and at intervals selected to effectively sample fatality rates as determined by carcass removal trials in above; • A standardised approach with a possible control group and/or variation in search techniques such as straight line transects/randomly selected spiral transects/dog searches will be undertaken. This will provide a means of robustly estimating the post construction collision fatality (if any); and, • Recorded fatalities will be interpreted alongside carcass persistence and searcher-efficiency data to provide an estimate of overall fatality rates.	
Biodiversity	In order to verify the efficacy of pollution prevention and mitigation works during construction, water quality monitoring is required. Baseline monitoring will be undertaken prior to construction, with construction-phase monitoring undertaken by the appointed contractor's Environmental Manager or suitably qualified specialist. Monitoring will be conducted prior to, during and following completion of construction works. Survey locations will target watercourses within the catchments of the construction areas and monitoring will comprise visual inspections, field hydrochemistry and grab sampling. Annex 3.4 (CEMP) provides the outline scope for water quality monitoring, including:- • At least one baseline monitoring visit. • Daily visual observation undertaken by the appointed contractor environmental manager in areas of high construction activity or during high rainfall periods to identify any evidence of siltation, oil or silt. Visual inspections will include details of the colour of the water at the time of inspection. • Weekly visual inspections and monthly field hydrochemistry monitoring. • One round of post construction monitoring. • Parameters for hydrochemistry analysis will include the following:- ○ pH; ○ Temperature; ○ Total Suspended Solids (TSS); ○ Dissolved Organic Carbon (DOC); ○ Conductivity; ○ Dissolved Oxygen (DO); ○ Total Oxidised Nitrogen (TON);	Construction

	- o Ammoniacal Nitrogen; - o Ammonia; - o Potassium; - o Phosphate; - o Biological Oxygen Demand (BOD); - o Chemical Oxygen Demand (COD); and, - o Total Petroleum Hydrocarbons (TPH) only during construction phase.	
Biodiversity	Habitat condition assessments and larval web surveys will be carried out in accordance with best practice guidance in Year 1, 3, 5, 10 and then for repeated 5-year increments for the lifetime of the project.	Operation
Land & Soil	The excavation of peat, soil, subsoil and bedrock will have a direct effect on the geological environment and no specific mitigation measures are proposed. The excavation and long term storage of materials will be completed in accordance with best practice for the management and treatment of such materials. However, to help offset the loss of peat at the proposed site, a Habitat Management Plan has been prepared and comprises the following:- • Drain management; • Marginal, cell and contour bunding; • Forest to bog restoration; • Bare peat revegetation; • Scrub removal; • Cessation of turf cutting; • Scrub clearance; and, • Prevention of uncontrolled burning.	Construction
Land & Soil	The following avoidance and design measures are proposed to reduce erosion effects at excavation and spoil storage areas:- • Mats will be used, as necessary, to support construction plant and machinery on soft ground, thus reducing the likelihood of soil and subsoil erosion and avoiding the formation of rutted areas. This will substantially reduce the likelihood for surface water ponding to occur; • Excavated material will be side cast and stored temporarily adjacent to excavation areas for use during reinstatement and landscaping. Where material is not required for reinstatement or landscaping, it shall be immediately transported to the spoil deposition areas; • Silt fences, and all necessary surface water management measures (including upslope interceptor drains), will be installed around all temporary stockpiles to limit movement of entrained sediment in surface water runoff. All slopes will be sealed with the bucket of an excavator;	Construction

	• In order to minimise erosion during the construction phase, works will not take place during periods of intense or prolonged rainfall (to prevent increased silt laden runoff). Drainage systems, as outlined in Chapter 7, will be implemented to limit runoff effects during the construction phase; • At the designated spoil deposition areas, material will be placed in layers to ensure stability is maintained and works will be undertaken in accordance with best practice construction methodologies. Works at the spoil deposition areas (including the borrow pit) will be monitored, on a weekly basis during the construction phase and monthly for a 6 no. month period thereafter, by an appropriately qualified Geotechnical Engineer. In the event that any ground stability issues arise, the Engineer will have the power to cease works until such time as remedial works have been completed to his/her satisfaction; • Permanently mounded spoil; for example, berms surrounding turbines and hardstands, berms located along access tracks and the spoil deposition areas; will be allowed to vegetate; and, • The underground electricity line (grid connection) trench will be reinstated to the required EirGrid/ESB Networks specification and in accordance with landowner requirements and will be reseeded or allowed to vegetate naturally (on agricultural land) or topped with asphalt (or similar along public roads) at the earliest opportunity to prevent erosion.	
Land & Soil	The following measures are proposed to specifically prevent contamination of soils and subsoils:- • The volume of fuels or oils stored on site will be minimised. All fuel and oil will be stored in an appropriately bunded area within the temporary construction compound. Only an appropriate volume of fuel will be stored at any given time. The bunded area will be roofed to avoid the ingress of rainfall and will be fitted with a storm drainage system and an appropriate oil interceptor; • All bunded areas will have 110% capacity of the volume to be stored; • On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled at the temporary compound and will be towed around the site by a 4x4 jeep to where plant and machinery is located. The 4x4 jeep will also be fully stocked with fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated, trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations to avoid any accidental leakages; • All plant and machinery used during construction will be regularly inspected for leaks and fitness for purpose; • Spill kits will be available to deal with any accidental spillages within the temporary construction compound and during re-fuelling; • All waste tar material arising from road cuttings (from trenching in public roads and haul route temporary alteration works) will be removed off-site and disposed of at a licensed waste facility. Due to the potential for contamination of soils and subsoils, it is not proposed to utilise this material for any reinstatement works or to store it within the spoil deposition areas; and, • An emergency plan for the construction phase to deal with accidental spillages is contained within the	Construction

	Planning-Stage Construction and Environmental Management Plan. This emergency plan will be further developed by the contractor prior to the commencement of construction.	
Land & Soil	To help offset the loss of peatland habitats, a Habitat Management Plan has been prepared and will be implemented at the project site. 6.5ha of forestry will be felled to accommodate wind farm infrastructure. However, all tree coverage felled will be replaced at a replanting site which will be subject to technical approval through a separate consenting process. No specific measures, other than best-practice felling and replanting methodologies are proposed and the efficacy and appropriateness of these measures will be assessed, separately, through the felling and replanting licensing process. However, subject to the adherence to standard methodologies, no significant effects are assessed as likely.	Construction
Land & Soil	In terms of peat/ground stability, the following control measures will be incorporated into the construction phase of the project will ensure the management of the risks for this site:- • Appointment of experienced and competent contractors; • The site will be supervised by experienced and qualified personnel; • Allocate sufficient time for the project (be aware that decreasing the construction time has the potential to increase the risk of initiating a localised peat movement); • Prevent undercutting of slopes and unsupported excavations; • Maintain a managed robust drainage system; • Prevent placement of loads/overburden on marginal ground; • Implementation of safety buffers around deep peat areas; • Adhere to the spoil and peat storage restriction areas detailed in the Geotechnical and Peat Stability Assessment; • Set up, maintain and report findings from monitoring systems as outlined in the Geotechnical and Peat Stability Assessment; • Ensure construction method statements are developed and agreed before commencement of construction and are followed by the contractor; and, • Revise and amend the Construction Risk Register as construction progresses to ensure that risks are managed and controlled for the duration of construction.	Construction
Land & Soil	Oil used in transformers (within each turbine, if required) and storage of oils/lubricants at the electricity substation could leak during the operation phase and result in adverse effects on soil and subsoils. Any oil storage tanks will be located in a roofed concrete bund capable of holding 110% of the stored oil volume. Turbine transformers will be located within the turbines, and any leaks will be fully contained within the turbine thus eliminating any pathway for leakages to affect land and soil.	Operation
Land & Soil	Mitigation measures applied during decommissioning activities will be similar to those applied during construction	Decommissioning

	where relevant. Mitigation measures, to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant and machinery, will be implemented as per the construction phase mitigation measures.	
Water	The overarching objective of the proposed mitigation measures is to ensure that all surface water runoff is comprehensively treated and attenuated such that no silt or sediment laden waters or deleterious material is discharged into the local drainage system. A Planning-Stage SWMP, incorporating the surface water drainage design has been prepared and incorporates the principles of Sustainable Drainage Systems (SuDS) through an arrangement of surface water drainage infrastructure. The SWMP has had regard to greenfield runoff rates and is designed to mimic same and is sufficient to accommodate a 1-in-100 year rainfall event. While the SuDS is an amalgamation of a suite of drainage infrastructure, the overall philosophy is straightforward. In summary:- • Clean water drains will be installed upslope of the works area to intercept clean surface water to prevent it becoming contaminated by silt/sediment from construction activities; • All surface water runoff from construction works areas will be directed to specially constructed downslope dirty-water swales surrounding all areas of ground proposed to be disturbed (including areas for the temporary storage of material); • The swales will direct runoff into settlement ponds/silt traps where silt/sediment will be allowed to settle; and, • Following treatment and the settlement of silt/sediment, clean water will be discharged indirectly to the local drainage network via buffered outfalls thus ensuring that no scouring occurs. The suite of surface water drainage infrastructure will include <i>inter alia</i> upslope interception (clean water) drains, downslope collector (dirty water) swales, sedimats, flow attenuation and filtration check dams, settlement ponds/silt traps, and buffered outfalls. The design criteria implemented as part of the SuDS are as follows:- • To minimise alterations to the ambient site hydrology and hydrogeology; • To provide settlement and treatment controls as close to the site footprint as possible and to replicate, where possible, the existing hydrological environment of the site; • To minimise sediment loads resulting from the development run-off during the construction phase; • To preserve greenfield runoff rates and volumes; • To strictly control all surface water runoff such that no silt or other pollutants shall enter watercourses and that no artificially elevated levels of downstream siltation or no plumes of silt arise when substratum is disturbed; • To provide settlement ponds to encourage sedimentation and storm water runoff settlement; • To reduce stormwater runoff velocities throughout the site to prevent scouring and encourage settlement of sediment locally; • To manage erosion and allow for the effective revegetation of bare surfaces; and, • To manage and control water within the site and allow for the discharge of runoff from the site below the	Construction

