

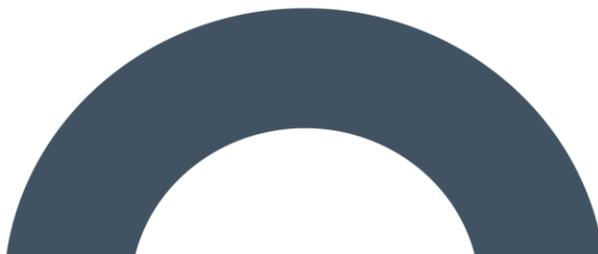


APPENDIX 4-4

**CONSTRUCTION AND
ENVIRONMENTAL
MANAGEMENT PLAN**

Construction and Environmental Management Plan

Slieveacurry Renewable
Energy Development Co.
Clare





DOCUMENT DETAILS

Client: **Slieveacurry Ltd.**

Project Title: **Slieveacurry Renewable Energy Development Co. Clare**

Project Number: **170224-c**

Document Title: **Construction & Environmental Management Plan**

Document File Name: **CEMP F - 2021.11.18 - 170224-c**

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Rev	Status	Date	Author(s)	Approved By
01	Final	18.11.2021	PH/EOS	MW

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1. INTRODUCTION

This Construction and Environmental Management Plan (CEMP) has been developed by MKO on behalf of Slieveacurry Ltd. who intend to apply to Clare County Council for planning permission to construct a renewable energy development and all associated infrastructure in the townland of Glendine North and adjacent townlands, in Co. Clare.

The CEMP has been prepared in conjunction with the Environmental Impact Assessment Report (EIAR) and by the Natura Impact Statement ('NIS') which will accompany the planning application for the Proposed Development to be submitted to the competent authorities. Should the project secure planning permission, the CEMP will be updated, in line with all conditions and obligations which apply to any grant of permission. The CEMP should be read in conjunction with the EIAR and planning drawings. The CEMP will also require updating by the selected contractor in order to identify, assess and satisfy the contract performance criteria as set out by the various stakeholders. The CEMP due to its structure and nature will also require constant updating and revision throughout the construction period as set out below. Therefore, this is a working document and will be developed further prior to and during the construction phase of the Proposed Development.

Triggers for amendments to the CEMP will include:

- When there is a perceived need to improve performance in an area of environmental impact;
- As a result of changes in environmental legislation applicable and relevant to the project;
- Where the outcomes from auditing establish a need for change;
- Where Work Method Statements identify changes to a construction methodology to address high environmental risk; and
- As a result of an incident or complaint occurring that necessitates an amendment.

This CEMP identifies the key planning and environmental considerations that must be adhered to and delivered during site construction and operation. The Contractor, as appointed by the Project Developer, will be required to implement all of the requirements set out in this CEMP. The CEMP may be updated and revised throughout the construction phase of the project, but all future iterations must meet or exceed the standards and requirements set out in this document and the Project Developer must be satisfied that all requirements set out in this document can and will be implemented in full by the appointed contractor.

The CEMP to be prepared by the appointed contractor will be a single, amalgamated document that can be used during the construction phase of the project, as a single consolidated point of reference relating to all construction, environmental and drainage requirements for the Planning Authority, developer and contractors alike. The CEMP may evolve over further iterations as the construction works progress, but at all times must meet or exceed the standards and requirements set out in this document. It will be the contractor's current version of the CEMP, which at any point in time, will guide the construction activities on site and the implementation of which will be audited by an Environmental Clerk of Works (ECoW).

1.1 Scope of the Construction and Environmental Management Plan

This report is presented as a guidance document for the construction of the proposed Slieveacurry Renewable Energy Development including connection to the existing Slievecallan 110kV substation. Where the term 'site' is used in the CEMP it refers to all works associated with the Proposed

Development enabling works. The CEMP outlines clearly the mitigation measures and monitoring proposals that are required to be adhered to in order to complete the works in an appropriate manner.

The report is divided into nine sections, as outlined below:

Section 1 provides a brief introduction as to the scope of the report.

Section 2 outlines the Site and Project details, detailing the targets and objectives of this plan along with providing an overview of construction methodologies that will be adopted throughout the project.

Section 3 sets out details of the environmental controls to be implemented on site. Site drainage principles, peat stability monitoring measures and a waste management plan are also included in this section.

Section 4 sets out a fully detailed implementation plan for the environmental management of the project outlining the roles and responsibilities of the project team.

Section 5 outlines the Emergency Response Procedure to be adopted in the event of an emergency in terms of site health and safety and environmental protection.

Section 6 consists of a summary table of all mitigation proposals to be adhered to during the project, categorised into three separate headings, 1) pre-commencement measures; 2) construction-phase measures and 3) operational-phase measures.

Section 7 consists of a summary table of all monitoring requirements and proposals to be adhered to during the project, categorised into three separate headings, 1) pre-commencement measures; 2) construction-phase measures and 3) operational-phase measures.

Section 8 sets out a programme for the timing of the works.

Section 9 outlines the proposals for reviewing compliance with the provisions of this report.

1.2 Targets and Objectives

The following key targets and objectives will inform the final detailed design should the proposed development secure planning permission and proceed to the construction phase. This includes consideration of the buildability of the designs that emerge:

- Adopt a sustainable approach to construction and, ensure sustainable sources for materials supply where possible;
- Keeping all watercourses free from obstruction and debris;
- Avoidance of any pollution incident or near miss as a result of working around or close to existing watercourses and having emergency measures in place;
- Correct fuel storage and refuelling procedures to be followed;
- Air and noise pollution prevention to be implemented;
- Construction Methods and designs will be altered where it is found there is an adverse effect on the environment;
- Good waste management and house-keeping to be implemented;
- Using recycled materials if possible, e.g. excavated stone, soil and subsoil material;
- Avoidance of vandalism;
- Monitoring of the works and any adverse effects that it may have on the environment and,
- Provide adequate environmental training and awareness for all project personnel.

The key site objectives are as follows;

- Keep impact of construction to a minimum on the local environment, watercourses and wildlife;
- Comply with all relevant water quality legislation;
- Ensure construction works and activities are completed in accordance with mitigation and best practice approach presented in the Environmental Impact Assessment Report (ELAR) and associated planning documentation;
- Ensure construction works and activities are completed in accordance with any planning conditions for the development;
- Ensure construction works and activities have minimal impact/disturbance to local landowners and the local community;
- Ensure construction works and activities have minimal impact on the Natural Environment;

2. SITE AND PROJECT DETAILS

2.1 Site Location and Description

The proposed renewable energy development site is located approximately 5 kilometres to the east of Miltown Malbay and approximately 7 kilometres to the south of Ennistimon Co. Clare. It is proposed to access the site of the Proposed Development via an existing access track off the local road to the northwest of the site off the R460 Regional Road, which travels in a northeast-southwest direction between Inagh and Miltown Malbay. The Proposed Development site is served by a number of existing forestry and agricultural roads and tracks.

The planning application includes for the construction of an underground cable route from the turbines to the existing Slievecallan 110kV substation in the townland of Knockalassa, County Clare. The planning application also includes for an extension to the existing Slievecallan 110kV substation. Connection via Slievecallan would comprise underground cabling, measuring approximately 7.1 km in total, located on existing forest roads / land, agricultural land and within the public road corridor and existing wind farm road.

Current land-use on the subject site comprises coniferous forestry, agriculture and turf cutting. Land-use in the wider landscape comprises a mix of agriculture, low density housing, wind farms and commercial forestry.

The townlands in which the proposed site and ancillary works are located as well as the underground cable route and substation extension works, are listed in Table 2-1.

Table 2-1 Townlands within which the Project is Located

Development Works	Townland
Wind turbines and access roads, Construction Compound, Borrow pits.	Glendine North, Fahanlunaghta More, Curraghodea, Letterkelly, Cloghaun More, Tooreen and Silverhill
Underground cable route	Doonsallagh East and Knockalassa
Substation Extension	Knockalassa

2.1.1 Description of the Development

The Proposed Development will comprise the construction of up to 8 No. wind turbines and all associated works. The proposed turbines will have a maximum blade tip height of up to 175 metres. The full description of the Proposed Development, as per the public planning notices, is as follows:

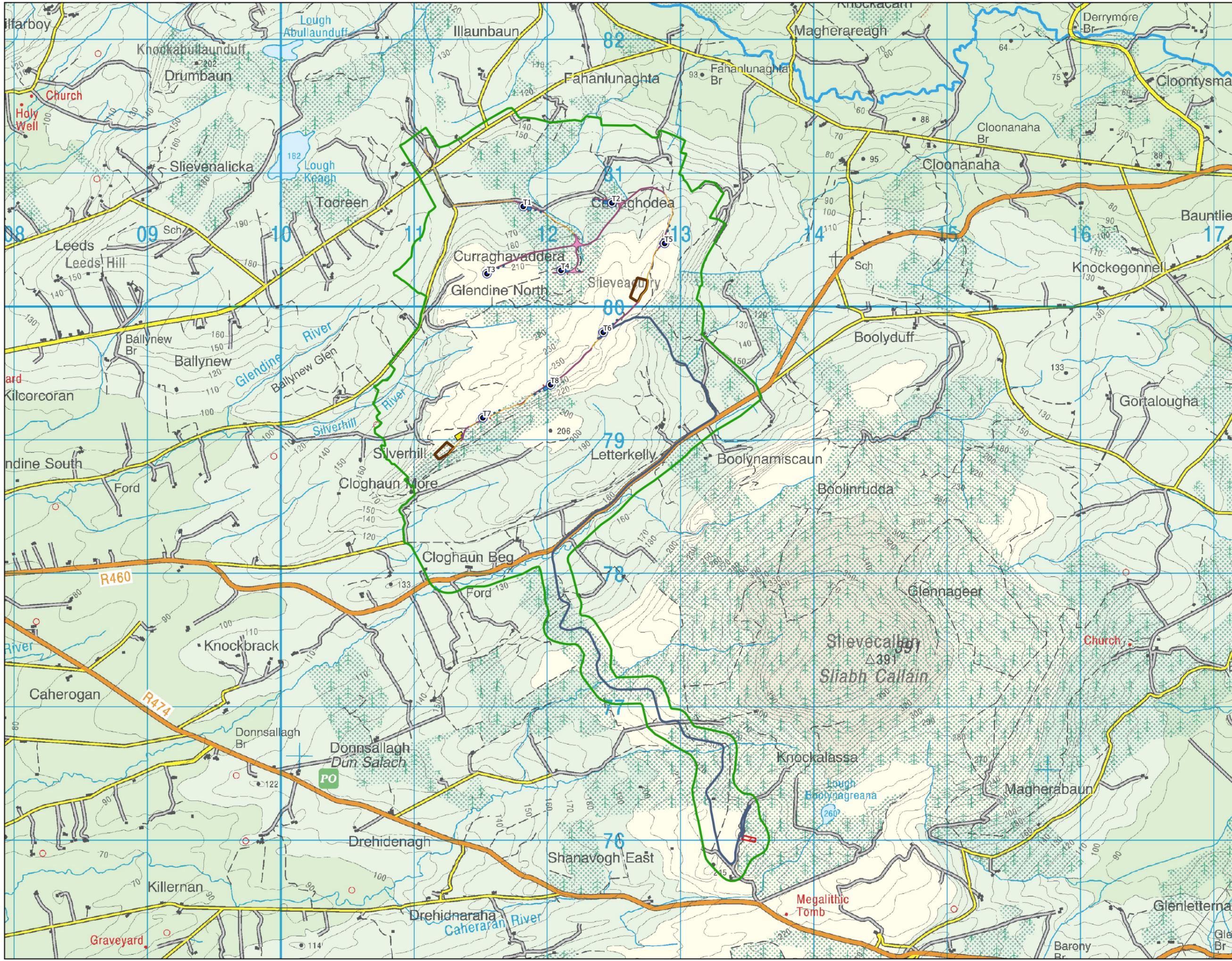
- 8 No. wind turbines with an overall ground-to-blade tip height in the range of 175 metres maximum to 173 metres minimum; a blade length in the range of 75 metres maximum to 66.5 metres minimum; and hub height in the range of 108.5 metres maximum to 100 metres minimum;
- A thirty-year operational life from the date of full commissioning of the development and subsequent decommissioning;
- A Meteorological Mast with a height of 30 metres;
- All associated underground electrical cabling (33kV) connecting the proposed turbines via Ring Main Unit (RMU) to the 110kV substation in the townland of Knockalassa;

- Permanent extension to the 110kV substation at Knockalassa comprising extension to the existing substation compound, provision of a new control building with welfare facilities and all associated electrical plant and equipment for an additional 110kV bay and security fencing;
- Upgrade of access junctions;
- Upgrade of existing tracks/ roads and provision of new site access roads and hardstand areas;
- 2 no. borrow pits;
- 2 no. temporary construction compounds;
- Site Drainage;
- Forestry Felling;
- Operational stage site signage; and
- All associated site development ancillary works and apparatus.

This application is seeking a ten-year planning permission and 30 year operational life from the date of commissioning of the renewable energy development.

The layout of the Proposed Development has been led by consideration of constraints and facilitators, thereby avoiding the environmentally sensitive parts of the site. The roads layout for the Proposed Development maximises the use of the existing onsite access roads and tracks where possible, with approximately 2.8 kilometres of existing roadway/ tracks requiring upgrading and approximately 3.8 kilometres of new access road to be constructed. The development of the proposed renewable energy development will require the felling of approximately 26.59 hectares of permanent and 1.9 hectares of temporary commercial forestry.

The proposed site layout showing individual elements of the development is shown in Figure 2-1 and in the Site Layout Drawings included with the application.



- ### Map Legend
- EIAR Site Boundary
 - Proposed Turbine Locations
 - Existing Roads - Upgrade Proposed
 - Proposed New Site Roads
 - Proposed Turbine Foundations
 - Proposed Turbine Hardstands
 - Proposed Borrow Pits
 - Proposed Temporary Construction Compounds
 - Met Mast Location
 - Proposed Grid Connection Route
 - Proposed Extension to Existing Slievecallan Substation
 - Temporary Runover Area
 - County Road to be Maintained
 - Public Road Expansion Area
 - Soft Levelled Area

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Proposed Layout	
Project Title	
Slieveacurry Renewable Energy Development, Co. Clare	
Drawn By	Checked By
Ellen Costello	Michael Watson
Project No.	Drawing No.
170224c	Figure 2-1
Scale	Date
1:25000	29.10.2021

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2.2 Construction Methodology Overview

2.2.1 Introduction

An experienced main contractor will be appointed to carry the civil works for the construction phase of the Proposed Development. The main contractors will comply with this CEMP and any revisions made to this document throughout the construction phase. An overview of the anticipated Construction Methodologies is provided below.

2.2.2 Overview of Proposed Construction Methodology

The EIAR includes construction methodologies for various elements of work to be undertaken as part of the project. These construction methodologies are reproduced in the following sub-sections but will be superseded by an appointed contractor's construction method statements, which will form part of the CEMP. The contractor's construction method statements will be prepared to take account of the detailed engineering, geotechnical and detailed drainage design which will be prepared prior to commencement of construction and all requirements of this CEMP.

The EIAR construction methodologies are provided for the following project elements:

- > Temporary Construction Compounds;
- > Borrow Pits;
- > Tree Felling;
- > Site Drainage System;
- > Proposed New Site Access Roads;
- > Upgrade of Existing Roads
- > Turbine and Meteorological Mast Foundations;
- > Crane Hardstands;
- > Electricity Substation Extension;
- > Site Underground Cabling
- > Culvert Crossings
- > Transport Route Accommodation Works
- > Decommissioning

2.2.2.1 Temporary Construction Compounds

There are two temporary construction compounds proposed for the site. The location of the compounds are shown in Figure 2-1. The compounds will typically be constructed as follows:

- > The area to be used as the compound will be marked out at the corners using ranging rods or timber posts.;
- > All drainage measures prescribed in the detailed drainage design for the project will be implemented around the works area;
- > The compound will be established using a similar technique as the construction of the excavated site roads as discussed above;
- > Where required, a layer of geogrid will be installed and compacted layers of well graded granular material will be spread and lightly compacted to provide a hard area for site offices and storage containers;
- > Areas within the compound will be constructed as site roads and used as vehicle hardstandings during deliveries and for parking;
- > A bunded containment area will be provided within the compound for the storage of lubricants, oils and site generators etc.;

- If necessary, the compound will be fenced and secured with locked gates, although fencing would only be utilised where significant risk of danger to third parties or vandalism is envisaged;
- Upon completion of the project the compound will be decommissioned by backfilling the area with the material arising during excavation, landscaping with peat material as required;
- During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used on site for toilet facilities. This will be maintained by the service contractor as required and will be removed from the site on completion of the construction phase;
- The water supply to the site will be from a temporary water storage tank which will be filled using a mobile water tank which will source water locally as required; and
- A section of the temporary construction compound in the southern section of the site will be repurposed to facilitate the construction of the meteorological mast.

2.2.2.2 Borrow Pits

It is proposed to develop two on-site borrow pits, to be located approximately 320 metres northeast of Turbine No. 6 and approximately 300 metres southeast of Turbine No. 7, as shown in Figure 2-1. The borrow pits will typically be excavated and backfilled as follows:

- The area to be used for both borrow pits will be marked out at the corners using ranging rods or timber posts. Drainage runs, and associated settlement ponds will be installed around the perimeter;
- The initial borrow pit excavation will involve removal of peat (if present) and mineral soil to the top of bedrock. These materials will be stored temporarily or placed around the borrow pit to form berms to prevent surface water inflow to the borrow pit excavation;
- All drainage measures prescribed in the detailed drainage design for the project will be implemented around the works area;
- The bedrock material will be extracted from the borrow pit and stockpiled or used as required;
- The use of material won from the borrow pit will be sequential with new road construction or turbine base formations;
- Temporary stockpiling of aggregates will be required to accommodate the cut and fill operations within the borrow pit, and the progression of access roads and turbine excavations;
- As the borrow pit excavation progress and become deeper, surface water and groundwater ingress will be removed via pumping to settlement ponds, and re-distribution locally across natural vegetated areas. Where required, additional specialist water treatment measures will be employed to ensure no deterioration in downstream water quality occurs;
- When extraction ceases within the borrow pit, the uphill face of the rock will be stepped, and deposits of soil will be placed which will assist in the re-vegetation of the rock face; and,
- The extraction area of the borrow pit will have to be permanently secured and a stock-proof fence will be erected around the borrow pit to prevent access to these areas as well as the installation of appropriate health and safety signage.

2.2.2.3 Tree Felling

Some of the proposed renewable energy development site is occupied by commercial forestry. As part of the Proposed Development, tree felling will be required within and around the development footprint to allow the construction of turbine bases, access roads, the underground cable and the other ancillary infrastructure. Turbulence felling may also be required in the vicinity of turbine locations, the

purpose of which is to avoid turbulence that can be created by the forest canopy and which can affect the performance and efficiency of the turbines.

A total of 26.59 hectares of forestry will be permanently felled within and around the footprint of the Proposed Development. An additional 1.90 hectares of trees will be required to be temporarily felled around all turbines to achieve the requirements of the bat mitigation proposal.

The tree felling activities required as part of the Proposed Development will be the subject of two Limited Felling Licence (LFL) applications to the Forest Service, as per the Forest Service's policy on granting felling licenses for wind farm developments. The policy requires that a copy of the planning permission for the Proposed Development be submitted with the felling licence applications; therefore the felling licenses cannot be applied for until such time as planning permission is obtained for the Proposed Development.

One LFL will be applied for the permanent felling required around the footprint of the Proposed Development footprint, for example along access roads and at turbine bases. A second LFL will be applied for to cover temporary felling including any turbulence felling.

Details of the appropriate mitigation and drainage measures are included in Section 3.5 below.

2.2.2.4 Site Drainage System

The early establishment of temporary drainage facilities will manage the risk of impacts on watercourses on and adjacent to the site during construction. In addition, construction operations will adopt best working practices. The development of the site will need to be phased accordingly.

The EIAR and project planning application includes a drainage design required for the purposes of assessing the potential effects of the proposed development. The drainage design will be developed further with a level of construction detail necessary to implement the measures on site. The detailed (construction phase) drainage design will form part of the CEMP and the effective implementation of the detailed drainage design will be audited by the ECoW.

Surface water management and drainage design principles are outlined in Section 3.2 below and Section 4.6 of the EIAR.

2.2.2.5 New Site Access Roads

New roadway will be required in areas where existing roads are not already present, or where existing sections are too steep or otherwise unsuitable for the required purpose in the case of the Proposed Development. Maximum use has been made of the existing machine tracks and fire breaks within areas of forestry to ensure that the felling area required to make way for proposed new site roads is kept to a minimum. There are approximately 3.8km of new access roads to be installed at the site. The new access roads will be constructed as follows using an excavated site road methodology which is summarised below.

- Establish alignment of the new site roads from the construction drawings and mark out the centrelines with ranging rods or timber posts;
- All drainage measures prescribed in the detailed drainage design for the project will be implemented around the works area;
- The road layout has been designed to avoid crossings of natural watercourses where possible;
- Where existing culverts are to be upgraded or extended, the works will be carried out to follow a method statement to be prepared in consultation with Inland Fisheries Ireland.

- The access tracks will be of single-track design with an overall width of 6m. There will be some local widening on the bends, junctions and around turbine bases for the safe passage of large vehicles;
- Any excavated road section's will, where it is considered beneficial have turf stripped over the area of the excavation and stored growing side up for reuse. This area will be oversized to facilitate the excavated subsoil material. The subsoil material will subsequently be capped with topsoil to form an earth bund around the excavated material;
- Where the Geotechnical Engineer confirms it is more suitable, a non-excavated ground bearing road will be employed. In this case a reinforced sub-base will be placed directly on the existing ground using geotextile separation layer and layers of geogrid reinforcing as designed by the Geotechnical Engineer to achieve the bearing capacity required for the road running surface.
- All peat excavated will be used as part of the borrow pit restoration or in reinstatement areas. Topsoil will be temporarily stockpiled locally for reuse for landscaping the backfill placed above the foundations.
- The subsoil will be excavated down to a suitable formation layer of either firm clay or bedrock;
- For both excavated, the road will be constructed using well-graded granular fill, spread and compacted in layers typically of 200mm and a suitable capping layer to provide a homogeneous running surface. The thickness of layers and amount of compaction required will be subject to detailed design by Project Engineer in consultation with the Construction Manager based on the characteristics of the material and the compaction plant to be used;
- All new roadways will be constructed with a camber to aid drainage of surface water;
- For excavations in overburden and peat, side slopes shall not generally be greater than 1(V): 2 or 3(H), respectively. Slacker slopes may be required if localised areas of weaker peat are encountered Design slopes will be informed by the Geotechnical Engineer;
- At bends or steep inclines from the roads, reflective snow poles will be erected to warn traffic on dark mornings and evenings that there is a turn in the road or a sharp incline beyond the site road.
- The granular fill use to complete the final running surface of the roads on site will be tested to BS812-111:1990 "Ten percent fines value".

2.2.2.6 Upgrading of Existing Site Access Roads

It is proposed to utilise the existing road network at the site as much as possible (approximately 2.8km will be used). These roads will require upgrading which will comprise widening of the roadway to a total running width of approximately six metres, with wider sections at corners and on the approaches to turbine locations and the laying of a new surface dressing on the existing section of roadway where necessary. The road widening will be undertaken as follows:

- If it is considered that the current road formation level is adequate to support required bearing, then no upgrade or widening works will be completed;
- Otherwise, where required, the subsoil in the existing road verge will be excavated down to a suitable formation layer and the spoil used for the restoration of borrow pits or in reinstatement areas;
- All drainage measures prescribed in the detailed drainage design for the project will be implemented around the works area;
- Well-graded imported granular fill will be spread and compacted in layers up to 200mm to provide a homogeneous running surface. The thickness of layers and amount of compaction required will be decided by the Construction Manager based on the characteristics of the material and the compaction plant to be used. These layers of granular fill will be brought to the same level as the top of the existing road surface;

- A layer of geogrid will be installed directly onto the top of the granular fill layer and the existing road surface where required; and,
- A layer of finer well graded stone for the running surface will be laid on the geogrid and compacted.
- Prior to any works commencing on the upgrade of existing roads, the requirement for additional roadside drainage will be considered by the Project Hydrologist in line with the proposals outlined in Section 4.

2.2.2.7 Turbine and Meteorological Mast Foundations

The wind turbines and meteorological mast foundations will be a reinforced concrete base designed to the appropriate standards (BS EN 1992-1-1:2004+A1:2014 Eurocode 2: Design of Concrete Structures). Foundation loads will be provided by the wind turbine and mast suppliers, and factors of safety will be applied to these in accordance with European design regulations. The turbine will be anchored to the foundation using a bolt assembly which shall be cast into the concrete. The meteorological mast is a free-standing structure which is also anchored to the reinforced concrete foundation. It is anticipated that the foundations for both the turbines and the meteorological mast will be either piled or ground bearing foundations and that the formation level of the turbine foundations will be on the lower mineral subsoil or bedrock. Bases for the turbines will measure up to 21 metres in diameter with the final design to be determined by the turbine supplier. They will likely be formed one metre below the base of the peat layer on stiff subsoil material or bedrock, or at a suitable level directed by the Geotechnical Engineer/Designer. The foundations will be constructed as follows:

- The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter;
- Where practical, the peat will be stripped over the area of the excavation and stored locally for reuse, the subsoil will be excavated and stored to one side for reuse during the landscaping around the finished turbine;
- No material will be removed from site and storage areas will be stripped of vegetation prior to stockpiling in line with best working practices;
- All groundwater and surface water arising from turbine base excavation will be pumped to the dirty water system prior to discharge from the works area;
- Soil excavation shall be observed by a qualified archaeologist in accordance with a scheme of archaeological monitoring to identify any significant remains as they come to light;
- The foundations excavation will be raised to formation level by compacted layers of well graded granular material will be spread and compacted to provide a hard area for the turbine foundation;
- A layer of lean-mix blinding will be laid approximately 75mm thick directly on top of the newly exposed formation, tamped and finished with a screed board to leave a flat level surface. The concrete should be protected from rainfall during curing and all surface water runoff from the curing concrete should be prevented from entering surface water drainage directly;
- High tensile steel reinforcement will be fixed in accordance with the designer's drawings & schedules. The foundation anchorage system will be installed, levelled and secured to the blinding using steel box section stools;
- Ductwork will be installed as required, and formwork erected around the steel cage and propped from the backside as required;
- The foundation anchorage system will be checked both for level and line prior to the concrete being installed in the base. These checks will be passed to turbine manufacturer for their approval;
- Concrete will be placed using a concrete pump and compacted when in the forms using vibrating poker to the levels and profile indicated on the drawings. Upon completion of the concreting works the foundation base will be covered and allowed to cure;
- Steel shutters will be used to pour the circular chimney section;

- Earth wires will be placed around the base;
- The foundation will be backfilled with a cohesive material, where possible using the material arising during the excavation and landscaped using the vegetable soil set aside during the excavation; and.
- Soil, rock and other materials excavated during construction shall be managed in line with the recommendations/ best practice guidelines outlined in Section 4.3.4 of the EIAR.

2.2.2.8 Crane Hardstands

All crane pads will be designed taking account of the loadings provided by the turbine manufacturer and will consist of a compacted stone structure. The crane hardstands will be constructed in a similar manner to the excavated site roads and will measure approximately to the turbine manufacturer's requirements. The position of the crane pads varies between turbine locations depending on topography, position of the site access road, and the turbine position.

2.2.2.9 Substation Extension

It is proposed to extend and expand the existing Slievecallan 110kV substation to accommodate the connection of the proposed Slievecurry Renewable Energy Development. The works will consist of the construction of a new control building with welfare facilities, associated electrical plant and equipment and security fencing. The substation will be constructed by the following methodology:

- The area of the substation will be marked out using ranging rods or wooden posts.;
- All drainage measures prescribed in the detailed drainage design for the project will be implemented around the works area;
- The wind farm control buildings will also be built within the substation compound;
- The foundations will be excavated down to the level indicated by the project engineer. The foundations will be shuttered and poured with reinforced concrete. An anti-bleeding admixture will be included in the concrete mix;
- The substation will be constructed with masonry blockwork. The block work walls will be built up from the footings to DPC level and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors;
- The block work will then be raised to wall plate level and the gables and internal partition walls formed. Scaffold will be erected around the outside of the building for this operation;
- Concrete roof slabs will be lifted into position using an adequately sized mobile crane;
- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- The electrical equipment will be installed and commissioned.
- Steel palisade fencing will be erected around the substation and control building compound area.
- All wastewater from the staff welfare facilities in the control buildings will pass to a sealed storage tank. The wastewater will be transported off site by a waste management contractor holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended).
- The construction and components of the substation will be to Eirgrid specifications.

2.2.2.10 Site Underground Cabling

The transformer in each turbine is connected to the substation through a network of buried electrical cables. Fibre-optic cables will also connect each wind turbine to the wind farm control building in the

substation compound. The ground is trenched typically using a mechanical excavator. The top layer of soil is removed and saved so that it is replaced on completion. The cables are bedded with suitable material unless the ground conditions are such that no bedding is required. The depth of the cables are to meet all national and international requirements and will generally be up to 1.3 m below ground level, depending on the ground conditions that are encountered. A suitable marking tape is installed between the cables and the surface. On completion the ground will be reinstated as per its original condition. The route of the cables will generally follow the access tracks to each turbine location. The cable trench can be located on either side of the road and/or below the road but where possible it should be located on the upslope side of the road.

Clay plugs (water flow barrier) will be installed at regular intervals of not greater than 50 metres along the length of the trenches where required to prevent the trenches becoming conduits for runoff water. Backfill material will be compacted in layers with approved engineer's specified material, which may be imported onto the site should sufficient volumes of suitable material not be encountered during the excavation phase of the proposed infrastructure.

2.2.2.11 **Underground Cable Route**

A connection between the proposed turbines and the existing Slievecallan 110kV substation will be necessary to export the electricity generated by the Proposed Development. The Proposed Development will connect to the existing Slievecallan 110kV substation. Connection via Slievecallan would comprise underground cabling, measuring approximately 7.1 km in total, located on existing forest roads / land, agricultural land and within the public road corridor. The underground cable will be laid beneath the surface of the site and/or public road using the following typical methodology:

- Before works commence, surveying will take place along the proposed cable route, with all existing culverts identified. All relevant bodies i.e. ESB, Clare County Council etc. will be contacted and all drawings for all existing services sought.
- When the cable is located on public roads, a traffic management plan will be set up prior to any works commencing. A road opening licence will be obtained where required and all plant operators and general operatives will be inducted and informed as to the location of any services.
- The cable ducts will be concrete surrounded where they pass under the public road and under drains or culverts.
- A tracked 360-degree excavator will then proceed to dig out the proposed trench, typically to a depth of 1200mm, within which the ducts will be laid.
- Trench supports will be installed, or the trench sides will be benched or battered back where appropriate and any ingress of ground water will be removed from the trench using submersible pumps, fitted with appropriate silt filtration systems, to prevent contamination of any watercourse.
- Once the trench has been excavated, a base-layer will be laid and compacted, comprising Clause 804, or 15 Newton CBM4 concrete as required.
- The ducting will be installed as per specification, with couplers fitted and capped to prevent any dirt etc. entering the duct. In poor ground conditions, the ends of the ducts will be shimmed up off of the bed of the trench, to prevent any possible ingress of water dirt. The shims will be removed again once the next length has been connected. Extreme care will be taken to ensure that all duct collars (both ends) are clean and in good condition prior to ducts being joined.
- As the works progress, the as-built location of the ducting will be recorded using a total station or GPS.
- As per the associated base-layer (Clause 804 material or 15 Newton CBM4 concrete) will be installed and compacted as per approved detail, with care not to displace the ducting.
- Spacers will be used to ensure that the correct cover is achieved at both sides of the ducting.

- The remainder of the trench will be backfilled in two compacted layers with approved engineer's specified material.
- Yellow marker warning tape will be installed across the width of the trench, at 300mm depth, before the finished surface is reinstated, as per original specification. Although the typical cross section of the off-road cabling trench shows a finished surface level of reinstated topsoil, these revised sections of off-road cabling may be finished with granular fill to facilitate access to the trench for any potential maintenance that is required during the operational phase of the Proposed Development.
- Marker posts will then be placed at regular intervals (generally at joint bays and any change in direction) to denote the location of the underground power cables.



Plate 2-1 Cable Trench View

2.2.2.11.1 Existing Underground Services

Any underground services encountered along the route will be surveyed for level and the ducting will pass over the service provided adequate cover is available. A minimum clearance of 300mm will be required between the bottom of the ducts and the service in question. If the clearance cannot be achieved the ducting will pass under the service and again 300 mm clearance between the top of the duct and bottom of the service will be achieved. In deeper excavations, an additional layer of marker tape will be installed between the ducting layer and yellow top level marker tape. If the required separation distances cannot be achieved then a number of alternative options are available such as using steel plates laid across the width of the trench and using 35N concrete surrounding the ESB ducts where adjacent services are within 600mm, with marker tape on the side of the trench. Back fill around any utility services will be with dead sand/pea shingle where appropriate. All excavations will be kept within the roadway boundaries, i.e. in road or grass margin.

2.2.2.11.2 Joint Bays

Joint bays are typically pre-cast concrete chambers where lengths of cable ducting will be connected. They will be located at various points along the ducting route approximately every 600-1200 meters. Where possible joint bays will be located in areas where there is a natural widening/wide grass margin on the road in order to accommodate easier construction, cable installation and create less traffic

congestion. During construction, the joint bay locations will be completely fenced off and will be incorporated into the traffic management system. Once they have been constructed they will be backfilled temporarily until cables are being installed.

2.2.2.11.3 **Underground Cable Watercourse/Culvert Crossings**

There are a total of 14 watercourse and culvert crossings along the proposed cable route, of which 4 no. are stream crossings as indicated in Figure 2-2. The remaining crossings are classified as culverts. The construction methodology has been designed to eliminate the requirement for in-stream works. A general description of the various construction methods employed at watercourse/ culvert crossings are described in the following paragraphs below. A list of the stream crossings along the underground cable route and the proposed crossing method at each location is provided in Table 2-2.

The crossing methodologies employed at the other culvert crossings along the underground cable route, will be selected from the suite of watercourse crossing options outlined below, as appropriate, depending on culvert type, depth, size and local ground conditions.

Should an alternative methodology option be required for individual crossings during the construction process this will be agreed with the relevant authorities including Clare County Council prior to works commencing.

Where culverts require upgrading, the Applicant will commission a survey of culverts, the results of which will be forwarded to the Planning Authority. Having regard to the duration of the consent requested (10 years) it is considered best practice that any such surveys be carried out prior to construction to facilitate accuracy and timely reporting of the surveys.

Standard Formation Crossing over Culvert – Option 1

Where adequate cover exists above a culvert, the standard aforementioned trench arrangement will be used where the cable ducts pass over a culvert without any contact with the existing culvert or water course. The cable trench will pass over the culvert in a standard trench as outlined in Figure 2-3.

Standard Formation Crossing under Culvert – Option 2

Where the culvert consists of a socketed concrete or sealed plastic pipe and sufficient depth is not available over the crossing, a trench will be excavated beneath the culvert and cable ducts will be installed in the standard formation 300mm below the existing pipe, as outlined in Figure 2-4.

Shallow Formation crossing over Culvert – Option 3

Where cable ducts are to be installed over an existing culvert and sufficient cover cannot be achieved, the ducts will be laid in a much shallower trench, the depth of which will be determined by the cover available at the culvert crossing location. The ducts within the shallow formation trench will be encased in 6mm thick steel galvanized plates and backfilled with 35N concrete.

Where sufficient deck cover is not available to fully accommodate the required ducts, it may be necessary to locally raise the pavement level. Any addition of a new pavement will be tied back into the existing road pavement at grade. This method of duct installation is further detailed in Figure 2-5.



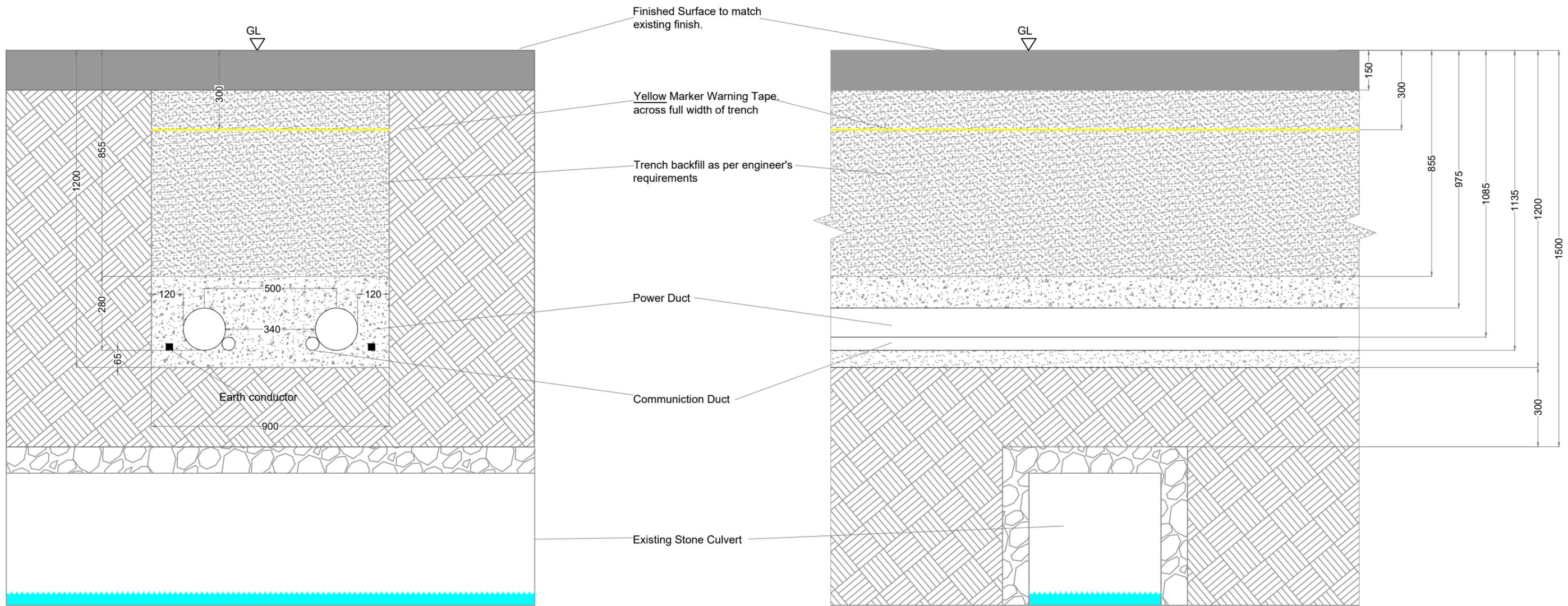
- Map Legend**
- EIAR Site Boundary
 - Proposed Turbine Locations
 - Proposed Grid Connection Route
 - Proposed Extension to Existing Slieveacallan Substation
 - Watercourse Crossings