	MAC of the relevant surface water regulation value.																	
Water	<u>Felling Operations</u> There is a requirement in the <i>Forest Service Code of Practice</i> and in the <i>FSC Certification Standard</i> for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document <i>Forestry and Water Quality Guidelines</i> are detailed below. <table><tr><th colspan="2">Average slope leading to the aquatic zone</th><th>Buffer zone width on either side of the aquatic zone</th><th>Buffer zone width for highly erodible soils</th></tr><tr><td>Moderate</td><td>(0–15%)</td><td>10m</td><td>15m</td></tr><tr><td>Steep</td><td>(15–30%)</td><td>15m</td><td>20m</td></tr><tr><td>Very steep</td><td>(>30%)</td><td>20m</td><td>25m</td></tr></table> A total of 6.5ha of forestry will be permanently felled to accommodate the construction and operation of the project. During the construction phase, a self-imposed conservative buffer zone of 50m will be maintained for all streams. Only approximately 0.8ha of the total 6.5ha proposed for felling is located inside a 50m watercourse buffer zone.	Average slope leading to the aquatic zone		Buffer zone width on either side of the aquatic zone	Buffer zone width for highly erodible soils	Moderate	(0–15%)	10m	15m	Steep	(15–30%)	15m	20m	Very steep	(>30%)	20m	25m	Construction
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Very steep	(>30%)	20m	25m															
Water	Mitigation measures during felling operations which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods, as follows:- - Machine combinations (i.e. handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance; - Checking and maintenance of tracks and culverts will be ongoing through any felling operation. No tracking of vehicles through watercourses will occur. Where possible, existing drains will not be disturbed during felling works; - Ditches which drain from the areas to be felled towards existing surface watercourses will be blocked, and temporary silt traps will be constructed. No direct discharge of such ditches to watercourses will occur. Drains and sediment traps will be installed during ground preparation. Collector drains will be excavated at an acute angle to the contour (c. 0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients and avoid being placed at right angles to the contour; - Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the spoil deposition areas. All new silt traps will be constructed on even ground and not on sloping ground; - In areas particularly sensitive to erosion or where felling inside the 50m buffer is required, it will be necessary to install double or triple sediment traps; - All drainage channels will taper out before entering the 50m buffer zone. This ensures that discharged water	Construction																

	gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils, silt traps will be installed at the end of the drainage channels; • Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimised and controlled; • Brash mats will be used to support vehicles on soft ground, reducing topsoil and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place before they become heavily used and worn. Provision will be made for brash mats along all off-road (track) routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction will be suspended during periods of high rainfall; • Timber will be stacked in dry areas, and outside the 50m watercourse buffer. Straw bales and check dams will be emplaced on the down gradient side of timber storage/processing sites; • Works will be carried out during periods of no, or low, rainfall in order to minimise entrainment of exposed sediment in surface water run-off; • Checking and maintenance of tracks and culverts will be ongoing through the felling operation; • Refuelling or maintenance of machinery will not occur within 100m of a watercourse. Mobile bowser, drip kits and qualified personnel will be used where refuelling is required; • A permit to refuel system will be adopted; • Branches, logs or debris will not be allowed to build up in the 50m buffer. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors; • Trees will be cut manually from along streams and using machinery to extract whole trees; and, • Travel will only be permitted perpendicular to and away from surface water features.	
Water	During felling, silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps is to slow water flow, increase residence time and allow settling of silt in a controlled manner.	Construction
Water	The following items will be carried out during pre-felling inspections and regularly thereafter:- • Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual waterlogging or bogging of machines; • Inspection of all areas reported as having unusual ground conditions; • Inspection of main drainage ditches and outfalls. During pre-felling inspections, the main drainage ditches will be identified. Where possible, the pre-felling inspection will be carried out during rainfall; • Following tree felling, all main drains will be inspected to ensure that they are functioning;	Construction

	- Extraction tracks within 10m of drains will be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground; - Culverts on drains exiting the site, if impeded by silt or debris, will be unblocked; and, - All accumulated silt will be removed from drains, culverts and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall.	
Water	During felling, sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The 'before' sampling will be conducted within 4-weeks of the felling activity commencing, preferably in medium-to-high water flow conditions. The 'during' sampling will be undertaken once a week or after rainfall events. The 'after' sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e. where an impact has been shown). Also, daily surface water monitoring forms (for visual inspections and field chemistry measurements) will also be utilised at every works site near any watercourse. These will be populated daily and kept on site for record and inspection.	Construction
Water	The key mitigation measure to prevent the release of silt or sediment during the construction phase is the avoidance of sensitive aquatic areas by using a 50m buffer. Other than some small sections of crane hardstandings and associated access tracks at T1 and T4, the watercourse crossings at turbines T4 and T9, and some sections of haul route upgrade works; the majority of the wind farm infrastructure (including all turbine foundation locations, borrow pit and peat/spoil deposition areas) is located outside of areas that have been assessed to be hydrologically sensitive. The generally large setback distance from sensitive hydrological features ensures that sufficient space is provided for the installation of drainage mitigation measures (discussed below) and to ensure their effective operation. The proposed buffer zone will ensure:- - Avoidance of physical damage to watercourses, and associated release of sediment; - Avoidance of excavations within close proximity to surface water courses; - Avoidance of the entry of suspended sediment from earthworks into watercourses; and, - Avoidance of the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.	Construction
Water	The following section details the measures which will be put in place during the construction phase to ensure that surface water features are protected from the release of silt or sediment and to ensure that all surface water runoff is fully treated and attenuated to avoid the discharge of dirty water. - Source controls to limit the likelihood for 'dirty water' to occur:- - Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with clean washed gravel, filter fabrics, and other similar/equivalent or	Construction

	appropriate systems; and, ○ Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures. ● In-Line controls to ensure appropriate management of silt laden water:- ○ Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems. ● Treatment systems to fully attenuate silt laden waters prior to discharge:- ○ Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems. It should be noted for this site that an extensive network of land, bog and forestry drains already exists and these will be integrated and enhanced as required and used within the wind farm drainage system. The integration of existing land drainage networks and wind farm networks is common practice in wind energy developments and will also result in benefits to surrounding lands. The main elements of interaction with existing drains will be as follows:- ● Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction and attenuation for flow management) of runoff from the wind farm drainage into the existing site drainage network. This will reduce the likelihood of any increased risk of downstream flooding or sediment transport/erosion; ● Silt traps will be placed in the existing drains upstream of any streams where construction works is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area; and, ● Buffered outfalls, which will be numerous over the site, will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site. <i>Pre-commencement Temporary Drainage Works</i> Prior to the commencement of haul route upgrades, access tracks, crane hardstandings and turbine foundations, the following key temporary drainage measures will be installed:- ● All existing dry bog, forestry or agricultural drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using check dams/silt traps; ● Clean water interceptor drains will be installed upgradient of the works areas; ● Check dams/silt fence arrangements (silt traps) will be placed in all existing drains that have surface water flows and also along existing roadside drains; and, ● A double silt fence perimeter will be placed down-slope of works areas that are located inside the	
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	watercourse 50m buffer zone. <i>Water Treatment Train</i> While the proposed drainage plan is assessed as providing a sufficient level of protection to avoid any deterioration in downstream water quality; a temporary final line of defence can be provided by a water treatment train (i.e. sequence of water treatment processes), if required. If the discharge water from construction areas fails to be of a high quality, then a filtration treatment system (such as a 'Siltbuster' or similar equivalent treatment train) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This water treatment train will apply for the entirety of the construction phase. <i>Silt Fences</i> Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to watercourses of sand and gravel sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. Double silt fences will be emplaced within drains down-gradient of all construction areas inside the hydrological buffer zones to provide an additional layer of protection in these areas. <i>Silt Bags</i> Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats (sediment entrapment mats, consisting of coir or jute matting) placed at the silt bag location to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure. <i>Management of Runoff from Peat/Spoil Deposition Areas</i> It is proposed that excavated peat/overburden/spoil will be utilised for reinstatement of excavated areas etc. and for landscaping purposes. Excess material, or material which is unsuitable for this purpose, will be stored, permanently, at dedicated peat/spoil deposition areas and in the 1 no. spent borrow pit. Proposed peat/spoil deposition areas and the borrow pit are located outside the 50m stream buffer zone. During the initial placement of peat/spoil in the deposition areas, silt fences, straw bales and biodegradable matting will be used to control surface water runoff. Drainage from overburden deposition areas will ultimately be routed to an oversized swale and a number of silt/settlement ponds with appropriate storage and settlement capacity, designed for a '1-in-100 year 6-hour return' period, before being discharged. Spoil deposition areas will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. Once re-vegetated and stabilised, spoil deposition areas will no longer be a likely source of silt laden runoff. Surface water protection infrastructure will be left in place until the areas have stabilised. <i>Underground Electricity Line Installation Works</i> Mitigation measures which are outlined below will be implemented to ensure that silt laden or contaminated surface water runoff from the trenching work does not discharge directly to the water:-	
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	• All existing dry drains that intercept the works area will be temporarily blocked down-gradient of the works using temporary check dams/silt traps (e.g. straw bales); • Clean water diversion drains will be installed upgradient of the works areas, as required; • Check dams/silt fence arrangements (silt traps or straw bales) will be placed in all existing drains that have surface water flows and also along existing roadside drains; and, • A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zones such as at watercourse crossing locations. Specific mitigation measures relating to the directional drilling at the crossing location are detailed below. <i>Directional Drilling</i> The following mitigation will be carried out during directional drilling works:- • Firstly, the crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance of vegetation; • A minimum 10 metre vegetative buffer zone will be maintained (if present) between disturbed areas and the watercourse bank. There will be no storage of material/equipment, excavated material (see below) or overnight parking of machinery inside the 10m buffer zone; • Double silt fencing will be placed upslope of the buffer zone on each side of the watercourse. • Mats will be used underneath the excavator, inside the 10 metre vegetative buffer zone, to prevent soil erosion/rutting and potential surface water quality impacts from localised surface water runoff; • Temporary storage of excavated material will be undertaken outside of the 10m buffer on flat ground or within a local hollow area. A containment berm will be placed downslope of the excavated material which in turn will be surrounded by secondary silt fence protection to prevent saturated soil from flowing back into the watercourse; • Operation of machinery and use of equipment within the 10m buffer will be kept to a minimum to avoid any unnecessary disturbance; • There will be no refuelling allowed within 100m of the watercourse crossing; • All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing; and, • Works shall not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted. Mitigation measures relating to the use of a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water for directional drilling include:- • The area around the Clear Bore™ batching, pumping and recycling plants will be bunded using terram and sandbags in order to contain any spillages; • Silt fences will be placed between the works area and adjacent rivers and streams on both banks; • Accidental spillage of fluids will be cleaned up immediately and transported off site for disposal at a licensed	
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	facility; and, • Adequately sized skips will be used for temporary storage of drilling arisings during directional drilling works. This will ensure containment of drilling arisings and drilling flush. A Fracture Blow-out (Frac-out) Prevention and Contingency Plan will be prepared by the drilling contractor prior to construction and will include the following measures:- • The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used); • The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags • to contain any potential spillage; • A double row of silt fencing will be placed between the works area and the adjacent river; • Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility; • Adequately sized skips will be used where temporary storage of arisings are required; • The drilling process/pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourse; • This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped; • Any frac-out material will be contained and removed off-site; • The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and, • If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location. <i>Pre-emptive Site Drainage Management</i> The works programme for the initial construction stage of the project will also take account of weather forecasts, and predicted rainfall in particular. Large excavations and movements of peat/subsoil or vegetation stripping will be suspended or scaled back if prolonged or intense rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast. The following forecasting systems are available and will be used on a daily basis at the site to direct proposed construction activities:- • General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates; • Meteo Alarm: Alerts to the possible occurrence of severe weather for the next 2-days. Less useful than general forecasts as only available on a provincial scale; • 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3-hours but does not account for possible heavy localised events; • Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin	
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	airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15-minutes. Radar images are not predictive; and, • Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest. The use of safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of an impending high rainfall intensity event. Works will be suspended if forecasting suggests either of the following is likely to occur:- • >10 mm/hr (i.e. high intensity local rainfall events); • >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, • >half monthly average rainfall in any 7 days. Prior to works being suspended the following control measures will be completed:- • Secure all open excavations; • Provide temporary or emergency drainage to prevent back-up of surface runoff; and, • Avoid working during heavy rainfall and for up to 24-hours after heavy events to ensure drainage systems are not overloaded. <i>Timing of Site Construction Works</i> The construction of the site drainage system will be carried out, at the respective locations, prior to other activities being commenced. The construction of the drainage system will only be carried out during periods of, where possible, no rainfall, therefore avoiding runoff. This will avoid the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and functional for all subsequent construction works. <i>Monitoring</i> Prior to the commencement of development, a detailed Site Drainage Plan and SWMP will be prepared to detail the precise siting and composition of the surface water management measures. The respective plans, which will form part of a detailed CEMP, will be prepared prior to the commencement of development. The CEMP will also include a detailed Water Quality Monitoring Plan for the monitoring of surface waters in the vicinity of the construction site by a designated Environmental Manager. The monitoring programme will comprise field testing and laboratory analysis of a range of agreed parameters. The civil works contractor, who will be responsible for the construction of the site drainage system, and Environmental Manager will undertake regular inspections of the drainage system to ensure that all measures are functioning effectively. The surface water sampling locations used in this EIAR (i.e. SW1–SW4) will be used during construction activities. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended. Any excess build-up of silt levels that may decrease the effectiveness of the drainage feature, will be removed	
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	and disposed of in an appropriate manner.	
Water	The management of excavation dewatering (pumping), particularly in relation to any accumulation of water in foundations or cabling and electricity line trenches, and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:- • Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations, will be put in place; • The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters to ensure that greenfield runoff rates are mimicked; • If required, pumping of excavation inflows will prevent build-up of water in the excavation; • All pumped water volumes will be discharged to the surface water management system adjacent to excavation areas, or via specialist treatment systems such as a Siltbuster unit; • There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur; • Daily monitoring of wind farm excavations by the Environmental Manager will occur during the construction phase. If high levels of seepage inflow occur, excavation work at this location will cease immediately and a geotechnical assessment undertaken; and, • A mobile 'Siltbuster' or similar equivalent specialist treatment system will be available on-site for emergencies. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if required.	Construction
Water	Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:- • The volume of fuels or oils stored on site will be minimised. All fuel and oil will be stored in an appropriately bunded area within the temporary construction compounds. Only an appropriate volume of fuel will be stored at any given time. The bunded area will be roofed to avoid the ingress of rainfall and will be fitted with a storm drainage system and an appropriate oil interceptor; • All bunded areas will have 110% capacity of the volume to be stored; • On site refuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled at the temporary compound and will be towed around the site by a 4x4 jeep to where plant and machinery is located. No refuelling will be permitted at works locations within the 50m hydrological buffer. The 4x4 jeep will also be fully stocked with fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations to avoid any accidental leakages; • All plant and machinery used during construction will be regularly inspected for leaks and fitness for purpose;	Construction

	• Spill kits will be readily available to deal with and accidental spillages; • All waste tar material arising from road cuttings (from trenching or other works in public roads) will be removed off-site and taken to a licensed waste facility. Due to the potential for contamination of soils and subsoils, it is not proposed to utilise this material for any reinstatement works or for storage within the spoil deposition areas; and, • An outline emergency plan for the construction phase to deal with accidental spillages is contained within the Planning-Stage CEMP. This emergency plan will be further developed prior to the commencement of development, and will be agreed with the Planning Authority as part of the detailed CEMP.	
Water	Measures to avoid contamination of ground and surface waters by wastewaters will comprise:- • Self-contained port-a-loos (chemical toilets) with an integrated waste holding tank will be installed at the site compound, maintained by the providing contractor, and removed from site on completion of the construction works; • Water supply for the site office and other sanitation will be brought to site and removed after use to be discharged at a suitable off-site treatment location; and, • No water will be sourced on the site, nor will any wastewater be discharged to the site.	Construction
Water	The following mitigation measures are proposed to ensure that the release of cement-based products is avoided:- • No batching of wet-cement products will occur on site. Ready-mixed concrete will be brought to site as required and, where possible, emplacement of pre-cast products will be utilised; • All watercourse crossings will utilise pre-cast products and the use of wet-cement products within the hydrological buffer will be avoided • Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. Chute cleaning will be undertaken at lined cement washout ponds with waters being stored in the temporary construction compounds, removed off site and disposed of at an approved licensed facility. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed; • Weather forecasting will be used to ensure that prolonged or intense rainfall is not predicted during concrete pouring activities; and, • The concrete pour sites will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.	Construction
Water	The following mitigation measures are proposed in relation to morphological changes to watercourses and drainage patterns:- • The 2 no. proposed new stream crossings will be clear span bridges (bottomless culverts) and the stream beds will remain undisturbed. No in-stream excavation works at the crossing locations are proposed and therefore there will be no impact on the stream at the proposed crossing location; • Wind farm electrical cabling or the underground electricity line cabling will be installed either above or	Construction

	below an existing culvert and will not directly interfere with the culvert; - At the time of construction, all guidance/best practice requirements of the Office of Public Works (OPW) or Inland Fisheries Ireland will be incorporated into the design/construction of the proposed watercourse/culvert crossings; - As a further precaution, in-stream construction work (if/where required) will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to <i>Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016)</i> (i.e., July to September inclusive). This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI); - During the near stream construction works (i.e. within the 50m buffer zone), double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase; - The 2 no. new watercourse crossings at the wind farm site will require a Section 50 license application to the OPW in accordance with the Arterial Drainage Act 1945. The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent; and, - No instream works are proposed at the underground electricity line watercourse crossings, with all crossings being carried out via HDD.	
Water	Regarding the replacement of natural surfaces with lower permeability surfaces:- - Interceptor drains will be installed up-gradient of all infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader; - Swales/track side drains will be used to collect runoff from access tracks, crane hardstanding areas and substation compound areas which may contain entrained suspended sediment, and channel it to settlement ponds for sediment settling; - Transverse drains ('grips') will be constructed, where appropriate, in the surface layer of access tracks to divert any runoff into swales/track side drains; - Check dams will be used along sections of access tracks drains to intercept silts at source. Check dams will be constructed from a 40mm non-friable crushed rock or similar; - Swales and check dams will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and, - Settlement ponds will be designed in accordance the greenfield runoff rate requirements; and, - Imported rock for construction purposes and road surfacing will be strong, well-graded limestone which will be resistant to erosion and have a low likelihood to generate fines in hardstand runoff.	Operation
Water	Mitigation measures relating to oils and fuels are as follows:-	Operation

	• All storage containers will be labelled appropriately, including hazardous markings; • Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction; • The substation transformer and oil storage tanks will be located in a concrete bund, impervious to rainwater ingress, capable of holding 110% of the stored oil volume; • Bunds will be to standard specified in CIRIA Report 163 'Construction of bunds for oil storage tanks' and CIRIA Report C535 'Above-ground proprietary prefabricated oil storage tank systems'; • Barrels and bunded containers will be stored upright and internally where appropriate and always on drip trays or sump pallets; • Appropriate spill kits will be available at all storage locations; • Turbine transformers will be located within the turbines, and any leaks will be fully contained within the turbine thus eliminating any pathway for leakages to affect land and soil. • Maintenance vehicles will be regularly inspected for leaks and fitness for purpose; • All fuel/chemical storage facilities will be subject to weekly inspection; and, • An emergency plan for the operational phase to deal with accidental spillages will be contained within Environmental Management Plan. Spill kits will be available to deal with accidental spillages.	
Water	As in the construction phase, temporary surface runoff control measures will again be put in place during decommissioning works. The drainage system will remain operational during the decommissioning phase and will serve to treat any sediment laden surface water run-off due to a renewed disturbance of soils. Following decommissioning, re-vegetation will be implemented as soon as practicable and monitored to ensure vegetation is established.	Decommissioning
Air Quality	<u>Site Management</u> • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken; • Make the complaints log available to the local authority when asked; and, • Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.	Construction
Air Quality	<u>Preparing & Maintaining the Site</u> • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible; • Erect solid screens or barriers around dusty activities that are at least as high as any stockpiles on site; • Fully enclose site or specific operations where there is a high likelihood of dust production and the site is active for an extensive period; • Avoid site runoff of water or mud;	Construction

	• Keep site fencing, barriers and scaffolding clean using wet methods; • Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and, • Cover, seed or fence stockpiles to prevent wind whipping.	
Air Quality	<u>Operating Vehicle/Machinery and Sustainable Travel</u> • Ensure all vehicles switch off engines when stationary – no idling vehicles; • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable; • Impose and signpost a maximum-speed-limit of 25kph on surfaced and 15kph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate); • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing); and, • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	Construction
Air Quality	<u>Operations</u> • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems; • Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate; • Use enclosed chutes and conveyors and covered skips; • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and, • Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	Construction
Air Quality	<u>Waste Management</u> • Bonfires and burning of waste materials are legally prohibited.	Construction
Air Quality	<u>Measures Specific to Earthworks</u> • Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable; • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as is practicable; and, • Only remove the cover in small areas during work and not all at once.	Construction
Air Quality	<u>Measures Specific to Construction</u> • Avoid scabbling (roughening of concrete surfaces) if possible; • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is	Construction

	required for a particular process, in which case ensure that appropriate additional control measures are in place; • Ensure fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and, • For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.	
Air Quality	<u>Measures Specific to Trackout</u> • Use water-assisted dust sweeper(s) on the access tracks and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use; • Avoid dry sweeping of large areas; • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport; • Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable; • Record all inspections of haul routes and any subsequent action in a site logbook; • Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowzers and regularly cleaned; • Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable); and, • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	Construction
Climate	During the construction phase, the following best practice measures shall be implemented to prevent significant GHG emissions and reduce effects on climate: - • Procurement of low carbon materials, the majority of GHG emissions from a construction project are associated with embodied carbon within materials. It is understood and accepted that market availability and price mean that it is difficult to commit to alternatives at this early stage in the project's development cycle; however, alternative options are set out below:- ○ Concrete: GGBS (Ground granulated blast-furnace slag), 30% lower clinker content cement, or better, where practicable; ○ Fibre reinforced concrete or similar instead of steel reinforcement; ○ Steel: recycled or electric arc foundry steel, cross laminated timber; ○ Bricks and aggregates: reclaimed or recycled; • Re-use of materials on site e.g. excavated material; • Use of EVs during construction; • Use of mains electricity or batteries during construction rather than diesel generators; and, • All plant adheres to Euro Stage V or better and all vehicles are Euro VI/Euro 6 (Euro 7 for new vehicles will commence late 2026)	Construction