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Drawing Title Cable Route Watercourse Crossings	
Project Title Slieveacurry Renewable Energy Development, Co. Clare	
Drawn By Ellen Costello	Checked By Michael Watson
Project No. 170224c	Drawing No. Figure 2-2
Scale 1:25000	Date 29/10/2021

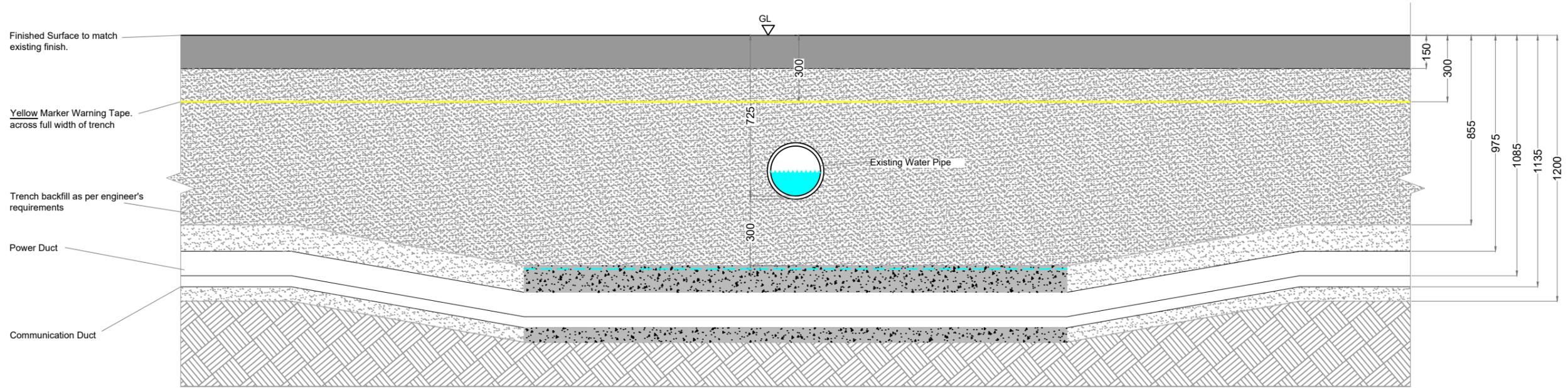
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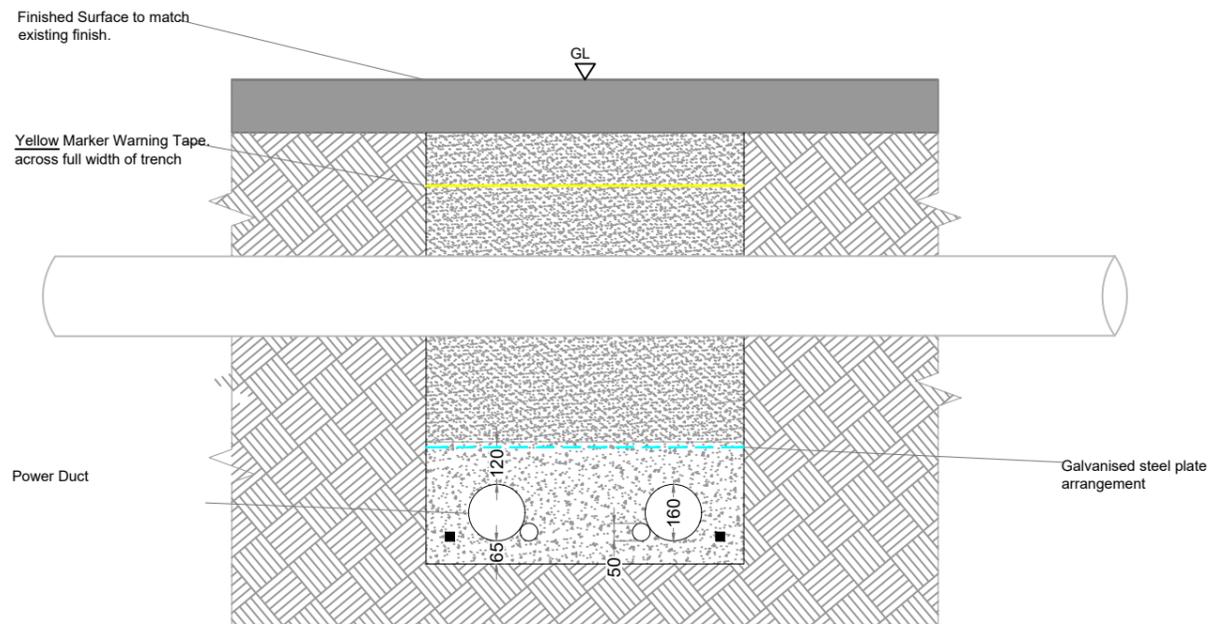
**33kV IPP Trench Section - 2 Circuits
Culvert Crossing Option 1**

**33kV IPP Trench Elevation - 2 Circuits
Culvert Crossing Option 1**

Figure 2-3	
DRAWING TITLE: Standard Formation Crossing Over Culvert - Option 1	
PROJECT TITLE: Slieveacurry Renewable Energy Development, Co. Clare	
DRAWING BY: Joseph O'Brien	CHECKED BY: Michael Watson
PROJECT No.: 170224c	DRAWING No.: 170224c - 42
SCALE: 1:15 @ A3	DATE: 26.10.2021
	
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**33kV IPP Trench Section - 2 Circuits
Culvert Crossing Option 2**

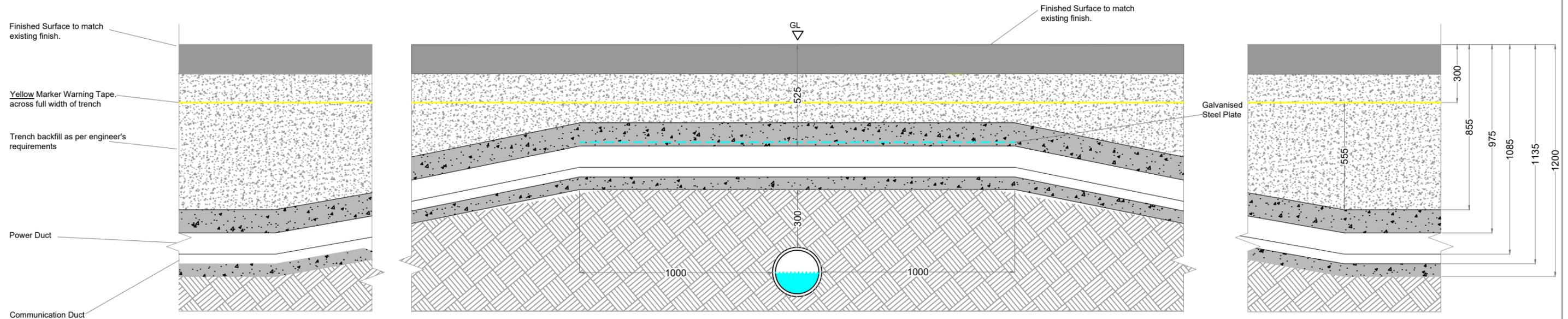


**33kV IPP Trench Elevation - 2 Circuits
Culvert Crossing Option 2**

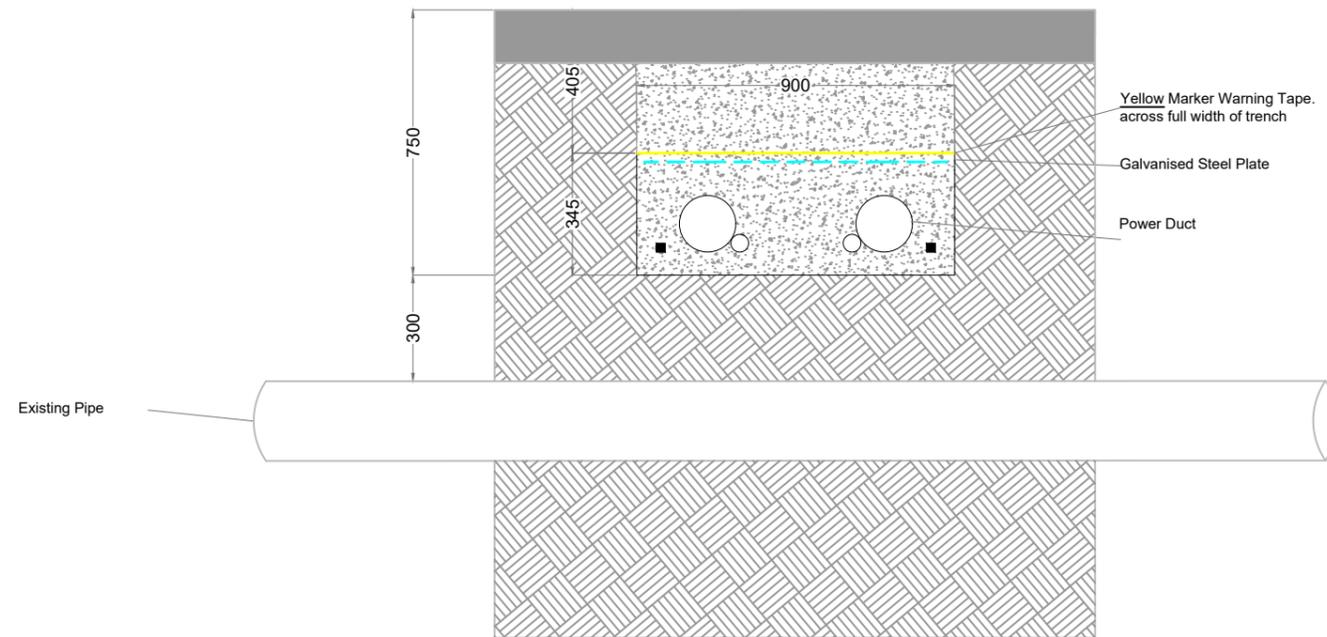
Figure 2-4	
DRAWING TITLE: Deep Formation Crossing Under Culvert - Option 2	
PROJECT TITLE: Slieveacurry Renewable Energy Development, Co. Clare	
DRAWING BY: Joseph O'Brien	CHECKED BY: Michael Watson
PROJECT No.: 170224c	DRAWING No.: 170224c - 43
SCALE: 1:20 @ A3	DATE: 26.10.2021



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**33kV IPP Trench Elevation - 2 Circuits
Culvert Crossing Option 3**



**33kV IPP Trench Elevation - 2 Circuits
Culvert Crossing Option 3**

Figure 2-5	
DRAWING TITLE: Shallow Formation Crossing Over Culvert - Option 3	
PROJECT TITLE: Slieveacurry Renewable Energy Development, Co. Clare	
DRAWING BY: Joseph O'Brien	CHECKED BY: Michael Watson
PROJECT No.: 170224c	DRAWING No.: 170224c - 44
SCALE: 1:20 @ A3	DATE: 26.10.2021

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Table 2-2. Underground Cable Route – Watercourse Crossings Methodology

Watercourse Crossing Reference No.	Watercourse Type	Cover from Road Level to Top of Culvert (m) 1	Maximum Depth of Trench from Road Level Under Culvert (mm) 1	Crossing Option Description	Watercourse Crossing Option	Extent of In-Stream Works
1	600mm diameter Corrugated pipe	1.3	N/A	Where cable ducts are to be installed over an existing culvert and sufficient cover cannot be achieved, the ducts will be laid in a much shallower trench, the depth of which will be determined by the cover available at the culvert crossing location.	Option 3	None. No in-stream works required.
2	Steel arch overbridge	2.0	N/A	Where adequate cover exists above a culvert, the standard trench arrangement will be used where the cable ducts pass over a culvert without any contact with the existing culvert or water course. The cable trench will pass over the culvert in a standard trench.	Option 1	None. No in-stream works required.
3	Steel arch overbridge	2.0	N/A	Where adequate cover exists above a culvert, the standard trench arrangement will be used where the cable ducts pass over a culvert without any contact with the existing culvert or water course. The cable trench will pass over the culvert in a standard trench.	Option 1	None. No in-stream works required.

Watercourse Crossing Reference No.	Watercourse Type	Cover from Road Level to Top of Culvert (m) 1	Maximum Depth of Trench from Road Level Under Culvert (mm) 1	Crossing Option Description	Watercourse Crossing Option	Extent of In-Stream Works
4	900mm diameter Corrugated pipe	5.0	N/A	Where adequate cover exists above a culvert, the standard trench arrangement will be used where the cable ducts pass over a culvert without any contact with the existing culvert or water course. The cable trench will pass over the culvert in a standard trench.	Option 1	None. No in-stream works required.

As presented in Table 2-2 above, 4 no. stream crossings will be traversed by the proposed cable all of which are off the public road and on private access tracks or existing wind farm roads. Crossing no's 2 to 4 all have adequate cover for the cable to pass over the existing crossing and maintaining 1m cover from top of cable duct to road/access track finished surface which is referred to as *Option 1*. Figure 2-3 for *Option 1* shows cover of 975mm however this is an indicative detail and may not be approximate relative to the watercourse crossing in question. However, considering the access tracks comprise unbound granular material, they can be raised after the laying of the cable slightly during reinstatement to ensure 1m cover is achieved.

For Crossing no. 1, which will be traversed using what is referred to as *Option 3*, the indicative detail in Figure 2-5 shows cover of less than the desired 1m. However, again, this is a detail to demonstrate the methodology proposed. Table 2-2 shows a depth of 1.3m at this location from track surface to the top of the existing watercourse crossing pipe. Maintaining the required 0.3m lateral separation between cable ducts and the watercourse crossing pipe and taking a 0.11m cable duct height leaves cover of 0.89m. As suggested above, considering this is unbound granular material access track, the surface can be raised to achieve the necessary 1m cover. Furthermore, the option to pass under the existing piped stream crossing has been presented as Option 2 and is outlined in Figure 2-4 can also ensure a 1m cover if it is considered appropriate to adopt.

For the remaining 10 no. culvert crossings as outlined in Appendix 4-7 of the EIAR, the flexibility in the options presented can be tailored to specific locations to ensure the 1m cover over the cable ducting will be achieved and also more importantly ensure instream works are avoided. The 9 no. culverts are located off the public road.

No cable works are proposed near public road bridges.

2.2.2.12 Watercourse Crossings

It is proposed that 3 no. new stream crossings will be required to facilitate the renewable energy development infrastructure.

A number of smaller crossings of artificial drains may also be required throughout the course of construction all of which will be undertaken using a piped culvert system. The methodologies for the installation of these crossings are summarised in this section.

Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling does not occur above or below the culvert and water can continue to flow as necessary.

All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance. Any watercourse crossings requiring in channel works will be installed during a permitted period in accordance and with Inland Fisheries Ireland best practice (IFI, 2016). This will ensure no potential impacts on spawning habitat.

The typical construction methodology for the installation of a pre-cast concrete clear-span bridge is presented below:

- The access road on the approach to the watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of the watercourse crossing.
- All drainage measures along the site road will be installed in advance of the works.

- The abutment will consist of concrete panels which will be installed on a concrete lean mix foundation to provide a suitable base. The base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry concrete lean mix. The base will be excavated along the stream bank with no instream works required.
- Access to the opposite side of the river for excavation and foundation installation will require the installation of pre-cast concrete slab across the river to provide temporary access for the excavator.
- All pre-cast concrete panels and slabs/beams will be installed using a crane which will be set up on the southern side of the stream and will be lifted into place from the stream bank with no contact with the watercourse.
- A concrete deck will be poured over the beams/slabs which span across the river. This will be shuttered, sealed and water tested before concrete pouring can commence. The deck will be leak tested before concrete pouring can commence.
- Once the culvert is in position stone backfill will be placed and compacted against the culvert up to the required level above the foundations.

When the concrete beams are cured the filling and compaction of the road will be completed. The road finish level will be decided by the Project Engineer.

All new crossings and upgrades to existing crossings will be completed as follows:

- The access road on the approach watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of the watercourse crossing.
- The installation of the culvert will take place in low flow conditions.
- Where a flow exists, the water running through the watercourse channel will be pumped around the water crossing location and back into the watercourse channel downstream of the works area.
- Where over pumping is required, measures will be taken to ensure that the pumped water discharge does not disturb the channel bed with the force of water from the discharge. A steel plate to reduce the force of the flow will be used where appropriate.
- The project engineer will determine the required gradient of the culvert. The culvert must be laid at a gradient that will ensure water is contained within the culvert at all times. Where necessary a rock armour dam will be installed within the channel to reduce flow and ensure an acceptable depth of water remains within the culvert. Where a gradient of 1 – 1.5% is identified, the use of a baffle has been recommended.
- The bed of the watercourse channel will be excavated, if necessary, to achieve the correct line and to allow the culvert to be embedded 300mm into the base of the existing drain.
- The embedded section will be allowed to fill naturally with existing material within the base of the drain or with suitable drainage material such as gravel or round shingle where deemed applicable.
- The culvert will be lowered into place using an excavator with a lifting mechanism.
- Large stone boulders (approx. 400mm), sourced from the on-site borrow pits, will be placed over the culvert to create a headwall for the culvert and a suitable sub-base for road construction.
- Smaller 50mm stone sourced on site will be placed upon the sub-base to construct the road over the water crossing.

The works will be undertaken in line with NRA *Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes*.

Proposed Mitigation Measures for watercourse crossings are detailed below as detailed in Section 9.5 of the EIAR and are summarised as follows:

- All proposed new stream crossings will be bottomless or clear span culverts and the existing banks will remain undisturbed. No in-stream excavation works are proposed and therefore there will be no direct impact on the stream at the proposed crossing location;
- Where the proposed underground cabling route follows an existing road or road proposed for upgrade, the cable will pass over or below the culvert within the access road;
- All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed crossings;
- As a further precaution, near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document “Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites”, i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);
- During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,
- All new river/stream crossings will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

All of the above works will be supervised by the Environmental Clerk of Works (ECoW) and the Project Hydrologist.

2.2.2.13 Transport Route Accommodation Works

Turbine delivery route accommodation works are required at various locations as outlined in Section 14 of the EIAR. Required works along the transport route are minor and are all located within the existing road corridor. The construction methodology of the turbine delivery accommodation works is outlined as follows:

- Overburden within the required areas for the accommodation works will be excavated and temporarily stockpiled adjacent to the works area, where possible, until a competent stratum is reached.
- Any excess excavated overburden will be removed from the works area to the on-site peat management areas or a licensed tip or, if suitable, stockpiled and reused for backfilling where appropriate.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum to provide further structural formation, if required.
- The competent stratum will be overlain with granular fill sourced from the on-site borrow pit or local quarries.
- A final surface running layer will be placed over the granular fill to provide a suitable surface to accommodate the turbine delivery/abnormal load vehicles.
- The temporary accommodation areas along the turbine delivery route will only be used by the turbine delivery/abnormal load vehicles and other vehicles associated with the delivery process.
- The temporary accommodation areas when not in use will be cordoned off from the public road, using bollards, where boundary walls, hedgerows or ditches have been removed.

- Upon completion of the turbine delivery phase, the granular surface of the accommodation works location will remain in place. All kerbing, barriers and boundary fencing will be reinstated.

Leaving the granular fill and final surface running layer in place within the accommodation areas will allow these to be used again in the future should it become necessary (i.e. at decommissioning stage for turbine removal, or in the unlikely event of having to swap out a blade component during the operational phase). Should this be required the boundary treatments will again be temporarily removed and managed as set out above.

An outline of the traffic management proposals are presented in Section 3.9 of this CEMP. A detailed Traffic Management Plan, will be provided specifying details relating to traffic management and included in the CEMP prior to the commencement of the construction phase of the Proposed Development.

2.2.3 Decommissioning

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 30 years. Following the end of their useful life, the equipment may be replaced with a new technology, subject to planning permission being obtained, or the Proposed Development may be decommissioned fully.

Upon decommissioning of the Proposed Development, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with the same model of cranes that were used for their erection. The turbine will be removed from site using the same transport methodology adopted for delivery to site initially. The turbine materials will be transferred to a suitable recycling or recovery facility.

All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in environment emissions such as noise, dust and/or vibration.

Site roadways could be in use for purposes other than the operation of the development by the time the decommissioning of the Proposed Development is to be considered, and therefore it may be more appropriate to leave the site roads in situ for future use. It is envisaged that the roads will provide a useful means of extracting the commercial forestry crop which exists on the site. If it were to be confirmed that the roads were not required in the future for any other useful purpose, they could be removed where required.

The electrical cabling connecting the Slieveacurry Renewable Energy Development to the existing 110kV substation in the townland of Knockalassa will be removed from the underground cable ducting at the end of the useful life of the renewable energy development. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance for an underground element that is not visible.

A Decommissioning Plan has been prepared (Appendix 4-8) the detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time. The potential for effects during the decommissioning phase of the proposed renewable energy development has been fully assessed in the EIAR.

3. ENVIRONMENTAL MANAGEMENT

3.1 Introduction

This CEMP includes all best practice measures required to construct the proposed renewable energy development. The drainage proposals will be developed further prior to the commencement of construction however, any such improvements will be in line with the principles set out here and will also be in full compliance with the planning consent and mitigation measures as presented in the EIAR, NIS and all other relevant planning documents. The following sections give an overview of the drainage design principles, dust and noise control measures and a waste management plan for the site.

3.2 Protecting Water Quality

3.2.1 Environmental Management in the Construction Phase

Timing of works can strongly influence the potential for damaging the freshwater environment. Operations during wetter periods of the year pose a significantly greater risk of causing erosion and siltation, which can be particularly severe following major rainfall or snowmelt events. Traditionally, wind farm construction undertaken during the drier summer months would result in significantly less erosion and siltation. Construction activities in the hydrological buffer zones shall be avoided during or after prolonged rainfall or an intense rainfall event and work will cease entirely near watercourses when it is evident that water quality is being impacted. Given that this site has an established drainage network and existing watercourse crossing points, there will be minimal impacts on watercourses.

3.2.2 Site Drainage Principles

The site drainage features have been outlined in Section 4.6 of the EIAR for the Proposed Development. The protection of the watercourses within and surrounding the site, and downstream catchments that they feed is of utmost importance in considering the most appropriate drainage proposals for the site of the Proposed Development. No routes of any natural drainage features will be altered as part of the Proposed Development. Turbine locations and associated new roadways were originally selected to avoid natural watercourses, and existing roads are to be used wherever possible. The Proposed Development has where possible, been kept a minimum of 50 metres from natural watercourses. There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows. Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Development.

A detailed drainage design for the project will be prepared prior to the commencement of construction to by the Project Hydrologist to incorporate these site drainage principles and carry forward into the construction phase of the project.

Existing artificial drains in the vicinity of existing site roads will be maintained in their present location where possible. If it is expected that these artificial drains will receive drainage water from works areas, check dams will be added (as specified below) to control flows and sediment loads in these existing artificial drains. If road widening or improvement works are necessary along the existing roads, where possible, the works will take place on the opposite side of the road to the drain.

3.2.3 Legislation and Best Practice Guidance

The drainage design presented in the EIAR and Planning Application documents has been prepared based on experience of the project team of other renewable energy sites in peat-dominated environments, and the number of best practice guidance documents.

There is no one guidance document that deals with drainage management and water quality controls for wind farm and other renewable energy developments. However, a selection of good practice approaches have been adopted in preparation of this CEMP, and these are taken from the various best practice guidance documents listed below. These relate to infrastructure and operational works on forested sites, forest road design, water quality controls for linear projects, forestry road drainage and management of geotechnical risks. To achieve best practice in terms of water protection through construction management, the detailed drainage design and all drainage management proposals shall be prepared in accordance with guidance contained in the following:

- Institute of Geologists Ireland (2013): *Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements*;
- National Roads Authority (2008): *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*;
- Department of Environment, Heritage and Local Government (2006): *Wind Energy Development Guidelines for Planning Authorities*;
- Institute of Geologists Ireland (2013): *Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements*;
- Forestry Commission (2004): *Forests and Water Guidelines*, Fourth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte (2009): *Forest Operations & Water Protection Guidelines*;
- Forest Services (Draft) *Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures*;
- Forest Service (2000): *Forestry and Water Quality Guidelines*. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford;
- COFORD (2004): *Forest Road Manual – Guidelines for the Design, Construction and Management of Forest Roads*;
- *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters* (Inland Fisheries Ireland, 2016);
- Inland Fisheries Ireland (2016): *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*;
- Scottish Natural Heritage (2010): *Good Practice During Wind Farm Construction*;
- CIRIA (Construction Industry Research and Information Association) (2006): *Guidance on ‘Control of Water Pollution from Linear Construction Projects’* (CIRIA Report No. C648, 2006);
- CIRIA 2006: *Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors* (CIRIA C532, 2006).
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (DoHPLG, 2018); and,
- *Guidance on the preparation of the EIA Report* (Directive 2011/92/EU as amended by 2014/52/EU), (European Union, 2017).

3.2.4 Site Drainage Design and Management

The proposed site drainage features for this site are outlined in Section 4.6 of the EIAR. As this CEMP is a working document and is presented as an Appendix to the EIAR, the drainage measures are not included in this document. When the final CEMP report is prepared, and presented as a standalone document, all drainage measures will be included in that document. These drainage proposals will be developed further prior to the commencement of construction as part of the detailed drainage design.

The following sections give an outline of drainage management arrangements in terms of pre-construction, construction and operational phases of the Proposed Development.

3.2.4.1 Pre-Construction Drainage

Prior to commencement of works in sub-catchments across the site, main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage. It is proposed to complete these inspections on a catchment by catchment basis as the construction works develop across the site, as works in all areas will not commence simultaneously.

Drainage and associated pollution control measures will be implemented onsite before the main construction works commence. Where possible drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of impact on surface waters by suspended sediment released during construction and entrained in surface run-off.

3.2.4.2 Construction Phase Drainage

The Project Hydrologist will complete a detailed drainage design and maintenance plan before construction commences and will attend the site to set out and assist with micro-siting of proposed drainage controls as outlined in Section 4.6 of the EIAR. The drainage system will be excavated and constructed in conjunction with the road and hard standing construction. Drains will be excavated and stilling ponds constructed to eliminate any suspended solids within surface water running off the site. Drainage infrastructure will include:

- Interceptor drains will be maintained up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader.
- Swales/roadside drains will be maintained to intercept and collect runoff from access roads and hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to stilling ponds for sediment settling;
- Check dams will be maintained at regular intervals along interceptor drains and swales/roadside drains in order to reduce flow velocities and therefore minimise erosion within the system during storm rainfall events; and,
- Stilling ponds/settlement ponds, emplaced downstream of swales and roadside drains, 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. The stilling ponds will be sized according to the size of the area they will be receiving water from but will be sufficiently large to accommodate peak flows storm events. Inspection and maintenance of all settlement ponds will be ongoing through the construction period.

Best practice and practical experience on other similar projects suggests that in addition to the drainage plans that are included in the EIAR, there are additional site based decisions and plans that can only be made in the field through interaction between the Site Construction Manager, the Project Hydrologist and the Project Geotechnical Engineers. The mechanisms for interaction between these are outlined within Section 4 of this CEMP.

In relation to decisions that are made on site it is important to stress that these will be implemented in line with the associated drainage controls and mitigation measures outlined in Section 6 below, and to ensure protection of all watercourses.

3.2.4.3 Operational Phase Drainage

The Project Hydrologist will inspect and review the drainage system after construction has been completed to provide guidance on the requirements of an operational phase drainage system. This operational phase drainage system will have been installed during the construction phase in conjunction with the road and hardstanding construction work as described above and in Section 4.6 of the EIAR.

The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.

3.2.4.4 Preparative Site Drainage Management

The detailed drainage design will specify all materials and equipment necessary to implement the drainage measures effectively, which will be brought on site in advance of any works commencing.

An adequate quantity of straw bales, clean stone, terram, stakes, etc. will be kept on site at all times to implement the detailed drainage design measures as necessary. The detailed drainage measures will be installed prior to, or at the same time as the works they are intended to drain.

3.2.4.5 Pre-emptive Site Drainage Management

The works programme for the groundworks part of the construction phase of the project will also take account of weather forecasts and predicted rainfall. The site Construction Manager is responsible for making the decision to postpone or abandon works. Large excavations and movements of overburden or large-scale overburden or soil stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

3.2.4.6 Reactive Site Drainage Management

In line with the requirements of the EIAR, the final drainage design prepared for the site must provide for reactive management of drainage on site. The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the ECoW on-site.

The contractor is solely responsible for the implementation of the detailed drainage design on site. The ECoW is responsible for monitoring the effectiveness of the drainage design as it is implemented on-site.

The ECoW with the support of the Project Hydrologist, will monitor the effectiveness of the on-site drainage during changing weather, ground or drainage conditions encountered on site. Where it appears that additional drainage measures will be required to ensure the drainage system remains effective, the ECoW will notify the contractor, the developer and project design team including the Project Hydrologist.

This may require the revisions to the detailed drainage design, including but not limited to the installation of additional check dams, interceptor drains or swales as deemed necessary on-site. The drainage design may have to be modified on the ground as necessary, and the modifications will draw on the various features outlined above in whatever combinations are deemed to be most appropriate to situation on the ground at a particular time.

In the event that works are giving rise to siltation of watercourses, the ECoW or Project Hydrologist will have the necessary authority to instruct the Construction Manager to stop all works in the immediate area around where the siltation is evident. The source of the siltation will be identified and additional drainage measures such as those outlined above will be installed in advance of works recommencing.

3.2.4.7 Rainfall Forecasting and Monitoring

Accurate forecasting and monitoring of rainfall is critical to the successful pre-emptive and reactive site drainage management as outlined in the subsections above.

Rainfall forecasts will be obtained for the nearest forecast reference point available via the www.yr.no weather forecasting website. The reference location will be that of The Hand Cross Roads (<https://www.yr.no/en/forecast/daily-table/2-2963821/Ireland/Munster/Co%20Clare/The%20Hand%20Cross%20Roads>).

Construction personnel will be required to check the forecasted rainfall for the days ahead and plan for or suspend planned works accordingly. The forecasted rainfall should be recorded for reference and comparison with the rainfall levels to be recorded on-site.

Actual rainfall will be monitored on site, ideally via an automated rain gauge with regular recording intervals recommended by the Project Hydrologist and a means of alerting the construction personnel of rainfall trigger levels. The recorded rainfall data should be available on site at all times for review by the ECoW, Project Hydrologist or any regulatory authorities. The appointed contractor will be required to outline their proposed means of recording rainfall on site to the satisfaction of the ECoW and the Project Hydrologist prior to commencement of works.

3.3 Cable Trench Drainage

Cable trenches are typically developed in short sections, thereby minimising the amount of ground disturbed at any one time and minimising the potential for drainage runoff to pick up silt or suspended solids. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences.

To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the upgradient side of the trench. Should any rainfall cause runoff from the excavated material, the material is contained in the downgradient cable trench. Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Development, would be used for landscaping and reinstatements of other areas elsewhere on site.

On steeper slopes, silt fences, as detailed in Section 4.6 of the EIAR will be installed temporarily downgradient of the cable trench works area, or on the downhill slope below where excavated material is being temporarily stored to control run-off.

3.4 Refuelling, Fuel and Hazardous Materials

The following mitigation measures are proposed to avoid release of hydrocarbons at the site:

- Road-going will be refuelled off site wherever possible;
- On-site refuelling will take carried out at designated refuelling areas at various locations throughout the site. Machinery will be refuelled directly by a fuel truck that came to site as required
- All other refuelling was carried out using a mobile double skinned fuel bowser which will be parked on a level area in the construction compound when not in use;
- 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.
- Fuels volumes stored on site should be minimised. Any fuel storage areas will be banded appropriately for the fuel storage volume for the time period of the

- construction and fitted with a storm drainage system and an appropriate oil interceptor;
- The electrical substation compound will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- The plant used will be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages will be developed (refer to Section 5) Spill kits will be available to deal with and accidental spillage in and outside the refuelling area.
- A programme for the regular inspection of plant and equipment for leaks and fitness for purpose will be developed at the outset of the construction phase.

3.5 Tree Felling

Mitigation measures will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses. These measures are derived from best practice guidance documents as outlined below and in Section 9 of the EIAR. A Harvest Management Plan is included in Appendix 4-6 of the EIAR to include peatland restoration to be undertaken in areas where permanent felling is proposed around turbines.

3.5.1 Forestry Felling Drainage Measures

Tree felling to facilitate the Proposed Development will not be undertaken simultaneously with construction groundworks. Keyhole felling to facilitate construction works will take place prior to groundworks commencing. Some further turbulence felling may take place after all groundworks have been completed but while turbines are being commissioned.

Permanent felling will be undertaken in and around the footprint of the proposed development (i.e. access roads, turbines etc). Temporary felling will be carried out around all turbines to reduce turbulence effects or bat mitigation. Tree stumps will only be removed in areas around the proposed development footprint. During tree felling there is a potential to generate peat particles and silts in surface water runoff due to tracking of machinery and disturbance of the peat surface etc, however mitigation is provided in Section 9.5.2.1 of Chapter 9 Water with regard surface water quality protection for this activity which is summarised below. Also, prior to the commencement of tree felling for subsequent road construction the following key temporary drainage measures will be installed:

- All existing dry forestry drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using forestry check dams/silt traps;
- Clean water diversion drains will be installed upgradient of the works areas;
- Check dams/silt fence arrangements (silt traps) will be placed in all existing forestry drains that have surface water flows and also along existing forestry 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.

Before the commencement of any felling works, an ECoW shall be appointed to oversee the keyhole and extraction works. The ECoW shall be experienced and competent, and shall have the following functions:

- Attend the site for the setup period when drainage protection works are being installed and be present on site during the remainder of the forestry keyhole felling works.
- Prior to the commencement of works, review and agree the positioning by the Operator of the required Aquatic Buffer Zones (ABZs), silt traps, silt fencing (see

- below), water crossings and onsite storage facilities for fuel, oil and chemicals (see further below).
- Be responsible for preparing and delivering the Environmental Toolbox Talk (TBT) to all relevant parties involved in site operations, prior to the commencement of the works.
 - Conduct daily and weekly inspections of all water protection measures and visually assess their integrity and effectiveness in accordance with Section 3.4 (Monitoring and Recording) and Appendix 3 (Site Monitoring Form (Visual Inspections)) of the of the *Forestry & Freshwater Pearl Mussel Requirements*.
 - Take representative photographs showing the progress of operation onsite, and the integrity and effectiveness of the water protection measures.
 - Collect water samples for analysis by a 3rd party accredited laboratory, adhering to the following requirements:
 - Surface water samples shall be collected upstream and downstream of the keyhole felling site at suitable sampling locations.
 - Sampling shall be taken from the stream / river bank, with no in-stream access permitted.
 - Review of operator's records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions.
 - Prepare and maintain a contingency plan.
 - Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the ECoW.

All relevant measures set out in the Forestry Water Quality Guidelines, Forest Harvesting & the Environment Guidelines and the Forest Protection Guidelines will apply. To protect watercourses, the following measures will be adhered to during all keyhole/tree felling activities.

- Works will be overseen by an ECoW as described above.
- The extent of all necessary tree felling will be identified and demarcated with markings on the ground in advance of any felling commencing.
- All roads and culverts will be inspected prior to any machinery being brought on site to commence the felling operation. No tracking of vehicles through watercourses will occur. Vehicles will only use existing road infrastructure and established watercourse crossings.
- All drainage measures prescribed in the detailed drainage design for the project will be implemented around the works area;
- Machine combinations will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance;
- Mechanised operations will be suspended during and immediately after heavy rainfall.
- Where brash is required to form brash mats, it is to be laid out at harvesting stage to prevent soil disturbance by machine movement.
- Brash which has not been pushed into the soil may be moved within the site to facilitate the creation of mats in more demanding locations.
- Felling of trees will be pointed directionally away from watercourses.
- Felling will be planned to minimise the number of machine passes in any one area.
- Extraction routes, and hence brash mats, will be aligned parallel to the ground contours where possible.
- Harvested timber will be stacked in dry areas, and outside any 50-metre watercourse buffer zone. Straw bales and check dams to be emplaced on the down gradient side of timber storage sites.
- Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but removing of natural debris deflectors will be avoided.

Table 3-1 Minimum Buffer Zone Widths (Forest Service, 2000)

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%)	10 m	15 m
Steep	(15 – 30%)	15 m	20 m
Very steep	(>30%)	20 m	25 m

3.6

Cement Based Products Control Measures

The following mitigation measures are proposed to avoid release of cement leachate from the site:

- No batching of wet-cement products will occur on site;
- The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout of trucks and discussing emergency procedures.
- Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place. Where possible pre-cast elements for culverts and concrete works will be used;
- No washing out of any plant used in concrete transport or concreting operations will be allowed on-site;
- Where concrete is delivered on site, only chute cleaning will be permitted, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- Use weather forecasting to plan dry days for pouring concrete;
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event;
- The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a concrete washout area, typically built using straw bales and lined with an impermeable membrane. below. The areas are generally covered when not in use to prevent rainwater collecting. In periods of dry weather, the areas can be uncovered to allow much of the water to be lost to evaporation. At the end of the concrete pours, any of the remaining liquid contents is tankered off-site. Any solid contents that will have been cleaned down from the chute will have solidified and can be broken up and disposed of along with other construction waste.

The 50 m wide river buffer zone and 20 m existing artificial drainage buffer will be in place for the duration of the construction phase. No construction activity will occur within the buffer zone with the exception of bridge and culvert construction. The buffer zone will:

- Prevent any cement-based products accidentally entrained in the construction phase drainage system entering directly into watercourses, achieved in part by ending drain discharge outside the 50 m buffer zone and allowing percolation across the vegetation of the buffer zone;
- Provide a buffer against accidental direct pollution of surface waters by any pollutants, or by pollutants entrained in surface water run-off.



Plate 3-1 Typical concrete wash out areas

3.7 Peat Management

3.7.1.1 Peat and Spoil Usage in Restoration of Borrow Pits

Once excavated, peat will be temporarily stored in localised areas adjacent to excavations for roads and hardstands before being placed into the permanent peat storage areas within the borrow pits. All temporary storage areas will be upslope of founded roads/hardstands and will be inspected by a suitably qualified person before material is stored in the area.

Once the required volume of rock has been extracted from the borrow pit areas, it is intended to reinstate these areas with any surplus peat and overburden excavated from the works areas of the Proposed Development.

The general construction methodology for the construction of the borrow pits, as presented in Fehily Timoney's Peat & Spoil Management Plan in Appendix 4-2 of the EIAR, is summarised below. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

As rock is being extracted from the borrow pit, upstands of rock will be left in place, depending on the type of rock, to act as intermediate retaining buttresses. Where this is not achievable, stone buttresses will be constructed within the borrow pit. The upstands or buttresses will form individual restoration areas within the borrow pit which will be filled once the required volume of rock has been extracted from each individual area. The buttresses will be wide enough to allow construction traffic access for the tipping of peat and spoil into the individual cells.