	In terms of impact on the project due to climate change, during construction, the Contractor will be required to mitigate against the effects of extreme rainfall/flooding through site risk assessments, method statements and good site management practise. The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes through site risk assessments, method statements and good site management practise. All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures. Temperatures can affect the performance of some materials, and this will require consideration during construction. During construction, the Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.	
Climate	Monitoring and reporting of the embodied carbon in the construction phase will be conducted. The aim of monitoring will be to seek further ways to minimise climate impacts. Monitoring will include contractual obligations, in line with the most recent Climate Action Plan and sectoral targets, for the successful tenderer to ensure that the project stays in line with updated aims. Commitments to monitor GHG emissions during the construction phase will also be secured through the final Construction Environmental Management Plan (CEMP). Monitoring will include embodied carbon of construction materials, water usage, power and fuel usage, and waste generation (including reuse and recycling rates). Where monitoring shows that the project is not meeting its targets, further mitigation will be put in place. Monitoring shall also include reviewing potentially extreme weather events which may cause damage during construction. The appointed Contractors' Environmental Management System (EMS) will include measures to address risks during such events i.e. flooding.	Construction
Climate	During the operation phase of the project, activities will be limited to maintenance of the wind farm infrastructure. Although the intensity of activity will be only a small fraction of the construction phase, all employees and contractors that are on site will ensure that machinery used is properly maintained and is switched off when not in use to avoid unnecessary exhaust emissions from maintenance traffic, plant and machinery.	Operation
Landscape	All construction activities will follow best practice methods to reduce effects on the environment, as outlined in the Construction and Environmental Management Plan (CEMP) which will manage the environmental commitments of the project through the construction phase. It is noted that an Environmental Manager (EM) and ECoW with appropriate experience will be appointed for the duration of the construction phase to ensure that the CEMP is effectively implemented.	Construction
Landscape	Aside from mitigation measures to minimise land and vegetation disturbance and dust emissions (which may reduce visual amenity), no specific landscape or visual mitigation measures are proposed in relation to the construction phase beyond adherence to best practice methods to reduce environmental impacts upon the environment.	Construction
Landscape	All areas affected during construction will be reinstated to their original condition, with all vegetation lost to facilitate works replaced. Trees and hedgerow planting, to replace that which may be lost during the construction phase, will be undertaken in accordance with approved landscaping plans and best practice and under the supervision of the ECoW. The following standards are widely adopted as representing best practice in landscape operations:- • BS 4428:1989 Code of practice for general landscape operations (excluding hard surfaces);	Operational

	• BS 5837:2012 – Trees in Relation to design, demolition and construction; • BS 8545 Trees: from nursery to independence in the landscape – Recommendations; and, • BS 3936 – Part 1: Nursery stock specification for trees and shrubs.	
Landscape	Following the decommissioning of the electrical control unit and the electricity line, all excavated or disturbed areas will be soiled over and re-seeded or allowed to vegetate naturally.	Decommissioning
Cultural Heritage	In advance of construction, and where site conditions are suitable, targeted non-intrusive geophysical survey will be undertaken to further inform archaeological risk assessment within areas of proposed ground disturbance. Survey methods may include magnetometry and, where appropriate, Ground Penetrating Radar. The suitability and scope of survey will be determined having regard to peat depth, forestry cover, ground conditions and accessibility, and will be agreed in consultation with the National Monuments Service.	Pre-Construction
Cultural Heritage	Targeted advance archaeological testing shall be undertaken in the vicinity of the junction of the N5 and R293, where temporary junction upgrade works occur in proximity to recorded monuments RO008-023, RO008-023001, RO008-023002 and RO008-065. The extent and location of testing shall be targeted to areas of proposed ground disturbance and informed by the final construction design, existing ground conditions and the results of any preceding non-intrusive survey, where undertaken. Testing shall be carried out under the appropriate statutory license and in consultation with the National Monuments Service. The objectives of advance testing are to:- • confirm the presence or absence of archaeological remains; • determine their character, extent and state of preservation; • inform refinement of mitigation strategy prior to construction; and, • reduce residual archaeological risk and uncertainty. Particular attention shall be given to areas where road carriageway widening intersects historic townland boundaries to identify any surviving boundary features of archaeological significance. Where archaeological remains are identified, appropriate preservation in situ or preservation by record will be agreed in consultation with the National Monuments Service. Where necessary, micro-siting of turbines or associated infrastructure will be employed to avoid previously unidentified archaeological features which may be identified during pre-construction investigations.	Pre-Construction
Cultural Heritage	All ground disturbance associated with the project shall be subject to archaeological monitoring by a suitably qualified archaeologist under licence issued by the National Monuments Service. This includes works within both previously undisturbed areas and existing road corridors. Monitoring will apply to all elements of the project involving ground disturbance, including turbine foundation excavations, crane hardstandings, access track construction, approach road widening, drainage infrastructure, borrow pit excavation, peat removal, electricity substation construction, electricity line installation, and all associated works. Where archaeological features or deposits are identified, works in the immediate area will cease pending consultation with the National Monuments Service. Appropriate mitigation measures will then be implemented, which may include preservation in situ, preservation by record or controlled archaeological excavation.	Construction

	Archaeological monitoring will:- • identify previously unrecorded archaeological remains; • ensure preservation by record where necessary; • provide a real-time mitigation response in the event of discovery; and, • ensure compliance with statutory obligations under the National Monuments Acts. Particular attention shall be given to areas of road carriageway widening, including locations where works intersect historic townland boundaries, to identify and record any surviving boundary features of archaeological significance.	
Cultural Heritage	In the event of archaeological features or material being uncovered during the construction phase:- • all machine work will cease in the immediate area to allow the archaeologist/s time to inspect and record any such material; • if any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record; and, • any further mitigation will require approval from the National Monuments Service of the Department of Housing, Local Government and Heritage (DoHLGH).	Construction
Cultural Heritage	Although no recorded archaeological monuments occur within the direct wind farm footprint, precautionary measures shall be implemented to ensure protection of heritage assets within the wider study area. These measures include:- • a programme of detailed measured and photographic recording shall be undertaken in advance of any alteration, removal or modification of the unrecorded stone bridge along the turbine component haul route; • avoidance of known archaeological constraints through established design layout; • maintenance of appropriate separation distances during construction activities; • marking of exclusion zones where required; and, • contractor awareness briefings regarding heritage protection obligations and legal responsibilities. These measures will ensure that indirect or accidental effects on known heritage assets are avoided.	Construction
Noise & Vibration	Construction activities will be completed in accordance with the provisions, where relevant, of BS 5228-1 which offers detailed guidance on the control of noise & vibration from demolition and construction activities. The relevant practices to be adopted during construction shall include:- • Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; • Establishing channels of communication between the contractor/developer, the Planning Authority and residents; • Appointing a site representative responsible for matters relating to noise and vibration; • Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; and, • Keeping site access tracks even to mitigate the potential for noise and vibration from HGVs.	Construction & Decommissioning

	Furthermore, a variety of practical noise control measures will be employed. These include:- • Selection of plant with low inherent potential for generation of noise and/or vibration; • Placing of noisy/vibratory plant as far away from sensitive properties as permitted by site constraints; and, • Regular maintenance and servicing of plant items.	
Noise & Vibration	The various contractors involved in the construction phase will be obliged, under contract, to take specific noise abatement measures and comply with the recommendations of BS 5228-1. The following list of measures will be implemented, as relevant, to ensure compliance with the relevant construction noise criteria:- • No plant or machinery will be permitted to cause a public nuisance due to noise; • The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. • All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract; • Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers; • Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use; • Any plant, such as generators or pumps, which may be required to operate outside of general construction hours will be surrounded by an acoustic enclosure or portable screen; • During the course of the construction programme, supervision of the works will include ensuring compliance with the limits detailed in the EIAR using methods outlined in BS 5228-1; and, • The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations, including the delivery of construction materials, shall be restricted to between 07:00hrs and 19:00hrs Monday to Friday and between 07:00hrs and 13:00hrs on Saturdays, with no operations on Sundays or public holidays. However, to ensure that optimal use is made of good weather periods, at occasional critical periods within the construction programme (i.e. concrete pours, turbine component deliveries and turbine erection) or in the event of an emergency; activities may be necessary outside out of these hours.	Construction & Decommissioning
Noise & Vibration	The following measures will be implemented, where necessary, to control and mitigate noise emissions associated with blasting operations and the processing of quarried stone:- • Notification of nearby residents before blasting starts (e.g. 24-hour written notification); • Carry out blasting using a series of trial blasts, each with progressively increasing charges. Larger charge weights are only to be used if the trial blast shows acceptable levels of air overpressure; • If air overpressure from blasting is too high a reduction in the amount of primer cord used, together with the adequate burial of any that is above the ground can greatly reduce; • Where NSRs are situated close to the blast site and air over pressure levels are cause for complaint, blasting shall be postponed during weather conditions whereby the NSRs are down wind of the blast;	Construction

	• The firing of blasts at similar times of the day to reduce the 'startle' effect. • Fit suitably designed muffler or sound reduction equipment to the rock breaking tool to reduce noise without impairing machine efficiency; • Ensure all air lines are sealed; • Use a dampened bit to eliminate a 'ringing' sound; • Erect an acoustic screen between compressors or generators and NSRs. When possible, line of sight between top of machine and NSR will be obscured; and, • Enclose the breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation.	
Noise & Vibration	The transmission and magnitude of ground vibrations associated with blasting operations at borrow pits are subject to many complex influences including charge type and position, and importantly, the precise nature of the ground conditions (material composition, compaction, discontinuities) at the source, receiver, and at every point along all potential ground transmission paths. Clearly any estimation of such conditions is subject to considerable uncertainty, thus limiting the utility of predictive exercises. Mitigation of the impacts of these activities is best achieved through on site testing processes, with progressively increased charges, carried out in consultation with the Planning Authority.	Construction
Noise & Vibration	Wind turbine manufactures offer various noise reduced modes for their turbines, whereby the turbine can operate normally but would produce a lower level of noise at the expense of a corresponding reduction in energy generation. The assumed noise reduced modes considered for embedded mitigation will be confirmed by the manufacturer prior to installation. The final requirement for noise reduced modes will be required to meet the noise limits set out in the chapter, cumulatively with the Largan Hill Wind Farm.	Operation
Noise & Vibration	In the unlikely event that an issue with low frequency noise is associated with the project, an appropriate detailed investigation, by an independent acoustic consultant, shall be undertaken. Due consideration shall be given to guidance on conducting such an investigation which is outlined in Appendix VI of the EPA document entitled <i>Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities</i> (NG4) (EPA, 2016). This guidance is based on the threshold values outlined in the Salford University document Procedure for the assessment of low frequency noise complaints, Revision 1, December 2011.	Operation
Noise & Vibration	In the unlikely event that a complaint is received which indicates potential tonal content associated with the perceived wind turbine noise, an independent acoustic consultant shall be employed to assess the level of tonality in accordance with paragraphs 3.15 to 3.17 of the DfESNZ guidance document. Where appropriate, a character correction shall be applied to the overall wind turbine noise to account for the audibility of the tone.	Operation
Noise & Vibration	In the unlikely event that a complaint is received which indicates potential amplitude modulation (AM) associated with turbine operation, an independent acoustic consultant shall be employed to assess the level of AM in accordance with the methods outlined in the IOA Wind Turbine Noise Amplitude Modulation Working Group (AMWG) document <i>A Method for Rating Amplitude Modulation in Wind Turbine Noise</i> (IOA, 2016) or subsequent revisions, and suitable measures implemented as necessary.	Operation
Shadow Flicker	Automated turbine shut down software is available and is already widely implemented to control or eliminate the occurrence of shadow flicker on wind farm developments where shadow flicker levels are proven to occur. Shut	Operation

	down software effectively limits (curtails) the operation of turbines during the infrequent and rare periods when shadow flicker occurs. The wind turbines will each be fitted with automated turbine shut down software, inherent to their design, to facilitate their shut down as required.	
Shadow Flicker	The shut-down software will be programmed with a set of predetermined times when shadow flicker could theoretically occur; if the wind is blowing and the sun is shining. The software will determine; based on the operation, or otherwise, of each turbine; whether the wind is blowing and; based on a sunlight sensor fitted within the wind farm; whether the sun is shining. If the wind is blowing and the sun is shining during the set of predetermined times discussed above, the software will temporarily switch off a turbine (or turbines) which is (or are) predicted to give rise to shadow flicker effects at a particular receptor.	Operation
Shadow Flicker	Within 12-months of the commencement of commercial operations, a shadow flicker survey will be undertaken by a suitably qualified person to verify the implementation of the turbine shut down software. Monitoring will be undertaken when and where the model predicts shadow flicker is expected to occur. The data which will be collected during the survey will include:- • The date, time, location (turbine ID) and duration of the measurement; • Sunlight intensity and direction; • Wind speed and direction/rotor angle; and, • Time, date and duration of any sensor triggered shut down. A site visit will be carried out by a suitably qualified person during each calendar season, to obtain representative samples of year-round conditions, to monitor the site when shadow flicker is predicted to occur to verify the effectiveness of the shut-down software.	Operation
Shadow Flicker	Should any third party complaints be raised in respect of shadow flicker at any time during the lifetime of the project, additional specific monitoring will be undertaken as per the methods described above.	Operation
Material Assets (Transport & Access)	Traffic movements will be limited to 07:00-19:00 Monday to Friday and 07:00-13:00 on Saturdays with no movements on Sundays or public holidays. It may be occasionally necessary to undertake works outside of these hours to avail of favourable weather conditions or during extended concrete pours. Where construction activities are necessary outside of the normal working hours, local residents and the Planning Authority will receive prior notification.	Construction
Material Assets (Transport & Access)	A designated contact point and coordinator will be put in place to manage all access arrangements and to interface with the public and the respective local authorities.	Construction
Material Assets (Transport & Access)	All works to the public road shall be undertaken in consultation with, and agreed in advance with, the Planning Authority. The detailed design process shall also been informed by a Road Safety Audit to be carried out prior to the commencement of development.	Construction
Material Assets (Transport & Access)	A Traffic Management Plan shall be agreed as part of the Construction Environmental Management Plan (CEMP) with the Planning Authority prior to the commencement of development. The Traffic Management Plan shall include inter alia confirmed details of construction material haul routes; confirmed details of vehicle specifications;	Construction

	a materials delivery programme; traffic management measures including details of 'Stop/Go' systems, signage, road closures and diversionary routes; and road reinstatement details.	
Material Assets (Transport & Access)	Traffic restrictions shall be kept to minimum duration and extent.	Construction
Material Assets (Transport & Access)	Appropriate traffic management; including maintenance of local access, pedestrian access (where safe to do so) and diversions (where required); shall be implemented to facilitate continued public use of roads where temporary traffic restrictions have to be put in place. Precise details of these measures will be detailed in the Traffic Management Plan to be agreed with the Planning Authority prior to the commencement of development.	Construction
Material Assets (Transport & Access)	The site shall be closed, and strictly secured, to the public during the construction phase.	Construction
Material Assets (Transport & Access)	All reasonable steps shall be taken to ensure that national and regional routes are used to transport all materials to the site in so far as practicable.	Construction
Material Assets (Transport & Access)	Prior to, and post, construction; pavement condition surveys will be undertaken along all non-national access routes proposed to be utilised in the delivery of construction materials (other than the locally classed routes at the project site which will be subject to upgrade works). Given the high-quality and well-maintained nature of motorways and national routes, it is not assessed as necessary to carry out surveys of these carriageways or structures. Following the completion of the pre-construction survey, any works which are assessed as necessary to facilitate the delivery of components and materials to the project site shall be undertaken, while any deterioration of carriageways or structures identified in the post-construction survey shall be put right at the expense of the developer and to the satisfaction of the Planning Authority.	Construction
Material Assets (Transport & Access)	Appropriate and adequate signage shall be provided at entrances providing access, safety and warning information.	Construction
Material Assets (Transport & Access)	At the site entrances, roadside hedgerows and vegetation shall be trimmed or removed prior to the commencement of construction to ensure that sightlines are provided in advance of the delivery of construction materials.	Construction
Material Assets (Transport & Access)	Speed limit compliance; particularly along the L5501, L55018 and L5506 and along the route of the underground electricity line; will be emphasised to all staff and contractors prior to the commencement of construction during site induction, and will be strictly enforced throughout the construction phase.	Construction
Material Assets (Transport & Access)	Sufficient car parking spaces will be available at the temporary construction compounds during the construction phase. Additionally, during construction of the underground electricity line, it is likely that agricultural (or other) premises will be used for the temporary storage of materials (e.g. ducting, cabling, etc.) and for the parking of construction plant, machinery, and work vehicles (cars, vans, etc.). No parking of cars by persons associated with the project will be permitted on any part of the public road that is not closed to traffic. All staff will be instructed to ensure that private entrances remain unobscured (particularly along the route of the underground electricity line.	Construction
Material Assets	The project will involve the delivery of a number of abnormal and exceptionally abnormal loads to the site due to	Construction

(Transport & Access)	the size of the delivery/load. It should be noted that abnormal weight loads are not expected to feature as part of the project as maximum axle loadings for abnormal/oversized loads shall be strictly enforced in accordance with the Road Traffic (Construction and Use of Vehicles) Regulations 2003 (S.I. No. 5 of 2003).	
Material Assets (Transport & Access)	The timing of oversized/abnormal loads shall be agreed with the relevant local authorities and An Garda Síochána, and all relevant licenses and permits shall be obtained in advance. All oversized/abnormal loads shall be accompanied by escort vehicles to ensure the maintenance of public safety.	Construction
Material Assets (Transport & Access)	Following the installation of the electricity and communications cable ducting, the trench will be backfilled with appropriate material and temporarily reinstated. Following the installation of the underground electricity line and electrical and communications cabling, all public roads within which it is proposed to install the infrastructure will be subject to a full-width carriageway reinstatement (re-surfacing) of the relevant road section. Road reinstatement specifications and methodologies will be agreed with the Planning Authority prior to the commencement of development and as part of the road opening licencing process.	Construction
Material Assets (Transport & Access)	Wheel washing facilities will be provided at site entrances to prevent any debris being transferred from site to the adjacent public roads. All drivers will be required to ensure that their vehicle is free from dirt and stones prior to departure from the project site. Where conditions exist for dust to become friable, techniques such as damping down of the affected areas will be employed and vehicles/loads will be covered to reduce dust emissions.	Construction
Material Assets (Transport & Access)	Road sweeping, particularly along the route of the underground electricity line, will be carried out as appropriate to ensure construction traffic does not adversely affect road conditions.	Construction
Material Assets (Transport & Access)	Due to the transient nature of the underground electricity line works, rolling road closures will be implemented where the electricity line is to be installed within the carriageway of public roads. Traffic restrictions shall be kept to minimum duration and extent	Construction
Material Assets (Aviation)	A minimum of 30-days prior notification will be provided regarding the commencement of crane operations at the project site. Additionally, as is best practice and implemented as standard, warning lights will be fitted to cranes during the installation of the wind turbines.	Construction
Material Assets (Aviation)	The wind turbines will, as requested by the IAA and Department of Defence in their consultation responses and implemented as standard, be fitted with aviation warning lighting in accordance with specification to be agreed with the IAA, Department and the Planning Authority prior to the commencement of development.	Pre-Construction & Operation
Material Assets (Aviation)	At a maximum of 30-days following the installation of all turbines, 'as-constructed details' will be provided to the IAA to allow for the updating of mapping charts, including:- • The number of wind turbines; • WGS-84 coordinates of each turbine; • Ground elevation of each turbine (Malin Head OD); • Blade tip elevation of each turbine (Malin Head OD); • Height of Turbine; • Contour maps at the requisite scale; and,	Construction