A temporary access track will be placed around the perimeter of the borrow pit area to allow for the tipping of material over the edge of the borrow pit area. The placement of peat and spoil within the borrow pits will likely require the use of long reach excavators, low ground pressure machinery and possibly bog mats in particular for drainage works.

The following particular recommendations/best practice guidelines for the placement of peat & in borrow pits should be considered and taken into account during construction.

- The borrow pits will be enclosed depressions and drainage from these areas will be managed effectively using temporary pumping arrangements and settlement ponds.
- Where possible, the surface of the placed peat & spoil should be shaped to allow efficient run-off of surface water from borrow pit areas.
- Silting ponds (settlement ponds) may be required at the lower side/outfall location of the borrow pits.
- The settlement ponds at the borrow pits will be designed to allow 24hr retention.
- A layer of geogrid to strengthen the surface of the placed peat & spoil within the borrow pits may be required.

- Infilling of the peat & spoil should commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress. The contractor excavating the rock will be required to develop the borrow pits in a way which will allow the excavated peat & spoil to be placed safely.
- The height of the rock buttresses constructed should be greater than the height of the placed peat & spoil to prevent any surface peat & spoil run-off. Buttresses up to 5m in height are likely to be required.

3.7.1.2 Placement of Peat & Spoil along access Roads

In some areas of the site of the Proposed Development excavated materials will be placed alongside the access roads. The following recommendations/best practice guidelines for the placement of peat and spoil alongside the access road will be adhered to during the construction of the Proposed Development:

- The potential spoil placement area locations identified are alongside the proposed access roads in the northeast and east of the site where the topography is typically flat (<5 °). The placement of spoil alongside the access roads should be restricted to areas where the peat depth is less than 1.5m.
- Given the relatively flat topography present at the northeast and eastern part of the site, the placement of peat and spoil alongside the access roads is deemed appropriate.
- The peat and spoil placed adjacent to the new proposed access roads will be restricted to a maximum height of 1m over a c.10m wide corridor on the upslope side of the access road, or both sides of the access road where the ground is flat (slope <2 °).
- The placement of excavated peat and spoil is to be avoided without first establishing the adequacy of the ground to support the load. The placement of peat and spoil within the placement areas will likely require the use of long reach excavators, low ground pressure machinery and possibly bog mats in particular for drainage works.
- Where there is any doubt as to the stability of the peat surface then no material shall be placed on to the peat surface. The risk of peat instability is reduced by not placing any loading onto the peat surface.
- The surface of the placed peat and spoil will be shaped to allow efficient run-off of surface water. Shaping of the surface of the peat and spoil should be carried out as placement of peat and spoil within the placement area progresses. This will reduce the likelihood of debris run-off and ensure stability of the placed peat and spoil.
- Finished/shaped side slopes in the placed peat and spoil shall be not greater than 1 (v): 2 (h) (for spoil) or 1 (v): 3 (h) (for peat). This slope inclination will be reviewed during construction, as appropriate. Where areas of weaker peat and spoil are encountered then slacker slopes will be required.
- Where possible, the acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the placed peat and spoil within the placement areas.
- No peat or spoil shall be sidecast in buffer zones adjacent to watercourses.
- Movement monitoring instrumentation may be required adjacent to the access road where peat has been placed. The locations where monitoring is required will be identified by the designer on site.
- Supervision by a geotechnical engineer or appropriately competent person is recommended for the works.
- An interceptor drain will be installed upslope of the designated peat placement areas to divert any surface water away from these areas. This will help ensure stability of the placed peat and reduce the likelihood of debris run-off.
- All the above mentioned general guidelines and requirements should be confirmed by the designer prior to construction.

The management of excavated peat and overburden and the methods of placement and/or reinstatement are described in detail in FT's Peat and Spoil Management Plan in Appendix 4-2 of the EIAR and should be considered when preparing Construction Method Statements for the proposed development.

3.8 Peat Stability Management

Peat instability or failure refers to a significant mass movement of a body of peat that would have an adverse impact on wind farm development and the surrounding environment. Peat failure excludes localised movement of peat that could occur below an access road, creep movement or erosion type events. In the absence of appropriate mitigation, the consequence of peat failure at the study area may result in:

- Death or injury to site personnel;
- Damage to machinery;
- Damage or loss of access tracks;
- Drainage disrupted;
- Site works damaged or unstable;
- Contamination of watercourses, water supplies by sediment particulates; and,
- Degradation of the environment.

3.8.1 General recommendations for Good Construction Practice

The peat stability assessment undertaken at the planning application stage indicated that there is insignificant risk of peat failure, although drainage mitigation measures would be required to prevent the build-up of water in the peat and reduce the risk of failure (FT, 2021).

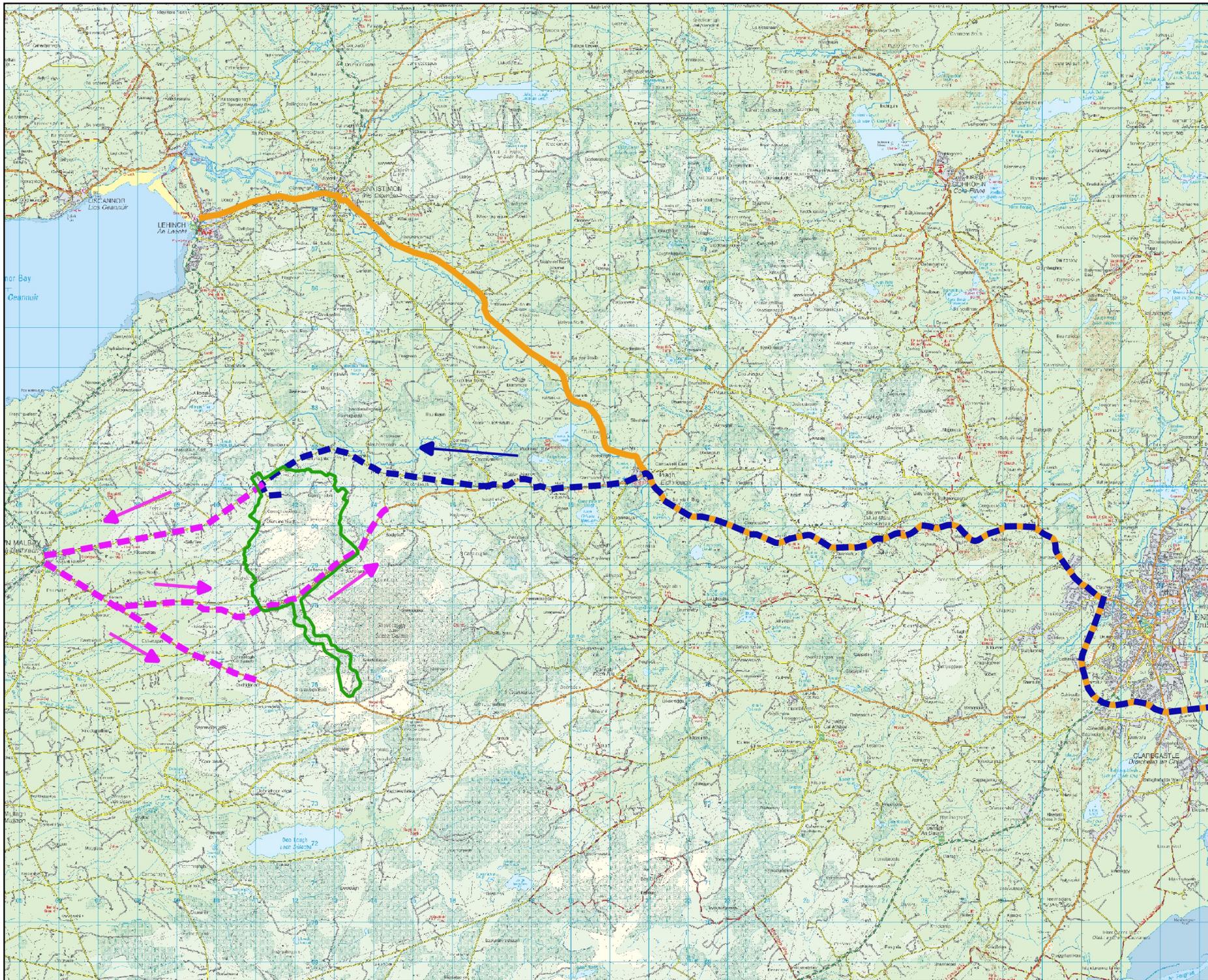
The following geotechnical control measures were recommended in the Peat Stability Assessment (FT, 2021) included in Appendix 8-1 of the EIAR, and should be factored into the detailed design and geotechnical risk registers being prepared for the construction stage of the project.

- Maintain hydrology of area as far as possible;
- Use of experienced geotechnical staff for site investigation;
- Use of experienced contractors and trained operators to carry out the work;
- Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

The project design engineer/ geotechnical engineer will be responsible for bringing forward all peat stability and peat and spoil management recommendations/requirements from the planning application documents and incorporating them into the geotechnical and engineering designs for the construction phase of the project. The geotechnical and peat stability design requirements of the project are not within the scope of the CEMP.

3.9 Traffic Management

This section of the CEMP provides an outline of the traffic management proposals for the construction phase of the proposed development. In the event planning permission is granted for the Proposed Development, the final Traffic Management Plan will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned.



Map Legend

- EIAR Site Boundary
- N85
- Turbine Delivery Route & Construction Haul Route
- Construction Haul Route



Drawing Title

Turbine Delivery and Construction Haul Route

Project Title
Slieveacurry Renewable Energy Development, Co. Clare

Drawn By: **Ellen Costello** Checked By: **Michael Watson**

Project No.: **170224c** Drawing No.: **Figure 3-1**

Scale: **1:125000** Date: **26.10.2021**



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3.9.1 Turbine and Materials Transport Route

It is proposed that large wind turbine components will be delivered to the site of the Proposed Development, from Dublin Port, Foynes Port or Galway Port, via the N85 National Secondary Road. From Ennis the turbines will be transported northwest along the N85 National Secondary Road to Inagh before turning left on to the R460 Regional Road and transported west for 4.2km to the junction with the L1074 Local Road. The turbines will be transported west/northwest for 4.2km before turning left onto a local road at Fahabeg. At Fahabeg, the turbines will be transported southwest for 2km after which the route will take a sharp left onto a local road approaching the proposed renewable energy development site from the northwest.

Construction materials such as concrete, steel and construction materials will follow the same transport route as the wind turbines from the National Road network to the Proposed Development site. All deliveries of turbine components and other construction materials to the site will only be via the proposed transport route outlined in Figure 3-1. All deliveries will access the site via this haul route for the duration of construction as per the programme outlined in Section 8 below. All deliveries of construction materials to the site will take place within the defined working hours of 7am – 7pm. It may be necessary on occasion, to commence works before 7am where concrete pours will be required to start earlier due to the volume of concrete required and the location of the concrete pour relative to the concrete supplier's batching plant. Main pours will be planned days and weeks in advance and will ensure disruption to work and school related traffic is avoided. The locations of all turbine foundations where large concrete pours will take place are off the public road and will be accessed by the internal site roads and will therefore eliminate the potential for queuing of trucks on the adjoining public road network. The typical vehicle type for delivery of construction materials to site with the exception of the wind turbines will be with standard heavy goods vehicles (HGV).

A detailed traffic and transport management plan for turbine delivery will be prepared by the haulage company, when appointed and will be submitted to Clare County Council for approval. The plan will include:

- A delivery schedule.
- A schedule of control measures for exceptional wide and heavy loads.
- Details of temporary works or any other minor alteration identified.
- A dry run of the route using vehicles with similar dimensions.

The deliveries of turbine components to the site will be made in convoys of three to four vehicles at a time, and mostly at night when roads are quietest. Convoys will be accompanied by escorts at the front and rear operating a “stop and go” system. Although the turbine delivery vehicles are large, they will not prevent other road users or emergency vehicles passing, should the need arise. The delivery escort vehicles will ensure the turbine transport is carried out in a safe and efficient manner with minimal delay or inconvenience for other road users. It is not anticipated that any section of the local road network will be closed during transport of turbines, although there will be some delays to local traffic at pinch points. During these periods it may be necessary to operate local diversions for through traffic. All deliveries comprising abnormally large loads will be made outside the normal peak traffic periods to avoid disruption to work and school-related traffic.

Prior to the Traffic Management Plan for turbine delivery being finalised, a full dry run of the transport operation along the route will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. This dry run will inform the final traffic management plan. All turbine deliveries will be provided for in a transport management plan which will have to be prepared in advance of the turbine delivery stage, when the exact transport arrangements are known, delivery dates confirmed and escort proposals in place. Such a transport management plan is typically submitted to the Planning Authority for agreement in advance of any abnormal loads using the local roads, and will provide for all necessary safety measures, including a convoy and Garda escort as required, off-peak turning/reversing movements and any necessary safety controls.

The roads and bridges all haul route will be subject to a condition survey by a suitably qualified engineer both before and after construction. Protection measures for such infrastructure as specified by the appointed engineers report will be implemented in full prior to construction.

Where any temporary accommodation works are required along turbine haul route these areas will be reinstated to original condition after deliveries have been completed. In the event of construction damage arising on any roads or bridges along the haul route it will be rectified immediately by the developer under consultation with the relevant roads engineer.

Prior to the delivery of oversized loads, the developer will engage with the local community to provided information on the scale, time and duration of such deliveries. This information will be informed by pre-delivery surveys which will be completed by the suppliers. This information along with any other information relevant to the project will be relayed to the local community by information leaflet and a website if deemed necessary. In addition, complaints will be documented in the site complaints log and the Site Environmental Clerk of Works will arrange to meet with those affected. The situation will be acted upon immediately and reviewed by the Project Manager.

3.10 Dust Control

Construction dust can be generated from many on-site activities such as excavation and backfilling. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e. soil, sand, peat, etc. and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Construction traffic movements also have the potential to generate dust as they travel along the haul route.

Proposed measures to control dust include:

- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- The designated public roads outside the site and along the main transport routes to the site will be regularly inspected by the ECoW for cleanliness, and cleaned as necessary;
- Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind;
- Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods;
- Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions;
- The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary;
- All construction related traffic will have speed restrictions on un-surfaced roads to 15 kph;
- Daily inspection of construction sites to examine dust measures and their effectiveness.
- The site access roads will be checked weekly for damage/potholes and repaired as necessary.
- When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper; and,
- All vehicles leaving the construction areas of the site will pass through a wheel washing area prior to entering the local road network.

3.11 Noise Control

The operation of plant and machinery, including construction vehicles, is a source of potential impact that will require mitigation at all locations within the site. Proposed measures to control noise include:

- Diesel generators will be enclosed in sound proofed containers to minimise the potential for noise impacts;
- Plant and machinery with low inherent potential for generation of noise and/or vibration will be selected. All construction plant and equipment to be used on-site will be modern equipment and will comply with the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations;
- Regular maintenance of plant will be carried out in order to minimise noise emissions. Particular attention will be paid to the lubrication of bearings and the integrity of silencers;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the works;
- Compressors will be of the “sound reduced” 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;
- Machines, which are used intermittently, will be shut down during those periods when they are not in use;
- Training will be provided by the ECoW to drivers to ensure smooth machinery operation/driving, and to minimise unnecessary noise generation; and,
- Local areas of the haul route will be condition monitored and maintained, if necessary.

3.12 Invasive Species Management

A baseline invasive species survey will be carried out at the site to identify the presence and location of any invasive species (listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) by a suitably qualified ecologist. If the presence of such species is found at or adjacent to the site, particularly in areas where its excavation may be required, an invasive species management plan will be prepared for the site to prevent the introduction or spread of any invasive species within the footprint of the works. An invasive species management plan, if required, will set out best practice control methods as summarised in the following sections.

3.12.1 Site Management

Careful preparation of the site and planning of the works is crucial to successful treatment of invasive species. The following list of guidelines, which is not exhaustive, shall be followed by all on-site personnel. Only those who have been inducted into biosecurity measures on-site may enter the contaminated zones within the works areas. Should any risk of contaminated material escaping be observed by the site management, the management plan for the site must be amended by an appropriately qualified person to mitigate against the risk.

3.12.2 Establish Good Site Hygiene

The following measures are proposed to establish good site hygiene to ensure the control of any potential spread of invasive species during construction works:

- A risk assessment and method statement must be provided by the Contractor prior to commencing works.
- Fences will be erected around areas of infestation, as confirmed by test pits, and warning signs shall be erected.
- A designated wash-down area will be created, where power-washed material from machinery can be contained, collected and disposed of with other contaminated material. This area will contain a washable membrane or hard surface.
- Stockpile areas will be chosen to minimise movement of contaminated soil.
- Stockpiles will be marked and isolated.

- Contaminated areas which will not be excavated will be protected by a root barrier membrane if they are likely to be disturbed by machinery. Root barrier membranes will be protected by a layer of sand above and below and topped with a layer of hardcore.
- The use of vehicles with caterpillar tracks within contaminated areas will be avoided to minimise the risk of spreading contaminated material.
- An ECoW/suitably qualified ecologist will be on site to monitor and oversee the implementation of invasive species management plans.

Plant and equipment which is operated within an area for the management of materials in contaminated areas should be decontaminated prior to relocating to a different works area. The decontamination procedures should take account of the following:

- Personnel may only clean down if they are familiar with the plant and rhizome material and can readily identify it.
- Decontamination will only occur within designated wash-down areas.
- Vehicles will be cleaned using stiff-haired brush and pressure washers, paying special attention to any areas that might retain rhizomes e.g. wheel treads and arches.
- All run-off will be isolated and treated as contaminated material. This will be disposed of in already contaminated areas.

3.13 Waste Management

This section of the CEMP provides a waste management plan (WMP) which outlines the best practice procedures during the excavation and construction phases of the project. The WMP will outline the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Development. Disposal of waste will be seen as a last resort.

3.13.1.1 Legislation

The Waste Management Act 1996 and its subsequent amendments provide for measures to improve performance in relation to waste management, recycling and recovery. The Act also provides a regulatory framework for meeting higher environmental standards set out by other national and EU legislation.

The Act requires that any waste related activity has to have all necessary licenses and authorisations. It will be the duty of the Waste Manager on the site of the development to ensure that all contractors hired to remove waste from the site have valid Waste Collection Permits. It will then be necessary to ensure that the waste is delivered to a licensed or permitted waste facility. The hired waste contractors and subsequent receiving facilities must adhere to the conditions set out in their respective permits and authorisations.

The Department of the Environment provides a document entitled, '*Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects*' (2006). It is important to emphasise that no demolition will take place at this site, however, this document was referred to throughout the process of completing this WMP.

3.13.2 Waste Management Hierarchy

The waste management hierarchy sets out the most efficient way of managing in the following order:

Prevention and Minimisation:

The primary aim of the WMP will be to prevent and thereby reduce the amount of waste generated at each stage of the project.

Reuse of Waste:

Reusing as much of the waste generated on site as possible will reduce the quantities of waste that will have to be transported off site to recovery facilities or landfill.

Recycling of Waste:

There are a number of established markets available for the beneficial use of Construction and Demolition waste such as using waste concrete as fill for new roads.

At all times during the implementation of the WMP, disposal of waste to landfill will be considered only as a last resort.

3.13.3 Construction Phase Waste Management

3.13.3.1 Description of the Works

The construction of the development will involve the construction of 8 no. turbines, new and upgrade of site access roads, internal cabling and the underground cable route, substation, control buildings and all associated infrastructure.

The turbines will be manufactured off site and delivered to site where on site erection will occur.