	A note of which turbines have been fitted with obstacle warning lights.	
Material Assets (Aviation)	In the event that the obstacle warning lights fail or if there are plans to withdraw them from use for a period of time, the IAA will be contacted, via AISOPs@iaa.ie, as a matter of urgency, to request that a NOTAM (Notice to Airmen) is issued concerning the absence of obstacle lighting. The following information will be provided to the IAA:- - Obstacle ID; - Obstacle type; - Obstacle Position; - Elevation; and - Colour of Light. It should also be noted, however, that the wind turbines will be fitted with an uninterruptable power supply (UPS) to ensure that the aviation warning lights remain operation even in the event of a power outage. This UPS is sufficient for a period of 12-hours; after which, the warning lights can be powered by a small generator should the power outage continue.	Operation
Material Assets (Telecommunications)	In its consultation response, 2rn recommended that a protocol agreement be entered into to ensure that any complaints received from members of the public are appropriately managed, addressed, and remediated. This is a standard protocol for wind energy developments and has been agreed between the parties.	Operation
Material Assets (Telecommunications)	If significant signal interference in any form is identified and is directly attributed to the project, appropriate remedial measures will immediately be undertaken. A range of technical measures are available to mitigate any instances of telecommunications interference including signal amplifiers, active deflectors and relay transmitters, repeater stations, booster units, realignment of domestic aerials, installation of higher quality aerials and the installation of suppression equipment. Remedial works will be promptly undertaken, at the Developer's expense, to ensure uninterrupted telecommunication, broadcasting and mobile phone service provision.	Operation
Material Assets (Resources & Utility Infrastructure)	Accidental collision with overhead wires or sub-surface cables/pipes will be mitigated through the implementation of good construction practice and procedures.	Construction
Material Assets (Resources & Utility Infrastructure)	The sourcing of aggregates locally, and from facilities which have been subject to EIA, will mitigate against the likelihood of significant effects during the construction phase	Construction
Material Assets (Resources & Utility Infrastructure)	During the process of connecting the project to the national grid, EirGrid will balance the loading on the electricity network to ensure that no significant disruption occurs and likely significant effects do not arise.	Construction

1.4 NATURA IMPACT STATEMENT MITIGATION MEASURES

Natura Impact Statement – Schedule of Mitigation Measures		
Topic	Mitigation Measure	Phase of Development for Implementation
Water Quality (Avoidance by Design)	This involves turbine locations and associated infrastructure being placed at a minimum set-back distance of 50m from any point of watercourses (measured from the bank top), insofar as possible. The buffer zone will avoid physical damage to watercourses and associated release of sediment; and avoid the entry of suspended sediment from earthworks into watercourses. However, some infrastructure; including the crossing of 2 no. watercourses within the wind farm site and crossings of watercourses by the underground electricity line; will be located within this buffer where additional measures will be employed.	Pre-Construction & Construction
Construction Environmental Management Plan	Construction works will be undertaken in accordance with safeguards and best practice measures included the Planning Stage CEMP prepared for the Proposed Development. The Contractor will be responsible for updating this CEMP into a Contractor's CEMP, which shall include the following Environmental Management Plans (EMPs): • Pollution Prevention Management Plan; • Emergency Response and Flood Risk Management Plan; • Biosecurity Management Plan; • Construction Waste Management Plan; • Habitat Management Plan; • Construction Traffic Management Plan; • Surface Water Management Plan; • Water Quality Management Plan; • Water Crossing Plan; and • SOWAR (schedule of works operation record). These EMPs will be prepared and approved by Roscommon County Council prior to any works commencing on-site. The Contractor's CEMP shall also include measures set out in this report as well as other reports prepared for this planning application; site-specific environmental management measures; details of any environmental monitoring requirements; communication protocols; non-conformance and non-compliance protocols; detailed roles and responsibilities; and particular measures as required by conditions associated with planning approval (if granted). In preparing the CEMP, the Contractor will adopt best practice construction measures and relevant guidelines and ensure that the works adhere to these standards at all times; these include, for example: • IFI (2016), 'Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters'; • CIRIA (2023), 'Environmental Good Practice on Site Guide (fifth edition) (C811)'; • BSI (2012), 'Trees in Relation to Design, Demolition and Construction' (BS 5837:2012);	Pre-Construction & Construction

	• BSI (2013), 'Code of Practice for Surface Water Management of Development Sites' (BS8582); • BSI (2014), 'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise' (BS 5228-1:2009+A1:20140); • BSI (2014), 'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration' (BS 5228-2:2009+A1:20140); • CIRIA (2001), 'Control of Water Pollution from Construction Sites. Guidance for Consultants and Contractors' (C532); • CIRIA (2006), 'Control of Water Pollution from Linear Construction Projects Technical Guidance' (C648D); • CIRIA (2006), 'Control of Water Pollution from Linear Construction Projects. Site Guide' (C649); • NetRegs (2018), 'Guidance for Pollution - Prevention Dealing with Spills' (GPP 22); • NetRegs (2021), 'Guidance for Pollution Prevention Understanding Your Environmental Responsibilities – Good Environmental Practices' (GPP 1); and • NetRegs (2021), 'Pollution Incident Response Planning' (GPP 21). All construction personnel involved with the construction phase of the Proposed Development will receive environmental training to inform them of the environmental sensitivities of the Site and their responsibilities throughout the works in terms of measures to be implemented and precautions required. Training will include an on-site induction (prior to the works) and ToolBox Talks (prior to and during the works). The frequency and content of environmental training will be specified in the Contractor's CEMP, and it will adhere with any requirements set out in documents prepared for the planning application and planning conditions set out by ACP (if any).	
Roles & Responsibilities	The names and contact details of the individuals with responsibilities for implementation and supervision of mitigation measures during all phases of the works will be clearly identified and displayed on notice boards at the site compounds as well as set out in documents such as the CEMP and site- specific method statements. All staff and subcontractors will have the responsibility to: • Work to agreed plans, methods and procedures to eliminate and minimise environmental impacts; • Understand the importance of avoiding emissions on-site, including pollutants, sediments and noise, and how to respond in the event of an incident to avoid or limit environmental impact; • Respond in the event of an incident to avoid or limit environmental impact; • Report all incidents immediately to their site environmental manager; • Monitor the workplace for potential environmental risks and alert the immediate line manager if any are observed; and • Co-operate as required, with site inspections. Environmental Manager The Contractor for the Proposed Development will be required to designate a member of staff, or engage a specific person, with demonstrable experience of environmental management and monitoring of construction at	Pre-Construction & Construction

	wind farm sites, referred to hereafter as the "Environmental Manager" (EM). The EM will assume responsibility for overseeing the implementation of all environmental protective measures and mitigation measures set out in this document and in the CEMP. The EM will be responsible for employing good working practice during all phases of the Proposed Development and for providing a briefing on environmental protection measures and ecological sensitivities of the Site to all site personnel in advance of commencement of works. Ecological Clerk of Works A suitably qualified Ecological Clerk of Works (ECoW) will be appointed to audit the site and report on the mitigation measures put in place, as outlined in the CEMP. The ECoW is independent of the contractor. The appointed contractor has sole responsibility for the implementation of all mitigation measures prescribed within environmental documents and best practise guidance The ECoW will be responsible for: • Developing and delivering ToolBox Talks to contractors and sub-contractors and keeping a register of these training sessions. As a minimum, ToolBox Talks on relevant site sensitivities regarding ecology to all contractors, including sub-contractors, prior to construction; • Liaising with stakeholders such as regulators, planners and members of the public; • Undertake and document regular monthly audits of the Proposed Development site to ensure compliance with ecological protection and mitigation measures; • Offer best practice guidance relevant to each activity and due diligence; • Ensuring that ecological mitigation measures set out in all documents prepared in relation to the Proposed Development (e.g., this NIS, the EIAR, and the Contractor's CEMP, amongst others) are implemented, working, and reviewed; and • Monitor the efficacy of mitigation measures implemented by the contractors and to report on the application and success of these measures. The ECoW will have a 'Stop Works' authority if mitigation measures put in place are failing. Once contractors remedy the situation with further measures and the ECoW agrees, then works can proceed.																	
Water	<u>Felling Operations</u> There is a requirement in the <i>Forest Service Code of Practice</i> and in the <i>FSC Certification Standard</i> for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document <i>Forestry and Water Quality Guidelines</i> are detailed below. <table><tr><th colspan="2">Average slope leading to the aquatic zone</th><th>Buffer zone width on either side of the aquatic zone</th><th>Buffer zone width for highly erodible soils</th></tr><tr><td>Moderate</td><td>(0–15%)</td><td>10m</td><td>15m</td></tr><tr><td>Steep</td><td>(15–30%)</td><td>15m</td><td>20m</td></tr><tr><td>Very steep</td><td>(>30%)</td><td>20m</td><td>25m</td></tr></table>	Average slope leading to the aquatic zone		Buffer zone width on either side of the aquatic zone	Buffer zone width for highly erodible soils	Moderate	(0–15%)	10m	15m	Steep	(15–30%)	15m	20m	Very steep	(>30%)	20m	25m	Construction
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Moderate	(0–15%)	10m	15m															
Steep	(15–30%)	15m	20m															
Very steep	(>30%)	20m	25m															

	A total of 6.5ha of forestry will be permanently felled to accommodate the construction and operation of the project. During the construction phase, a self-imposed conservative buffer zone of 50m will be maintained for all streams. Only approximately 0.8ha of the total 6.5ha proposed for felling is located inside a 50m watercourse buffer zone.	
Water	Mitigation measures during felling operations which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods, as follows:- • Machine combinations (i.e. handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance; • Checking and maintenance of tracks and culverts will be ongoing through any felling operation. No tracking of vehicles through watercourses will occur. Where possible, existing drains will not be disturbed during felling works; • Ditches which drain from the areas to be felled towards existing surface watercourses will be blocked, and temporary silt traps will be constructed. No direct discharge of such ditches to watercourses will occur. Drains and sediment traps will be installed during ground preparation. Collector drains will be excavated at an acute angle to the contour (c. 0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients and avoid being placed at right angles to the contour; • Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the spoil deposition areas. All new silt traps will be constructed on even ground and not on sloping ground; • In areas particularly sensitive to erosion or where felling inside the 50m buffer is required, it will be necessary to install double or triple sediment traps; • All drainage channels will taper out before entering the 50m buffer zone. This ensures that discharged water gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils, silt traps will be installed at the end of the drainage channels; • Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimised and controlled; • Brash mats will be used to support vehicles on soft ground, reducing topsoil and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place before they become heavily used and worn. Provision will be made for brash mats along all off-road (track) routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction will be suspended during periods of high rainfall; • Timber will be stacked in dry areas, and outside the 50m watercourse buffer. Straw bales and check dams will be emplaced on the down gradient side of timber storage/processing sites;	Construction

	• Works will be carried out during periods of no, or low, rainfall in order to minimise entrainment of exposed sediment in surface water run-off; • Checking and maintenance of tracks and culverts will be ongoing through the felling operation; • Refuelling or maintenance of machinery will not occur within 100m of a watercourse. Mobile bowser, drip kits and qualified personnel will be used where refuelling is required; • A permit to refuel system will be adopted; • Branches, logs or debris will not be allowed to build up in the 50m buffer. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors; • Trees will be cut manually from along streams and using machinery to extract whole trees; and, • Travel will only be permitted perpendicular to and away from surface water features.	
Water	During felling, silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps is to slow water flow, increase residence time and allow settling of silt in a controlled manner.	Construction
Water	The following items will be carried out during pre-felling inspections and regularly thereafter:- • Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual waterlogging or bogging of machines; • Inspection of all areas reported as having unusual ground conditions; • Inspection of main drainage ditches and outfalls. During pre-felling inspections, the main drainage ditches will be identified. Where possible, the pre-felling inspection will be carried out during rainfall; • Following tree felling, all main drains will be inspected to ensure that they are functioning; • Extraction tracks within 10m of drains will be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground; • Culverts on drains exiting the site, if impeded by silt or debris, will be unblocked; and, • All accumulated silt will be removed from drains, culverts and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall.	Construction
Water	During felling, sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The 'before' sampling will be conducted within 4-weeks of the felling activity commencing, preferably in medium-to-high water flow conditions. The 'during' sampling will be undertaken once a week or after rainfall events. The 'after' sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e. where an impact has been shown). Also, daily surface water monitoring forms (for visual inspections and field chemistry measurements) will also be utilised at every works site near any watercourse. These will be populated daily and kept on site for record and	Construction

	inspection.	
Water	The key mitigation measure to prevent the release of silt or sediment during the construction phase is the avoidance of sensitive aquatic areas by using a 50m buffer. Other than some small sections of crane hardstandings and associated access tracks at T1 and T4, the watercourse crossings at turbines T4 and T9, and some sections of haul route upgrade works; the majority of the wind farm infrastructure (including all turbine foundation locations, borrow pit and peat/spoil deposition areas) is located outside of areas that have been assessed to be hydrologically sensitive. The generally large setback distance from sensitive hydrological features ensures that sufficient space is provided for the installation of drainage mitigation measures (discussed below) and to ensure their effective operation. The proposed buffer zone will ensure:- • Avoidance of physical damage to watercourses, and associated release of sediment; • Avoidance of excavations within close proximity to surface water courses; • Avoidance of the entry of suspended sediment from earthworks into watercourses; and, • Avoidance of the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.	Construction
Water	The following section details the measures which will be put in place during the construction phase to ensure that surface water features are protected from the release of silt or sediment and to ensure that all surface water runoff is fully treated and attenuated to avoid the discharge of dirty water. • Source controls to limit the likelihood for 'dirty water' to occur:- ◦ Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with clean washed gravel, filter fabrics, and other similar/equivalent or appropriate systems; and, ◦ Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures. • In-Line controls to ensure appropriate management of silt laden water:- ◦ Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems. • Treatment systems to fully attenuate silt laden waters prior to discharge:- ◦ Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems. It should be noted for this site that an extensive network of land, bog and forestry drains already exists and these will be integrated and enhanced as required and used within the wind farm drainage system. The integration of	Construction

	existing land drainage networks and wind farm networks is common practice in wind energy developments and will also result in benefits to surrounding lands. The main elements of interaction with existing drains will be as follows:- • Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction and attenuation for flow management) of runoff from the wind farm drainage into the existing site drainage network. This will reduce the likelihood of any increased risk of downstream flooding or sediment transport/erosion; • Silt traps will be placed in the existing drains upstream of any streams where construction works is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area; and, • Buffered outfalls, which will be numerous over the site, will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site. <i>Pre-commencement Temporary Drainage Works</i> Prior to the commencement of haul route upgrades, access tracks, crane hardstandings and turbine foundations, the following key temporary drainage measures will be installed:- • All existing dry bog, forestry or agricultural drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using check dams/silt traps; • Clean water interceptor drains will be installed upgradient of the works areas; • Check dams/silt fence arrangements (silt traps) will be placed in all existing drains that have surface water flows and also along existing roadside drains; and, • A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zone. <i>Water Treatment Train</i> While the proposed drainage plan is assessed as providing a sufficient level of protection to avoid any deterioration in downstream water quality; a temporary final line of defence can be provided by a water treatment train (i.e. sequence of water treatment processes), if required. If the discharge water from construction areas fails to be of a high quality, then a filtration treatment system (such as a 'Siltbuster' or similar equivalent treatment train) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This water treatment train will apply for the entirety of the construction phase. <i>Silt Fences</i> Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to watercourses of sand and gravel sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. Double silt	
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	fences will be emplaced within drains down-gradient of all construction areas inside the hydrological buffer zones to provide an additional layer of protection in these areas. <i>Silt Bags</i> Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats (sediment entrapment mats, consisting of coir or jute matting) placed at the silt bag location to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure. <i>Management of Runoff from Peat/Spoil Deposition Areas</i> It is proposed that excavated peat/overburden/spoil will be utilised for reinstatement of excavated areas etc. and for landscaping purposes. Excess material, or material which is unsuitable for this purpose, will be stored, permanently, at dedicated peat/spoil deposition areas and in the 1 no. spent borrow pit. Proposed peat/spoil deposition areas and the borrow pit are located outside the 50m stream buffer zone. During the initial placement of peat/spoil in the deposition areas, silt fences, straw bales and biodegradable matting will be used to control surface water runoff. Drainage from overburden deposition areas will ultimately be routed to an oversized swale and a number of silt/settlement ponds with appropriate storage and settlement capacity, designed for a '1-in-100 year 6-hour return' period, before being discharged. Spoil deposition areas will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. Once re-vegetated and stabilised, spoil deposition areas will no longer be a likely source of silt laden runoff. Surface water protection infrastructure will be left in place until the areas have stabilised. <i>Underground Electricity Line Installation Works</i> Mitigation measures which are outlined below will be implemented to ensure that silt laden or contaminated surface water runoff from the trenching work does not discharge directly to the water:- • All existing dry drains that intercept the works area will be temporarily blocked down-gradient of the works using temporary check dams/silt traps (e.g. straw bales); • Clean water diversion drains will be installed upgradient of the works areas, as required; • Check dams/silt fence arrangements (silt traps or straw bales) will be placed in all existing drains that have surface water flows and also along existing roadside drains; and, • A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zones such as at watercourse crossing locations. Specific mitigation measures relating to the directional drilling at the crossing location are detailed below. <i>Directional Drilling</i> The following mitigation will be carried out during directional drilling works:- • Firstly, the crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance of vegetation; • A minimum 10 metre vegetative buffer zone will be maintained (if present) between disturbed areas and the	
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	watercourse bank. There will be no storage of material/equipment, excavated material (see below) or overnight parking of machinery inside the 10m buffer zone; • Double silt fencing will be placed upslope of the buffer zone on each side of the watercourse. • Mats will be used underneath the excavator, inside the 10 metre vegetative buffer zone, to prevent soil erosion/rutting and potential surface water quality impacts from localised surface water runoff; • Temporary storage of excavated material will be undertaken outside of the 10m buffer on flat ground or within a local hollow area. A containment berm will be placed downslope of the excavated material which in turn will be surrounded by secondary silt fence protection to prevent saturated soil from flowing back into the watercourse; • Operation of machinery and use of equipment within the 10m buffer will be kept to a minimum to avoid any unnecessary disturbance; • There will be no refuelling allowed within 100m of the watercourse crossing; • All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing; and, • Works shall not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted. Mitigation measures relating to the use of a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water for directional drilling include:- • The area around the Clear Bore™ batching, pumping and recycling plants will be bunded using terram and sandbags in order to contain any spillages; • Silt fences will be placed between the works area and adjacent rivers and streams on both banks; • Accidental spillage of fluids will be cleaned up immediately and transported off site for disposal at a licensed facility; and, • Adequately sized skips will be used for temporary storage of drilling arisings during directional drilling works. This will ensure containment of drilling arisings and drilling flush. A Fracture Blow-out (Frac-out) Prevention and Contingency Plan will be prepared by the drilling contractor prior to construction and will include the following measures:- • The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used); • The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags • to contain any potential spillage; • A double row of silt fencing will be placed between the works area and the adjacent river; • Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility; • Adequately sized skips will be used where temporary storage of arisings are required; • The drilling process/pressure will be constantly monitored to detect any possible leaks or breakouts into the	
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	surrounding geology or local watercourse; • This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped; • Any frac-out material will be contained and removed off-site; • The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and, • If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location. <i>Pre-emptive Site Drainage Management</i> The works programme for the initial construction stage of the project will also take account of weather forecasts, and predicted rainfall in particular. Large excavations and movements of peat/subsoil or vegetation stripping will be suspended or scaled back if prolonged or intense rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast. The following forecasting systems are available and will be used on a daily basis at the site to direct proposed construction activities:- • General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates; • Meteo Alarm: Alerts to the possible occurrence of severe weather for the next 2-days. Less useful than general forecasts as only available on a provincial scale; • 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3-hours but does not account for possible heavy localised events; • Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15-minutes. Radar images are not predictive; and, • Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest. The use of safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of an impending high rainfall intensity event. Works will be suspended if forecasting suggests either of the following is likely to occur:- • >10 mm/hr (i.e. high intensity local rainfall events); • >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, • >half monthly average rainfall in any 7 days. Prior to works being suspended the following control measures will be completed:- • Secure all open excavations;	
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	• Provide temporary or emergency drainage to prevent back-up of surface runoff; and, • Avoid working during heavy rainfall and for up to 24-hours after heavy events to ensure drainage systems are not overloaded. <i>Timing of Site Construction Works</i> The construction of the site drainage system will be carried out, at the respective locations, prior to other activities being commenced. The construction of the drainage system will only be carried out during periods of, where possible, no rainfall, therefore avoiding runoff. This will avoid the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and functional for all subsequent construction works. <i>Monitoring</i> Prior to the commencement of development, a detailed Site Drainage Plan and SWMP will be prepared to detail the precise siting and composition of the surface water management measures. The respective plans, which will form part of a detailed CEMP, will be prepared prior to the commencement of development. The CEMP will also include a detailed Water Quality Monitoring Plan for the monitoring of surface waters in the vicinity of the construction site by a designated Environmental Manager. The monitoring programme will comprise field testing and laboratory analysis of a range of agreed parameters. The civil works contractor, who will be responsible for the construction of the site drainage system, and Environmental Manager will undertake regular inspections of the drainage system to ensure that all measures are functioning effectively. The surface water sampling locations used in this EIAR (i.e. SW1–SW4) will be used during construction activities. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended. Any excess build-up of silt levels that may decrease the effectiveness of the drainage feature, will be removed and disposed of in an appropriate manner.	
Water	The management of excavation dewatering (pumping), particularly in relation to any accumulation of water in foundations or cabling and electricity line trenches, and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:- • Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations, will be put in place; • The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters to ensure that greenfield runoff rates are mimicked; • If required, pumping of excavation inflows will prevent build-up of water in the excavation; • All pumped water volumes will be discharged to the surface water management system adjacent to excavation areas, or via specialist treatment systems such as a Siltbuster unit; • There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur;	Construction