The turbine foundations will consist of stone from the local quarries and a concrete base which will contain reinforcing steel. These concrete foundations will be shuttered with steel formwork specifically designed for the works and re-usable off site on similar projects.

The construction of the extension to the substation will comprise of a concrete foundation with concrete masonry blocks and a timber roof structure with roof tile or slate covering. The roof structure will be made up of prefabricated roof trusses manufactured off site to minimise timber cutting on site.

The site roads will be constructed with rock won from on-site borrow pits

The waste types arising from the construction phase of the development are outlined in Table 3-2 below.

Table 3-2 Expected waste types arising during the Construction Phase

Material Type	Example	EWC Code
Cables	Electrical wiring	17 04 11
Cardboard	Boxes, cartons	15 01 01
Composite packaging	Containers	15 01 05
Metals	Copper, aluminium, lead, iron and steel	17 04 07

Material Type	Example	EWC Code
Inert materials	Sand, stones, plaster, rock, blocks	17 01 07
Mixed municipal waste	Daily canteen waste from construction workers, miscellaneous	20 03 01
Plastic	PVC frames, electrical fittings	17 02 03
Plastic packaging	Packaging with new materials	15 01 02
Tiles and ceramics	Slates and tiles	17 01 03
Wooden packaging	Boxes, pallets	15 01 03

Hazardous wastes that may occur on site during the construction phase of the development may include oil, diesel fuel, chemicals, paints, preservatives etc. All hazardous wastes will be stored in banded containers/areas before being collected by an authorised waste contractor and brought to an EPA licensed waste facility. As mentioned above, hazardous wastes will be kept separate from non-hazardous wastes so that contamination does not occur.

3.13.3.2 Waste Arisings and Proposals for Minimisation, Reuse and Recycling of Construction waste

Construction waste will arise on the project mainly from excavation and unavoidable construction waste including material surpluses and damaged materials and packaging waste.

Appropriate measures should be taken to ensure excess waste is not generated during construction, including;

- Ordering of materials should be on an ‘as needed’ basis to prevent over supply to site. Co-ordination is required with suppliers enabling them to take/buy back surplus stock.
- Purchase of materials pre-cut to length to avoid excess scrap waste generated on site.
- Request that suppliers use least amount of packaging possible on materials delivered to the site.
- Ensuring correct storage and handling of goods to avoid unnecessary damage that would result in their disposal
- Ensuring correct sequencing of operations.
- Use reclaimed materials in the construction works.

Hazardous waste will be kept separate from all other construction waste to prevent contamination and removed appropriately.

3.13.3.3 Waste Arising from Construction Activities

All waste generated on site will be contained in waste skips at a waste storage area on site. This waste storage area will be kept tidy with skips clearly labelled to indicate the allowable material to be disposed of therein.

The expected waste volumes generated on site are unlikely to be large enough to warrant source segregation at the wind farm site. Therefore, all wastes streams generated on site will be deposited into a single waste skip. This waste material will be transferred to a Materials Recovery Facility (MRF) by a

fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal.

The waste generated from the turbine erection will be limited to the associated protective covers which are generally reusable. Considering the specialist nature of this packaging material the majority will be taken back by suppliers for their own reuse. Any other packaging waste generated from the turbine supply will be deposited into the on-site skips and subsequently transferred to the MRF.

It is not envisaged that there will be any waste material arising from the materials used to construct the site roads as only the quantity of stone necessary will be sourced from local quarries and brought on site on an 'as needed' basis.

Site personnel will be instructed at induction that under no circumstances can waste be brought to site for disposal in the on-site waste skip. It will also be made clear that the burning of waste material on site is forbidden.

3.13.4 Waste Arising from Decommissioning

The design life of the proposed renewable energy development is 30 years after which time a decision will be made to determine whether or not the turbines will be replaced by new turbines or if decommissioning will occur. The lengthy time frame between the completion of the construction phase and decommissioning will result in the only materials remaining on site at that time will be infrastructural material such as the turbine foundations, turbines and the granular material used to construct roads. If the site is decommissioned, cranes will disassemble each turbine tower and all equipment. The associated components will be removed from site for re-use, recycling or waste disposal. Any structural elements that are not suitable for recycling will be disposed of in an appropriate manner. All lubrication fluids will be drained down and put aside for appropriate collection, storage, transport and disposal. Any materials which cannot be re-used or recycled will be disposed of by an appropriately licenced contractor.

The waste types arising from the decommissioning of the development are outlined in Table 3-3 below.

Table 3-3 Expected waste types arising during the Decommissioning Phase

Material Type	Example	EW Code
Cables	Electrical wiring	17 04 11
Metals	Copper, aluminium, lead, iron and rebar	17 04 07
Inert materials	Crushed stone, concrete	17 01 07

3.13.4.1 Reuse

Many construction materials can be reused a number of times before they have to be disposed of:

- Concrete can be reused as aggregate for roads cable trench backfilling material.
- Plastic packaging etc. can be used to cover materials on site or reused for the delivery of other materials.
- Excavated material can be reused for reinstatement of the areas around turbine foundations and adjacent to site roads.

3.13.4.2 Recycling

If a certain type of construction material cannot be reused onsite, then recycling is the most suitable option. The opportunity for recycling on site will be restricted to the associated packaging from the wind turbines.

All waste that is produced during the construction phase including dry recyclables will be deposited in the on-site skip initially and sent for subsequent segregation at a remote facility. The anticipated volume of all waste material to be generated at the development is low which provides the justification for adopting this method of waste management.

3.13.4.3 Implementation

3.13.4.3.1 Roles and Responsibilities

Prior to the commencement of the development a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the objectives of the plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient authority so that they can ensure everyone working on the development adheres to the management plan.

3.13.4.3.2 Training

It is important for the Construction Waste Manager to communicate effectively with colleagues in relation to the aims and objectives of the waste management plan. All employees working on site during the construction phase of the project will be trained in materials management and thereby, should be able to:

- Distinguish reusable materials from those suitable for recycling;
- Ensure maximum segregation at source;
- Co-operate with site manager on the best locations for stockpiling reusable materials;
- Separate materials for recovery; and
- Identify and liaise with waste contractors and waste facility operators.

3.13.4.3.3 Record Keeping

The WMP will provide systems that will enable all arisings, movements and treatments of construction waste to be recorded. This system will enable the contractor to measure and record the quantity of waste being generated. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The WMP can then be adapted with changes that are seen through record keeping.

The fully licensed waste contractor employed to remove waste from the site will be required to provide documented records for all waste dispatches leaving the site. Each record will contain the following:

- Consignment Reference Number
- Material Type(s) and EWC Code(s)
- Company Name and Address of Site of Origin
- Trade Name and Collection Permit Ref. of Waste Carrier
- Trade Name and Licence Ref. of Destination Facility
- Date and Time of Waste Dispatch
- Registration no. of Waste Carrier vehicle
- Weight of Material
- Signature of Confirmation of Dispatch detail

- > Date and Time of Waste Arrival at Destination
- > Site Address of Destination Facility

3.13.4.4 **Waste Management Plan Conclusion**

The WMP will be properly adhered to by all staff involved in the project which will be outlined within the induction process for all site personnel. The waste hierarchy should always be employed when designing the plan to ensure that the least possible amount of waste is produced during the construction phase. Reuse of certain types of construction wastes will cut down on the cost and requirement of raw materials therefore further minimising waste levels.

This preliminary WMP has been prepared to outline the main objectives that are to be adhered to for the preparation of a more detailed WMP to be completed after the planning phase of the Proposed Development.

4. ENVIRONMENTAL MANAGEMENT IMPLEMENTATION

4.1 Roles and Responsibilities

The Project Developer will appoint a design team to prepare the detailed design for the proposed development prior to the commencement of construction and ensure all planning and environmental obligations are met. The developer will appoint a project contractor who will be responsible for the construction of the proposed development in accordance with this CEMP which will be updated by the contractor as required during the construction phase of the project. Any updated CEMP must meet or exceed the standards and requirements set out in this document.

The Environmental Clerk of Works (ECoW) will be nominated by the Project Developer to oversee the project contractor’s effective implementation of the project’s environmental requirements and obligations, as captured in the CEMP. The ECoW will be responsible for monitoring the works of the project contractor from an environmental perspective on behalf of the Project Developer. For the sake of expediency, the ECoW will report their ongoing audit findings, monitoring results and site observations to both the Project Developer and the project contractor, having been nominated by the developer to fulfil the role.

The ECoW will have the power to halt the works, should the need arise and will be supported by the developer to ensure the contractor adheres to such an instruction.

The ECoW will also have to call upon the project ecologist, Project Hydrologist, or other members of the Project Developer’s design team, as required, to oversee the contractor’s works on-site.

An organogram structure for the construction stage roles is as outlined below.

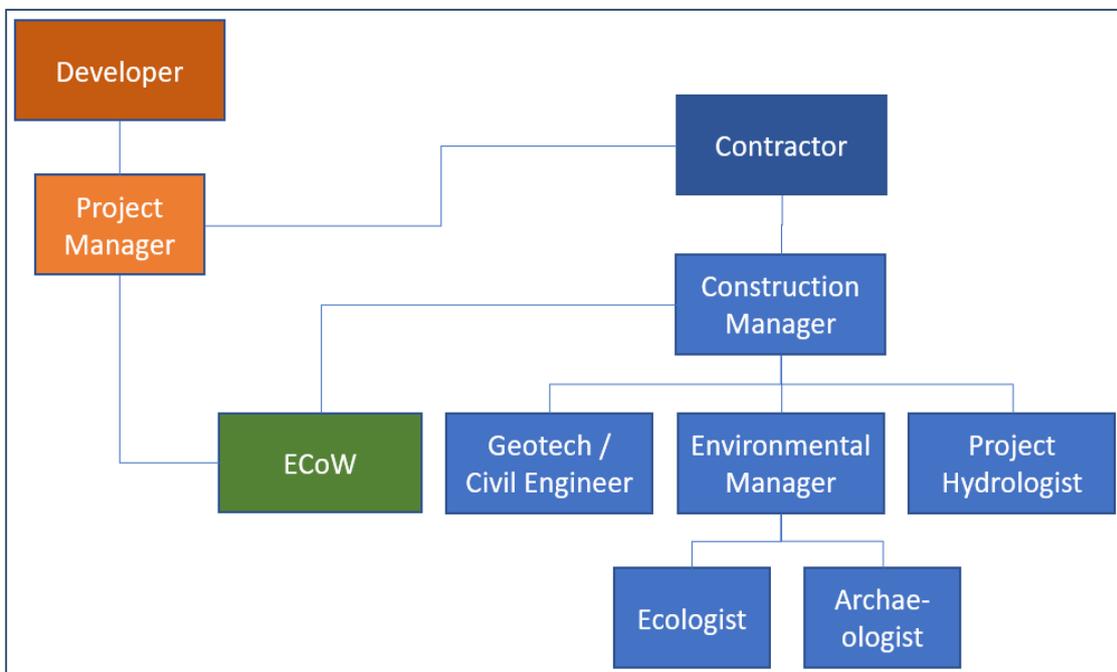


Figure 4-1 Project Organogram

Any requirement of the granted permission, for the works to be supervised by an engineer with professional indemnity insurance, who upon completion of the works, including site stability, shall

certify the said works, will be adhered to. Such an engineer will be appointed to oversee and supervise the construction phase of the project.

4.1.1 Construction Manager

The project contractor will be required to nominate a Construction Manager who will have responsibility for the organisation and execution of environmental requirements outlined in this CEMP or any further versions thereof. The Construction Manager will have an assigned deputy who will fulfil the role of Environmental Manager. To implement the CEMP, the Construction Manager with the assistance of the Environmental Manager will be required to:

- Implement all project design requirements to minimise environmental risk;
- Implement all CEMP requirements and measures to minimise environmental risk;
- Ensure any site personnel responsible for directing works on site are familiar with all requirements of the CEMP;
- Propose revisions to the project CEMP for approval of the Project Developer, project design team and ECoW, only where any such revisions meet or exceed the standards and requirements set out in this document;
- Ensure that all environmental standards are achieved during the construction phase of the project;
- Promptly implement any remedial action required to rectify and close-out any non-compliant items identified by ECoW;
- Ensure immediate notification of environmental incidents are issued to the ECoW, the Project Developer and the relevant authorities, initially by phone and as soon as is practicable by e-mail;
- Identify environmental training requirements and arrange relevant training for all levels of site-based staff/workers.
- Ensure that all construction activities are planned and performed such that minimal risk to the environment is introduced.

4.1.2 Site Environmental Clerk of Works

The Project Developer will be required to engage a qualified Environmental Engineer, Environmental Scientist, or equivalent, with experience in wind farm construction to fulfil the role of Environmental Clerk of Works (ECoW) to oversee the construction works and audit the implementation of the CEMP. The ECoW will report to the Project Developer and project contractor but will liaise closely with the Construction Manager in relation to the project contractor's day-to-day implementation of the CEMP on site. The responsibilities and duties of the ECoW will include the following:

- Review/approval of the CEMP and supporting environmental documentation and review/approval of contractor method statements;
- Undertake environmental monitoring, inspections and reviews to ensure the works are carried out in compliance with the CEMP by the project contractor;
- Manage the water quality monitoring programme and turbidity monitors;
- Maintain a live Actions List and accompanying map outlining any corrective actions across the site requiring attention or action by the contractor;
- Confirm for the project contractor that pre-commencement requirements have been met to allow construction activities to commence;
- Highlight for the contractor, any abandonment triggers that are occurring and inform the contractor that works are to cease;
- Generate environmental reports as required to show environmental data trends and ensure environmental records are maintained throughout the construction period;
- Advise site management/contractor/sub-contractors on:
 - Prevention of environmental pollution and improvement to existing working methods;

- Changes in legislation and legal requirements affecting the environment;
- Suitability and use of plant, equipment and materials to prevent pollution;
- Environmentally sound methods of working and systems to identify environmental hazards;
- Assist the contractor in coordinating the required inputs and site visits from the Project Ecologist or Project Hydrologist to support the ECoW role;
- Ensure immediate notification of any environmental incidents are issued to the Construction Manager and Project Developer;
- Support the investigation of incidents of significant, potential or actual environmental damage and ensure corrective actions are carried out, recommend means to prevent recurrence and communicate incident findings to relevant parties.
- Liaise with the Project Design Team and attend meetings to report on audit findings
- Support the contractor who will be responsible for providing toolbox talks and site induction content to ensure the requirements of the CEMP are delivered on site.
- The geotechnical and peat stability design requirements of the project are not within the remit of the ECoW.

The level, detail and frequency of reporting expected from the ECoW for the Construction Manager, developer's project manager, and any Authorities or other Agencies, will be agreed by all parties prior to commencement of construction, and may be further adjusted as required during the course of the project.

4.1.3 Project Ecologist

The Project Ecologist will be available to support the ECoW on matters relating to the protection of sensitive habitats and species encountered prior to or during the construction phase of the wind farm. The Project Ecologist will not be full time on site but will undertake pre-commencement surveys and visit the site as required.

4.1.4 Project Hydrologist

The Project Hydrologist is part of the design team that will prepare the detailed drainage design for the construction phase of the project, but will also support the ECoW in monitoring, overseeing and auditing the effective implementation of the detailed drainage design by the project contractor. The Project Hydrologist will not be full time on site but will be required to visit as necessary to oversee the implementation of their drainage design.

The responsibilities and duties of the Project Hydrologist will include the following:

- Preparation of detailed drainage design before construction commences;
- Input to the CEMP in respect of drainage design and water quality management
- Attend site to support ECoW and oversee and audit the effective implementation of the detailed drainage design.
- Complete ongoing inspection and monitoring of the development, particularly in areas of drainage control in support of the ECoW in monitoring the effectiveness of the drainage design as it is implemented on-site.

4.1.5 Geotechnical Engineer/Civil Engineer

The Geotechnical Engineer will report to the Construction Manager and is responsible for inspection and review of geotechnical aspects associated with construction of the proposed renewable energy development. The Geotechnical Engineer will not be full time on site but will visit site at least once a month during the construction phase civil works and on a weekly basis during site preparation/groundworks.

The responsibilities and duties of the Geotechnical Engineer will include the following:

- Visit site regularly, or at least once a month during the construction phase, to complete geotechnical audits and reviews and report any issues to the Construction Manager;
- Ensuring that identified hazards are listed in the Geotechnical Risk Register and that these are subject to ongoing monitoring; and,
- Ongoing inspection and monitoring of the development, particularly in areas of peatland and the temporary stockpile areas, through all phases of construction (including pre, during and post construction) and ensure construction is carried out as specified in the EIAR, NIS and in relevant planning conditions.

4.2 Water Quality and Monitoring

4.2.1 Pre-Construction Baseline Monitoring

Baseline water quality field testing and laboratory analysis will be undertaken where required prior to commencement of felling and construction at the site. The baseline monitoring programme will be subject to agreement with Clare County Council.

Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standards (EQSs) and sampling will be undertaken for each watercourse e.g. at SW1, SW2, SW3 & SW4 as outlined in Figure 9-2 of the EIAR on a monthly basis.

Baseline sampling will be completed on at least two occasions and these should coincide with low flow and high flow stream conditions. The high flow sampling event will be undertaken after a period of sustained rainfall, and the low flow event will be undertaken after a dry spell.

4.2.2 Construction Phase Monitoring

4.2.2.1 Daily Visual Inspections

Daily visual inspections of drains and outfalls will be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels measured during construction be higher than the existing levels, the source will be identified and additional mitigation measures implemented.

Inspection sheets and photographic records will be kept on site. Inspection points will include the in-situ field monitoring point locations and the laboratory analysis sampling points. Inspection points will depend on works being completed within the catchment upstream of the identified monitoring locations. Visual inspections will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period and data including photographs will be collected by visual inspections and independently assessed by the Project Hydrologist who will monitor and advise on the records being received.

The following periodic inspection regime will be implemented:

- Daily general visual inspections of site operations and inspections of all watercourses within the site and in the surrounding area by the ECoW or a suitably qualified and competent person as delegated by the ECoW;
- Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify and maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter will be noted and corrective action

will be implemented. High risk locations such as settlement ponds will be inspected daily. Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement;

- Event based inspections by the ECoW as follows:
 - >10 mm/hr (i.e. high intensity localised rainfall event);
 - >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
 - Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week).
- Monthly site inspections by the Project Hydrologist/ ECoW during construction phase;
- Quarterly site inspections by the Project Hydrologist/ ECoW after construction for a period of one year following the construction phase; and,
- A written record will be maintained or available on-site within this Construction Environmental Management Plan (CEMP) which will be maintained on-site during the construction phase.

4.2.2.2 Continuous Turbidity Monitoring

Turbidity monitors or sondes can be installed where required at locations surrounding the wind farm site. The sondes will provide continuous readings for turbidity levels in the watercourse. This equipment will be supplemented by daily visual monitoring at their locations as outlined in the sections below.

4.2.2.3 Monthly Laboratory Analysis

Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken as per water monitoring programme for the Proposed Development. This will not be restricted to just these locations around the proposed renewable energy development site with further sampling points added as deemed necessary by the ECoW in consultation with the Project Hydrologist and Site Manager.

4.2.2.4 Field Monitoring

Field chemistry measurements of unstable parameters, (pH, conductivity, temperature) will be taken at the surface water monitoring locations, as per water monitoring programme for the proposed renewable energy development and each primary watercourse along the route along with at all installed sonde locations. These analyses will be carried out by either the ECoW or the Project Hydrologist. In-situ field monitoring will be completed on a Monthly basis. In-situ field monitoring will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period. The Project Hydrologist will monitor and advise on the readings collected by in-situ field monitoring.