	- Daily monitoring of wind farm excavations by the Environmental Manager will occur during the construction phase. If high levels of seepage inflow occur, excavation work at this location will cease immediately and a geotechnical assessment undertaken; and, - A mobile 'Siltbuster' or similar equivalent specialist treatment system will be available on-site for emergencies. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if required.	
Water	Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:- - The volume of fuels or oils stored on site will be minimised. All fuel and oil will be stored in an appropriately bunded area within the temporary construction compounds. Only an appropriate volume of fuel will be stored at any given time. The bunded area will be roofed to avoid the ingress of rainfall and will be fitted with a storm drainage system and an appropriate oil interceptor; - All bunded areas will have 110% capacity of the volume to be stored; - On site refuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled at the temporary compound and will be towed around the site by a 4x4 jeep to where plant and machinery is located. No refuelling will be permitted at works locations within the 50m hydrological buffer. The 4x4 jeep will also be fully stocked with fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations to avoid any accidental leakages; - All plant and machinery used during construction will be regularly inspected for leaks and fitness for purpose; - Spill kits will be readily available to deal with and accidental spillages; - All waste tar material arising from road cuttings (from trenching or other works in public roads) will be removed off-site and taken to a licensed waste facility. Due to the potential for contamination of soils and subsoils, it is not proposed to utilise this material for any reinstatement works or for storage within the spoil deposition areas; and, - An outline emergency plan for the construction phase to deal with accidental spillages is contained within the Planning-Stage CEMP. This emergency plan will be further developed prior to the commencement of development, and will be agreed with the Planning Authority as part of the detailed CEMP.	Construction
Water	Measures to avoid contamination of ground and surface waters by wastewaters will comprise:- - Self-contained port-a-loos (chemical toilets) with an integrated waste holding tank will be installed at the site compound, maintained by the providing contractor, and removed from site on completion of the construction works; - Water supply for the site office and other sanitation will be brought to site and removed after use to be	Construction

	discharged at a suitable off-site treatment location; and, No water will be sourced on the site, nor will any wastewater be discharged to the site.	
Water	The following mitigation measures are proposed to ensure that the release of cement-based products is avoided:- - No batching of wet-cement products will occur on site. Ready-mixed concrete will be brought to site as required and, where possible, emplacement of pre-cast products will be utilised; - All watercourse crossings will utilise pre-cast products and the use of wet-cement products within the hydrological buffer will be avoided - Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. Chute cleaning will be undertaken at lined cement washout ponds with waters being stored in the temporary construction compounds, removed off site and disposed of at an approved licensed facility. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed; - Weather forecasting will be used to ensure that prolonged or intense rainfall is not predicted during concrete pouring activities; and, - The concrete pour sites will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.	Construction
Water	The following mitigation measures are proposed in relation to morphological changes to watercourses and drainage patterns:- - The 2 no. proposed new stream crossings will be clear span bridges (bottomless culverts) and the stream beds will remain undisturbed. No in-stream excavation works at the crossing locations are proposed and therefore there will be no impact on the stream at the proposed crossing location; - Wind farm electrical cabling or the underground electricity line cabling will be installed either above or below an existing culvert and will not directly interfere with the culvert; - At the time of construction, all guidance/best practice requirements of the Office of Public Works (OPW) or Inland Fisheries Ireland will be incorporated into the design/construction of the proposed watercourse/culvert crossings; - As a further precaution, in-stream construction work (if/where required) will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to <i>Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016)</i> (i.e., July to September inclusive). This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI); - During the near stream construction works (i.e. within the 50m buffer zone), double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase; - The 2 no. new watercourse crossings at the wind farm site will require a Section 50 license application to the	Construction

	OPW in accordance with the Arterial Drainage Act 1945. The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent; and, No instream works are proposed at the underground electricity line watercourse crossings, with all crossings being carried out via HDD.	
Water	Regarding the replacement of natural surfaces with lower permeability surfaces:- - Interceptor drains will be installed up-gradient of all infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader; - Swales/track side drains will be used to collect runoff from access tracks, crane hardstanding areas and substation compound areas which may contain entrained suspended sediment, and channel it to settlement ponds for sediment settling; - Transverse drains ('grips') will be constructed, where appropriate, in the surface layer of access tracks to divert any runoff into swales/track side drains; - Check dams will be used along sections of access tracks drains to intercept silts at source. Check dams will be constructed from a 40mm non-friable crushed rock or similar; - Swales and check dams will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and, - Settlement ponds will be designed in accordance the greenfield runoff rate requirements; and, - Imported rock for construction purposes and road surfacing will be strong, well-graded limestone which will be resistant to erosion and have a low likelihood to generate fines in hardstand runoff.	Operation
Water	Mitigation measures relating to oils and fuels are as follows:- - All storage containers will be labelled appropriately, including hazardous markings; - Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction; - The substation transformer and oil storage tanks will be located in a concrete bund, impervious to rainwater ingress, capable of holding 110% of the stored oil volume; - Bunds will be to standard specified in CIRIA Report 163 'Construction of bunds for oil storage tanks' and CIRIA Report C535 'Above-ground proprietary prefabricated oil storage tank systems'; - Barrels and bunded containers will be stored upright and internally where appropriate and always on drip trays or sump pallets; - Appropriate spill kits will be available at all storage locations; - Turbine transformers will be located within the turbines, and any leaks will be fully contained within the turbine thus eliminating any pathway for leakages to affect land and soil.	Operation

	• Maintenance vehicles will be regularly inspected for leaks and fitness for purpose; • All fuel/chemical storage facilities will be subject to weekly inspection; and, • An emergency plan for the operational phase to deal with accidental spillages will be contained within Environmental Management Plan. Spill kits will be available to deal with accidental spillages.	
Disturbance (Otter)	Where works are to occur within 150m of a potential otter holt, a wildlife licence is required to undertake these works according to an agreed methodology with NPWS. If such a licence is required, it is recommended that in order to determine whether the potential otter holts observed are in active use (or how known active sites are being used), further pre-construction surveys should be undertaken by installing a weatherproof motion-triggered camera at each location, for periods of several days, ideally at least one week, repeated as per standard methodology. This could be carried out at any time of year as otter active all year round. Should the identified otter holts be found to be active, it will be necessary to delineate an exclusion zone of up to 150m around the feature for the duration of construction.	Pre-Construction & Construction
Disturbance (Salmonids & Lamprey)	The following measures will be implemented to minimise as far as possible the disturbance which could be generated: • Adoption of Best Practice Methods for works¹; • Soft-start techniques will be employed during working hours; and • Machinery will not be used early in the day or late in the day (i.e., they will not start until at least one hour after sunrise and will cease not later than one hour prior to sunset). Lamprey species typically migrate in darkness, so this restriction will benefit them particularly. In addition to the above, to further minimise the potential for disturbance to be caused. Depending on the timing of the proposed works, different life stages of migratory fish species may be impacted by factors such as noise and disturbance associated with construction activities, or by increased sediment ingress into the watercourse during works involving excavation. Spawning and egg incubation for salmon occurs from October to February and for lamprey species from March to May, so works near watercourses will be carried out over summer if possible, bearing in mind that juveniles of these species may be present at any time of year.	Construction
Invasive Species	Medium and high impact invasive species such as cherry laurel, Rhododendron and Japanese knotweed were recorded within the project site (species recorded included scheduled and non-scheduled invasive species. Due to the passage of time from initial site surveys to the start of construction works, a preconstruction invasive species survey must be carried out to determine baseline conditions for the presence of invasive species. Results of this survey will be presented in a site-specific Invasive Species Management Plan (ISMP) which will be prepared by the Appointed Contractor. The management plan will set out strict biosecurity measures with reference to Best Practice guidance to ensure there is no potential for the spread of alien invasive species during the construction works.	Pre-Construction & Construction

¹ https://safety.networkrail.co.uk/wp-content/uploads/2019/11/NR_GN_ESD25-Guidance-on-Best-Practicable-Means-BPM-for-the-Control-of-Noise-and-Vibration.pdf (last accessed 24/05/2024)

	Measures within the ISMP will include (but are not limited to) 1) A Method Statement for avoidance of invasive species within the project site; 2) if avoidance is not possible then removal and treatment measures will be required to be used to prevent the spread of invasive species; and 3) A specialist invasive species contractor will be employed during the project life to ensure all removal and treatment is carried under the appropriate licensing and guidance. While the ISMP will contain specific measures (relevant to specific species) to be employed on site subject to the outcome of the pre-construction invasive species, the following measures will be employed as a matter of course:- • An invasive species management plan will be developed and implemented. This will include the general prevention and containment measures and species-specific treatment measures as may be required; • An Ecological Clerk of Works will be employed for the duration of the construction period to make contractors aware of any invasive and non-native species sensitivities of the project and to undertake pre-construction surveys, enforcing any exclusion zones and mitigation measures as required; • Use of toolbox talks as part of site introduction to workers, including what to look out for and what procedures to follow if invasive species are observed; • Signs will be used to warn workers of invasive species contamination; • Only planting and sowing of native species if any reinstatement works are required or where invasive plant species are physically removed; • Unwanted material contaminated with invasive species will be transported offsite by an appropriate licenced waste contractor and disposed of at a suitably licenced facility (NRA, 2010); • Good hygiene practices will be adhered to including the removal of build-up of soil on equipment; keeping equipment clean; washing vehicles exiting the site using a pressure washer to prevent the transport of seeds; storing wastewater from washing facilities securely and treating to prevent spread of invasive species; checking footwear and clothing of workers for seeds, fruits or other viable material before leaving the site; any plant material arising from cleaning equipment, footwear and clothing will be carefully disposed of following (NRA, 2010) guidelines in such a manner not to cause the spread of invasive species; • A pre-construction walkover survey of the project will be undertaken during the growing season (April to August). This will search for invasive and non-native species, which could change over time. The extent of invasive plant species will be physically marked out if there have been any changes since baseline surveys; and, • If any are identified, then appropriate exclusion zone(s) will be implemented. A buffer will be used to cordon off invasive species outside the works footprint.	
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