4.2.2.5 Monitoring Parameters

The analytical determinants of the monitoring programme (including limits of detection and frequency of analysis) will be as per S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations and European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The likely suite of determinants will include:

- pH (field measured)
- Electrical Conductivity (field measured)
- Temperature (field measured)
- Dissolved Oxygen (field measured)
- Total Phosphorus
- Chloride
- Nitrate

- > Nitrite
- > Total Nitrogen
- > Ortho-Phosphate
- > Ammonia N
- > Biochemical Oxygen Demand
- > Total Suspended Solids
- > Turbidity

4.2.3 Construction Phase Drainage Inspections & Maintenance

Drainage performance will form part of the civil works contract requirements. During the construction phase, the project contractor will be responsible for the effectiveness of drainage measures. This responsibility extends to drainage maintenance, to ensure that the installed drainage measures continue to perform as intended by the detailed drainage design. Silt fences, check dams, level spreaders and other drainage measures likely to form part of the detailed drainage design, require regular maintenance to ensure they continue to function effectively, and the project contractor is entirely responsible for this maintenance.

Regular inspections of all existing and installed drainage measures should be undertaken by the project contractor, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water within the system. The contractor will devise a system of recording the findings of these inspections. Any excess build-up of silt levels at check dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. For this reason, the drainage measures installed on-site should be inspected at least weekly by the contractor and maintained as required during the construction phase of the project to ensure good performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam.

The ECoW will monitor the effectiveness of the on-site drainage during changing weather, ground or drainage conditions encountered on site, through their regular visual inspections of on-site watercourses and water monitoring programme. Where it appears that additional drainage measures will be required to ensure the drainage system remains effective, the ECoW will notify the contractor, the developer and project design team including the Project Hydrologist. The ECoW's role in this regard does not replace the need for the weekly (at least) inspections of the drainage system's measures by the project contractor.

On completion of the civil and excavations works at the site, the frequency of inspections and monitoring of the drainage infrastructure to be undertaken by the contractor can reduce to monthly.

4.2.4 Surface Water Monitoring Reporting

Visual inspection and laboratory analysis results of water quality monitoring shall assist in determining requirements for any necessary improvements in drainage controls and pollution prevention measures implemented on site.

It will be the responsibility of the ECoW to present the ongoing results of water quality and weather monitoring at or in advance of regular site meetings.

Reports on water quality will consider all field monitoring and visual inspections, and results of laboratory analysis completed for that period. Reports will describe how the results compare with baseline data as well as previous reports on water quality. The reports will also describe whether any deterioration or improvement in water quality has been observed, whether any effects are attributable

to construction activities and what remedial measures or corrective actions have been implemented. Any proposed alteration to sampling frequency will be agreed with Clare County Council in advance

4.2.5 Post Construction Monitoring

4.2.5.1 Monthly Laboratory Analysis Sampling

Monthly sampling for laboratory analysis for a range of parameters adopted during pre-commencement and construction phases will continue for six months after construction, in particular after large excavation and heavy civils works. The Project Hydrologist will monitor and advise on the readings being received from the testing laboratory.

4.3 Environmental Awareness and Training

4.3.1 Environmental Induction

The Environmental Induction will be integrated into the general site induction on a case by case basis for each member of staff employed on-site depending on their assigned roles and responsibilities on site. Where necessary, the Environmental Induction will as a minimum include:

- A copy of the Environmental Management Site Plans and discussion of the key environmental risks and constraints;
- An outline of the CEMP structure;
- A discussion of the applicable Works Method Statement;
- The roles and responsibilities of staff, including contractors, in relation to environmental management; and,
- An outline of the Environmental Incident Management Procedure.

4.3.2 Toolbox Talks

Toolbox talks would be held by the ECoW or Construction Manager at the commencement of each day, or at the commencement of new activities. The aims of the toolbox talks are to identify the specific work activities that are scheduled for that day or phase of work. In addition, the necessary work method statements and sub plans would be identified and discussed prior to the commencement of the day's activities. The toolbox talks will include training and awareness on topics including:

- On-site Ecological Sensitivities
- Buffers to be upheld – watercourses, archaeology, ecology
- Sediment and Erosion Control
- Good site practice
- On-site Traffic Routes and Rules
- Keeping to tracks – vehicle rules
- Strictly adhering to the development footprint
- Fuel Storage
- Materials and waste procedures

Site meetings would be held on a regular basis involving all site personnel. The objectives of site meetings is to discuss the coming weeks activities and identify the relevant work method statements and sub plans that will be relevant to that week's activities. Additionally, any non-compliance identified during the previous week would also be discussed with the aim to reduce the potential of the same non-compliance reoccurring.

During construction of the Proposed Development, all staff will be made aware of and adhere to the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013*'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan.

5. EMERGENCY RESPONSE PLAN

An Emergency Response Plan (ERP) is presented in this section of the CEMP. It provides details of procedures to be adopted in the event of an emergency in terms of site health and safety and environmental protection.

5.1 Emergency Response Procedure

The Emergency Response Plan (ERP) is presented in this section of the CEMP. It provides details of procedures to be adopted in the event of an emergency. The site ERP includes details on the response required and the responsibilities of all personnel in the event of an emergency. The ERP will require updating and submissions from the contractor/PSCS and suppliers as the project progresses. Where sub-contractors that are contracted on site are governed by their own emergency response procedure a bridging arrangement will be adopted to allow for inclusion of the sub-contractor's ERP within this within this document.

This is a working document that requires updating throughout the various stages of the project.

5.1.1 Roles and Responsibilities

The chain of command during an emergency response sets out who is responsible for coordinating the response. The Construction Manager will lead the emergency response which makes him responsible for activating and coordinating the emergency response procedure. The other site personnel who can be identified at this time who will be delegated responsibilities during the emergency response are presented in Figure 5-1. In a situation where the Construction Manager is unavailable or incapable of coordinating the emergency response, the responsibility will be transferred to the next person in the chain of command outlined in Figure 5-1. This will be updated throughout the various stages of the project.

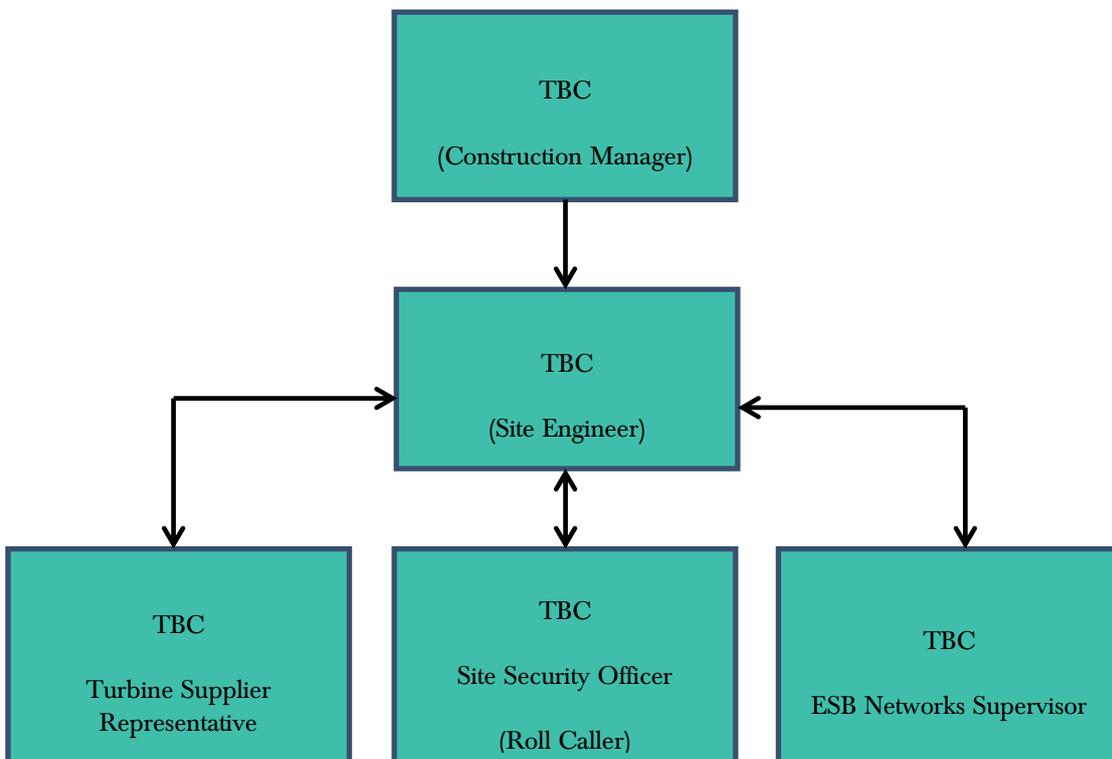


Figure 5-1 Emergency Response Procedure Chain of Command

5.1.2 Initial Steps

In order to establish the type and scale of potential emergencies that may occur, the following hazards have been identified as being potential situations that may require an emergency response in the event of an occurrence.

Table 5-1 Hazards associated with potential emergency situations

Hazard	Emergency Situation
Site Evacuation / Fire Drill	Injury to operative through exposure to fire
Excessive Peat Movement or Onset of a Peat Slide	Injury to operative through engulfment in peat
Siltation of watercourses, Fuel Management and Spill Control	Run-off to a watercourse causing pollution

In the event of an emergency situation associated with, but not restricted to, the hazards outlined in Table 5-1 the /Construction Manager will carry out the following:

- Make safe the area if possible and ensure that there is no identifiable risk exists with regard to dealing with the situation e.g. if a machine has turned over, ensure that it is in a safe position so as not to endanger others before assisting the injured.
- Contact the required emergency services or delegate the task to someone if he is unable to do so. If delegating the task, ensure that they follow the procedures for contacting the emergency services as set out in Section 5.2.1.
- Take any further steps that are deemed necessary to make safe or contain the emergency incident e.g. cordon off an area where an incident associated with electrical issues has occurred.
- Contact any regulatory body or service provider as required e.g. ESB Networks the numbers for which as provided in Section 5.2.2.
- Contact the next of kin of any injured personnel where appropriate. The procedure for this is outlined in Section 5.2.3.

5.1.3 Site Evacuation/Fire Drill

A site evacuation/fire drill procedure will provide basis for carrying out the immediate evacuation of all site personnel in the event of an emergency. The following steps will be taken:

- Notification of the emergency situation. Provision of a siren or fog-horn to notify all personnel of an emergency situation.
- An assembly point will be designated in the construction compound area and will be marked with a sign. All site personnel will assemble at this point.
- A roll call will be carried out by the Site Security Officer to account for all personnel on site.
- The Site Security Officer will inform the Construction Manager when all personnel have been accounted for. The Construction Manager will decide the next course of action, which be determined by the situation that exists at that time and will advise all personnel accordingly.

All personnel will be made aware of the evacuation procedure during site induction. The Fire Services Acts of 1981 and 2003 require the holding of fire safety evacuation drills at specified intervals and the keeping of records of such drills.

5.1.4 Excessive Peat Movement

The emergency measures to be followed in the event of any excessive peat movement will be stipulated by the geotechnical designer for the project and should be outlined in their geotechnical risk register.

Where there is excessive peat movement or continuing peat movement recorded at a monitoring location, or identified at any location within the site, but no apparent signs of distress to the peat (e.g. cracking, surface rippling) then the following shall be carried out.

- All construction activities shall cease within the affected area.
- Increased monitoring at the location shall be carried out. The area will be monitored, as appropriate, until such time as movements have ceased.
- Re-commencement of limited construction activity shall only start following a cessation of movement and the completion of a geotechnical risk assessment by a geotechnical engineer.

5.1.5 Onset of Peat Slide

Where there is the onset or actual detachment of peat (e.g. cracking, surface rippling) then the following shall be carried out.

- On alert of a peat slide incident, all construction activities will cease and all available resources will be diverted to assist in the required mitigation procedures.
- Where considered possible action will be taken to prevent a peat slide reaching any watercourse. This will take the form of the construction of check barrages on land. Due to the terrain, the possible short run-out length to watercourses, speed of movement and the inability to predict locations it may not be possible to implement any on-land prevention measures, in this case a watercourse check barrage will be implemented.
- For localised peat slides that do not represent a risk to a watercourse and have essentially come to rest the area will be stabilised initially by rock infill, if required. The failed area and surrounding area will then be assessed by the engineering staff and stabilisation procedures implemented. The area will be monitored, as appropriate, until such time as movements have ceased.

5.1.6 Spill Control Measures

Every effort will be made to prevent an environmental incident during the construction and operational phase of the project. Oil/fuel spillages are one of the main environmental risks that will exist on the site which will require an emergency response procedure. The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. The following steps provide the procedure to be followed in the event of such an incident:

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident.
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill.
- If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses or sensitive habitats.
- If possible, clean up as much as possible using the spill control materials.

- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- Notify the ECoW immediately giving information on the location, type and extent of the spill so that they can take appropriate action.
- The ECoW will inspect the site and will assist by providing any advice possible to ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- The Construction Manager will notify the appropriate regulatory body such as Clare County Council, Inland Fisheries Ireland, National Parks and Wildlife Service, etc. if deemed necessary.

The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. Environmental incidents are not limited to just fuel spillages. Therefore, any environmental incident must be investigated in accordance with the following steps.

- The ECoW must be immediately notified.
- If necessary, the Construction Manager will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident.
- The details of the incident will be recorded on an Environmental Incident Form which will provide information such as the cause, extent, actions and remedial measures used following the incident. The form will also include any recommendations made to avoid reoccurrence of the incident.
- If the incident has impacted on an ecologically sensitive receptor, such as a sensitive habitat, protected species or designated conservation site (pSPA or cSAC), the ECoW will liaise with the Project Ecologist.
- If the incident has impacted on a sensitive receptor such as an archaeological feature the ECoW will liaise with the Project Archaeologist.

A record of all environmental incidents will be kept on file by the ECoW and the Project Contractor. These records will be made available to the relevant authorities such as Clare County Council, IFI, NPWS, etc. if required. The ECoW will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the Main Contractor as appropriate.

5.2 Contact the Emergency Services

5.2.1 Emergency Communications Procedure

In the event of requiring the assistance of the emergency services the following steps should be taken:

Stay calm. It is important to take a deep breath and not get excited. Any situation that requires 999/112 is, by definition, an emergency. The dispatcher or call-taker knows that and will try to move things along quickly, but under control.

Know the location of the emergency and the number you are calling from. This may be asked and answered a couple of times but do not get frustrated. Even though many emergency call centres have enhanced capabilities meaning they are able to see your location on the computer screen they are still required to confirm the information. If for some reason you are disconnected, at least emergency crews will know where to go and how to call you back.

If you reach a recording, listen to what it says. If the recording says your call cannot be completed, hang up and try again. If the recording says all call takers are busy, WAIT. When the next call-taker or dispatcher is available to take the call, it will transfer you.

Let the call-taker guide the conversation. He or she is typing the information into a computer and may seem to be taking forever. There is a good chance, however, that emergency services are already being sent while you are still on the line.

Follow all directions. In some cases, the call-taker will give you directions. Listen carefully, follow each step exactly, and ask for clarification if you do not understand.

Keep your eyes open. You may be asked to describe victims, suspects, vehicles, or other parts of the scene.

Do not hang up the call until directed to do so by the call taker.

Due to the remoteness of the site it may be necessary to liaise with the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This should form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.

5.2.2 Contact Details

A list of emergency contacts is presented in Table 5-2. A copy of these contacts will be included in the Site Safety Manual and in the site offices and the various site welfare facilities.

Table 5-2 Emergency Contacts

Contact	Telephone no.
Emergency Services – Ambulance, Fire, Gardaí	999/112
Doctor – Miltown Malbay Centre	065 708 4494
Hospital – Clare General Hospital	065 682 4464
ESB Emergency Services	1850 372 999
Gas Networks Ireland Emergency	1850 20 50 50
Gardaí – Local Garda Station. Miltown Malbay	065 7084222
Health and Safety Co-ordinator - Health & Safety Services	TBC
Health and Safety Authority	1890 289 389
Inland Fisheries Ireland (IFI)	1890 347 424
Project Supervisor Construction Stage (PSCS): TBC	TBC
Project Supervisor Design Stage (PSDS): TBC	TBC
Client: Slieveacurry Ltd.	021 7336034

5.2.3 Procedure for Personnel Tracking

All operatives on site without any exception will have to undergo a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.

In the event of a site operative becoming in an emergency situation where serious injury has occurred and hospitalisation has taken place, it will be the responsibility of the Site Manager or next in command if unavailable to contact the next of kin to inform them of the situation that exists.

5.3 Induction Checklist

Table 5-3 provides a list of items highlighted in this ERP which must be included or obtained during the mandatory site induction of all personnel that will work on the site. This will be updated throughout the various stages of the project.

Table 5-3 Emergency Response Plan Items Applicable to the Site Induction Process

ERP Items to be included in Site Induction	Status
All personnel will be made aware of the evacuation procedure during site induction	
Due to the remoteness of the site it may be necessary to liaise with and assist the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This should form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.	
All operatives on site without any exception will have undergone a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.	

6. MITIGATION PROPOSALS

All mitigation measures relating to the pre-commencement, construction and operational phases of the Proposed Development were set out in the various sections of the Environmental Impact Assessment Report (EIAR), NIS prepared as part of the planning permission application to Clare County Council.

This section of the CEMP groups together all of the mitigation measures presented in the above documents. The Mitigation Measures are presented in the following pages.

By presenting the mitigation proposals in the below format, it is intended to provide an easy to audit list that can be reviewed and reported on during the future phases of the project. The tabular format in which the below information is presented, can be further expanded upon during the course of future project phases to provide a reporting template for site compliance audits.

Table 6-1 Site Preparation and Mitigation Measures

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
Pre-Commencement Phase					
MM1	Environmental Management	EIAR Section 4	All proposed site activities will be provided for in a Construction Environmental Management Plan (CEMP), prepared prior to the commencement of any operations onsite. The CEMP will set out all measures necessary to ensure works are carried out in accordance with the mitigation measures set out in the EIAR and will set out the monitoring and inspections procedures and frequencies.		
MM2	Environmental Management	EIAR Section 4	The ECoW will maintain responsibility for monitoring the construction works and audit the implementation of the CEMP.. In addition, a Project Ecologist, Project Hydrologist, Project Archaeologist, Project Geotechnical Engineer will visit the site regularly and report to the ECoW.		
MM3	Environmental Management	CEMP Section 4	A Site ECoW will oversee the site works and implementation of the Construction Environmental Management Plan (CEMP), and provide on-site advice on the mitigation measures necessary as necessary to ensure the project proceeds as intended. The level, detail and frequency of reporting expected from the ECoW for the Construction Manager, developer’s project manager, and any Authorities or other Agencies, will be agreed by parties where required prior to commencement of construction, and may be further adjusted as required during the course of the project.		
MM4	Surface Water Quality	CEMP Section 4	<p>Baseline water quality field testing and laboratory analysis will be undertaken where required prior to commencement of felling and construction at the site. The baseline monitoring programme will be subject to agreement with Clare County Council.</p> <p>Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will also be undertaken as per water monitoring programme for the Proposed Development and each primary watercourse along the route.</p>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM5	Birds	EIAR Section 7 CEMP Section 5	<p>A Project Ecologist will be appointed. The responsibilities and duties of the Project Ecologist will include the following:</p> <ul style="list-style-type: none"> ➤ Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided. ➤ Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Development area. ➤ Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise. ➤ Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. ➤ Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress. 		
MM6	Birds	EIAR Section 7	<p>Pre-commencement bird surveys will be undertaken prior to the initiation of works at the Site. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas, where access allows. If winter roost sites or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located, and earmarked for monitoring at the beginning of the first winter season or breeding season (respectively) of the construction phase. If it is found to be active during the construction phase no works shall be undertaken within a 500m buffer in line with best practise. No works shall be permitted within the buffer until it can be demonstrated that the roost or nest is no longer occupied.</p>		
MM7	Concrete Deliveries	EIAR Section 4	<p>The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout of trucks and discussing emergency procedures.</p>		
MM8	Site Drainage Plan	EIAR Section 4	<p>The Project Hydrologist will prepare detailed drainage design before construction commences.</p>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 4			
MM9	Preparative Site Drainage Management,	EIAR Section 4 CEMP Section 4	<p>The detailed drainage design will specify all materials and equipment necessary to implement the drainage measures effectively, which will be brought on site in advance of any works commencing.</p> <p>An adequate quantity of straw bales, clean stone, terram, stakes, etc. will be kept on site at all times to implement the detailed drainage design measures as necessary. The detailed drainage measures will be installed prior to, or at the same time as the works they are intended to drain.</p>		
MM10	Pre-emptive site drainage management	EIAR Section 9 CEMP Section 4	The works programme for the groundworks part of the construction phase of the project will also take account of weather forecasts and predicted rainfall in particular.		
MM11	Drainage Inspection	CEMP Section 3	Prior to commencement of works in sub-catchments across the site main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage.		
MM12	Drainage Maintenance	EIAR Section 4 CEMP Section 4	An inspection and maintenance plan for the drainage system on site will be prepared in advance of commencement of any works. Regular inspections of all installed drainage systems will be necessary, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water at parts of the systems where it is not intended. The inspection of the drainage system will be the responsibility of the site ECoW or the Project Hydrologist.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM13	Earthworks	CEMP Section 3	Drainage and associated pollution control measures will be implemented onsite before the main construction works commence. Where possible drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of impact on surface waters by suspended sediment released during construction and entrained in surface run-off.		
MM14	Earthworks	EIAR Section 9 NIS Section 5	A 50-metre buffer zone will be maintained around hydrological features and 10m to main drains during construction where possible. With the exception of road crossings of streams and associated culvert construction, no development infrastructure, vehicle or plant movement, construction activity or stock-piling of construction materials or construction waste will take place within this zone, and no vegetation will be removed from within this zone.		
MM15	Felling	EIAR Section 4, 7	Construction will not commence during the Breeding Bird season from March to August inclusive. If breeding activity is identified, the nest site will be located, and no works shall be undertaken within a 500m buffer (Forestry Commission Scotland 2006; Ruddock & Whitfield 2007). No works shall be permitted within the buffer until it can be demonstrated that the nest is no longer occupied.		
MM16	Flora & Fauna	EIAR Section 6	<p>Areas of suitable marsh fritillary habitat will be fenced off or clearly marked prior to the commencement of any site works under the guidance and supervision of a suitably qualified Ecological Clerk of Works (ECoW). This is particularly important where the site access track, south of T2, occurs in close proximity to a known colony:</p> <ul style="list-style-type: none"> ➤ Pre-commencement surveys will be undertaken for marsh fritillary to determine long term trends of the population within the site. ➤ Vegetation structure and suitability will be monitored following the NBDC survey methodology (NBDC, 2020). ➤ Pollinator enhancement measures through habitat creation, as described in the Biodiversity Management Plan. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ Habitat condition monitoring will be undertaken during construction and in year 1 post construction to ensure that there are no negative effects on marsh fringing habitat. 		
MM17	Invasive Species Management	EIAR Section 6 CEMP Section 3	A pre-construction invasive species survey will be undertaken a part of the proposed project. This will provide updated data in advance of any construction given the intervention time period between the original survey work and any future grant of permission/ construction. Measures will be in place to prevent the spread of these species during the proposed works. In addition, all necessary precautions will be taken to prevent the introduction of invasive species to the site from elsewhere.		
MM18	Archaeology	EIAR Section 13	<p>The following areas should be subject to pre-construction stage licensed archaeological testing:</p> <ul style="list-style-type: none"> ➤ Proposed new roads in non-forested areas ➤ Turbine bases and hardstands for T3, T5, T6 and T7 ➤ Proposed Borrow pit south of T5 ➤ Sections of proposed cable route that traverse green field sections ➤ A report on the results of the testing should be undertaken prior to the commencement of development and submitted to the relevant authorities ➤ Archaeological monitoring of ground works during construction. A report on the results of the monitoring shall be compiled and submitted to the relevant authorities on completion of the project. 		
MM19	Archaeology	EIAR Section 13	<p>One monument subject to statutory protection as defined in the Record of Monuments and is located within the EIAR site boundary for the Proposed Development. It consists of a multiple stone circle (CL031-052) located at Curraghodea townland at ITM E512804, N680240. Proposed Mitigation Measure:</p> <ul style="list-style-type: none"> ➤ A 30m exclusion zone should be established by the contractor under the supervision of the appointed archaeologist prior to construction. The exclusion zone should be marked with permanent fence posts and durable high-visibility fencing with 'Keep Out' signage. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM20	Archaeology	EIAR Section 13	<p>The National School (RPS 637) is located within the EIAR study area boundary. Although the structure is located within the EIAR boundary, it is not located within the footprint of any proposed infrastructure. The structure will not be directly impacted by any of the proposed construction works. Proposed Mitigation Measures:</p> <ul style="list-style-type: none"> ➤ The structure and its location should be highlighted in the CEMP as an environmental constraint so that the area can be avoided during construction works. 		
MM21	Archaeology	EIAR Section 13	<p>One structure of local cultural / built heritage merit was noted within the EIAR boundary and consists of a road bridge along the regional road R460 on the Letterkelly - Cloghaun Beg townland boundary. The structure is located 58m to the west of the proposed cable route. Proposed Mitigation Measures:</p> <ul style="list-style-type: none"> ➤ The structure and its location should be highlighted in the CEMP as an environmental constraint so that the area can be avoided during construction works. 		
MM22	Archaeology	EIAR Section 13	<p>A derelict stone house was recorded during the field survey along cable route at ITM E512924, N679668 in the townland of Letterkelly. The structure is located 12m to the east of the proposed cable route. Mitigation measures are required in order to avoid such effects. Proposed Mitigation Measures include:</p> <ul style="list-style-type: none"> ➤ The structure and its location should be highlighted in the CEMP as an environmental constraint so that the area can be avoided during construction works. ➤ A buffer zone of 10m from the house should be established by the contractor and directed by the appointed archaeologist prior to construction. The buffer zone should be marked with fencing and Keep Out signage. 		
MM23	Human Health	EIAR Section 5	<p>Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made clear. Local access to properties will also be maintained throughout any</p>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum		
Construction Phase					
Construction Management					
MM24	Health and Safety	EIAR Section 5 CEMP Section 4	During construction of the Proposed Development, all staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan. Health and safety guidelines for working within and around electrical substations and overhead lines will be adhered to on site.		
MM25	Health and Safety	EIAR Section 4, 5 CEMP Section 2	<ul style="list-style-type: none"> ➤ Stock-proof fencing will be erected around the borrow pits if deemed necessary to prevent uncontrolled access to these areas. Appropriate health and safety signage will also be erected on this fencing and at locations around the site. ➤ Fencing will be erected in areas of the site where uncontrolled access is not permitted. 		
MM26	Health and Safety	EIAR Section 5	<p>Signs will also be erected at suitable locations across the site as required for the ease and safety of operation of the proposed renewable energy development. These signs include:</p> <ul style="list-style-type: none"> ➤ Buried cable route markers at appropriate intervals and change of cable route direction; ➤ Directions to relevant turbines at junctions; ➤ "No access to Unauthorised Personnel" at appropriate locations; ➤ Speed limits signs at site entrance and junctions; ➤ "Warning these Premises are alarmed" at appropriate locations; ➤ "Danger HV" at appropriate locations; ➤ "Warning – Keep clear of structures during electrical storms, high winds or ice conditions" at site entrance; ➤ "No unauthorised vehicles beyond this point" at specific site entrances; and ➤ Other operational signage required as per site-specific hazards. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM27	Wastewater Management	<p>EIAR Section 4 ,9</p> <p>CEMP Section 4</p>	<p>Temporary port-a-loo toilets and toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. There will also be a water supply on site for hygiene purposes. The wastewater will be transported off site by a waste management contractor holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended)</p>		
MM28	Wastewater Management	CEMP Section 9	<p>It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. It is not proposed to treat wastewater on-site.</p>		
MM29	Refuelling	<p>EIAR Section 4, 8, 9</p> <p>NIS Section 5</p> <p>CEMP Section 3, 5</p>	<ul style="list-style-type: none"> ➤ On-site refuelling will be carried out using a mobile double skinned, banded fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. It is not practical for all vehicles to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the Proposed Development. The 4x4 jeep will also carry 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 when not in use. Refuelling operations will be carried out only by designated trained and competent operatives. Mobile anti-pollution measures such as drip trays and fuel absorbent mats will be used during all refuelling operations. ➤ Fuels stored on site will be minimised. Storage areas where required will be banded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor; ➤ The plant used during construction will be regularly inspected for leaks and fitness for purpose; ➤ An emergency plan for the construction phase to deal with accidental spillages is contained within section 5 of the CEMP. Spill kits will be available to deal with and accidental spillage in and outside the re-fuelling area. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM30	Road Maintenance and resurfacing	EIAR Section 4, 8, 9 NIS Section 5 CEMP Section 3, 5	All waste tar material arising from the chipping and resurfacing of the temporary construction access road will be removed off-site and taken to licenced waste facility		
MM31	Plant and Equipment Inspections	CEMP Section 3	A programme for the regular inspection of plant and equipment for leaks and fitness for purpose will be developed at the outset of the construction phase.		
MM32	Temporary water supply and onsite sanitation	EIAR Section 4 CEMP Section 2	Water supply for the site office and other sanitation will be brought to site and removed after use from the site to be discharged at a suitable off-site treatment location		
MM33	Pre-emptive site drainage management	EIAR Section 9 CEMP Section 3	<p>The works programme for the groundworks part of the construction phase of the project will also take account of weather forecasts and predicted rainfall in particular.</p> <p>The following forecasting systems are available and will be used on a daily basis at the site to direct proposed construction activities:</p> <ul style="list-style-type: none"> ➤ General Forecasts, Meteo Alarm, 3-hour Rainfall Maps, Rainfall Radar Images, Consultancy Service ➤ Works will be suspended if forecasting suggests either of the following is likely to occur: <ul style="list-style-type: none"> ○ >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. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>Prior to works being suspended the following control measures should be completed:</p> <ul style="list-style-type: none"> ➤ 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. 		
MM34	Protection of Watercourses	EIAR Section 9 CEMP Section 3	Silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time, and allow settling of silt in a controlled manner.		
MM35	Protection of Watercourses	EIAR Section 4 & 9 NIS Section 5	<p>The Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters will be adopted and Inland Fisheries Ireland stipulated that measures should be in place with regard to protection of watercourses during construction of the Proposed Development, including:</p> <ul style="list-style-type: none"> ➤ There be no drainage or other physical interference with the bed or bank of any watercourse without prior consultation with IFI. ➤ Suspended solids and or hydrocarbon contaminated site run-off waters are controlled adequately so that no pollution of surface waters can occur. More specifically IFI feels the following issues should be addressed <ul style="list-style-type: none"> ○ Identifying and zoning the project for environmental impact should a peat slip occur ○ Setting out contingency plan should a peat movement occur. ○ Setting out a plan for the control of silt in such a scenario, including measures to be put in place at the initial stages of construction. ➤ In the event of any watercourse crossings being bridged or culverted the following general criteria should apply, <ul style="list-style-type: none"> ○ The free passage of fish must not be obstructed. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ○ The original slope of the riverbed should be maintained with no sudden drops on the downstream side. ○ Bridges are preferable to culverts. ○ In the event of a crossing being in excess of 30cm in width IFI should be consulted prior to works commencing. ○ All instream works should be carried out only in the April-September period. 		
MM36	Surface Water Quality	CEMP Section 4	<p>Monthly laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken as per water monitoring programme for the Proposed Development and each primary watercourse along the route. This will not be restricted to just these locations around the proposed renewable energy development site with further sampling points added as deemed necessary by the ECoW in consultation with the Project Hydrologist and Site Manager.</p> <p>In-situ field monitoring will be completed on a Monthly basis. In-situ field monitoring will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period. The Project Hydrologist will monitor and advise on the readings collected by in-situ field monitoring.</p>		
MM37	Concrete Deliveries and Management	EIAR Section 4, 9 NIS Section 5	<p>Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in sealed concrete delivery trucks.</p>		
MM38	Concrete Deliveries and Management	EIAR Section 4 NIS Section 5	<ul style="list-style-type: none"> > No washing out of any plant used in concrete transport or concreting operations will be carried out onsite. When concrete is delivered to site, only the chute of the delivery truck will be cleaned, using the smallest volume of water necessary, before leaving the site. > Concrete trucks will be directed back to their batching plant for washout. > Any solid contents that will have been cleaned down from the chute will have solidified and can be broken up and disposed of along with other construction waste. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM39	Concrete Deliveries and Management	EIAR Section 4 NIS Section 5	No concrete will be transported around the site in open trailers or dumpers so as to avoid spillage while in transport.		
MM40	Concrete Deliveries and Management	EIAR Section 4	Clearly visible signs in prominent locations will be placed close to concrete pour areas specifically stating washout of concrete lorries is not permitted on the site		
MM41	Concrete Deliveries and Management	EIAR Section 4	Main pours will be planned days or weeks in advance. Large pours will be avoided when prolonged periods of heavy rain are forecast.		
MM42	Concrete Deliveries and Management	EIAR Section 4	Concrete pumps and machine buckets will be restricted from slewing over watercourses while placing concrete.		
MM43	Concrete Deliveries and Management	EIAR Section 4	Excavations will be sufficiently dewatered before concreting begins. Dewatering will continue while concrete sets.		
MM44	Concrete Deliveries and Management	EIAR Section 4	Covers will be available for freshly placed concrete to avoid the surface washing away in heavy rain.		
MM45	Concrete Deliveries and Management	EIAR Section 4 CEMP Section 3	Surplus concrete after completion of a pour will be returned to the concrete suppliers batching plant for recycling.		
MM46	Road Cleanliness	EIAR Section 4.	A road sweeper will be available if any section of the public roads were to be dirtied by trucks associated with the Proposed Development.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 3			
Drainage Design and Maintenance					
MM47	Drainage Planning	EIAR Section 9	Construction of the site drainage system will only be carried out during periods of low 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. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and operational for all subsequent construction works.		
MM48	Watercourse Buffers	EIAR Section 4. CEMP Section 3	All discharges from the proposed works areas will be made over vegetation filters at a minimum of 50m from streams and lakes respectively.		
MM49	Water Discharge	EIAR Section 4	There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows.		
MM50	Wastewater Management	EIAR Section 4. CEMP Section 3	During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used on site for toilet facilities. This will be maintained by the service contractor as required and will be removed from the site on completion of the construction phase.		
MM51	Borrow Pit Drainage	EIAR Section 4, 9	During the construction phase of the project, it will be necessary to keep the borrow pit area free of standing water while rock is still being extracted. This will be achieved by using a mobile pump, which will pump water into the same series of drains, settlement ponds with a level spreader, siltbuster or equivalent, which will receive the water from the single outlet		
MM52	Drainage Swales,	EIAR Section 4, 9	Swales will be used to intercept and collect run off from construction areas of the site during the construction phase, and channel it to settlement ponds for sediment attenuation as per the drainage design.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 3			
MM53	Interceptor Drains,	EIAR Section 4, 9 CEMP Section 3	Interceptor drains will be installed up-gradient of any works areas to collect surface flow runoff and prevent it reaching excavations and construction areas of the site. It will then be directed to areas where it can be re-distributed over the ground as sheet flow as per the drainage design.		
MM54	Check Dams	EIAR Section 4, 9 CEMP Section 3	Check dams will not be used in any natural watercourses, only artificial drainage channels and interceptor drains. The check dams will be installed at regular intervals along interceptor drains to restrict flow velocity, minimise channel erosion and promote sedimentation behind the dam as per the drainage design.		
MM55	Level Spreaders,	EIAR Section 4. CEMP Section 3	A level spreader will be constructed at the end of each interceptor drain to convert concentrated flows in the drain into diffuse sheet flow on areas of vegetated ground. The levels spreaders will be located downgradient of any proposed works areas in locations where they are not likely to contribute further to water ingress to construction areas of the site.		
MM56	Piped Slope Drains	EIAR Section 4	Piped slope drains will be used to transfer water away from areas where slopes are too steep to use level spreaders and will only remain in place for the duration of the construction phase		
MM57	Vegetation Filters	EIAR Section 4, 9	Vegetation filters, that is areas of existing vegetation, accepting drainage water issuing from level spreaders as sheet flow, will remove any suspended sediment from water channelled via interceptor drains or any remaining sediment in waters channelled via swales and settlement ponds.		
MM58	Settlement Ponds	EIAR Section 4, 9	Settlement ponds, placed either singly or a pair in series, will buffer volumes of run-off discharging from the drainage system during periods of high rainfall, by		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 3	retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to water courses as per the drainage design.		
MM59	Dewatering Silt Bag	EIAR Section 4, 9 CEMP Section 3	Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, the majority of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats Sediment entrapment mats, consisting of coir or jute matting, will be placed at the silt bag location to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.		
MM60	Siltbuster	EIAR Section 4, 9	A “siltbuster” or similar equivalent piece of equipment will be available to filter any water pumped out of excavation areas if necessary, prior to its discharge to stilling ponds or swales. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit.		
MM61	Culvert Upgrades	EIAR Section 4, 9	The following mitigation is proposed for completion of wind farm culvert upgrades: <ul style="list-style-type: none"> ➤ Where possible pre-cast elements for culverts and concrete works will be used; ➤ All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse; ➤ In all cases, culverts will be oversized to allow mammals to pass through the culvert. ➤ Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. ➤ All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ All proposed new stream crossings will be bottomless or clear span culverts and the existing banks will remain undisturbed. No in-stream excavation works are proposed and therefore there will be no direct impact on the stream at the proposed crossing location; ➤ Where the proposed underground cabling route follows an existing road or road proposed for upgrade, the cable will pass over or below the culvert within the access road; ➤ All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed crossings; ➤ As a further precaution, near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document “Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites”, i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI); ➤ During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and, ➤ All new river/stream crossings will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent. 		
MM62	Silt Fences,	EIAR Section 4, 9.	<ul style="list-style-type: none"> ➤ Silt fences will be emplaced within drains down-gradient of all construction areas. ➤ They will remain in place throughout the entire construction phase. ➤ Silt fences will be installed as single, double or a series of triple silt fences, depending on the space available and the anticipated sediment loading. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ The silt fence designs follow the technical guidance document ‘Control of Water Pollution from Linear Construction Projects’ published by CIRIA (Ciria, No. C648, 1996). Up to three silt fences may be deployed in series. ➤ All silt fencing will be formed using Terrastop Premium or equivalent silt fence product. ➤ Silt fences will be inspected regularly to ensure water is continuing to flow through the fabric, and the fence is not coming under strain from water backing up behind it 		
MM63	Sediment disposal	EIAR Section 4	Sediment that is removed from settlement ponds, check dams, silt bags etc. as part of routine maintenance will be carefully disposed of away from all aquatic zones or will be transported off-site for disposal.		
MM64	Excavation seepages and treatment	EIAR Section 4, 9	<ul style="list-style-type: none"> ➤ Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place; ➤ If required, pumping of excavation inflows will prevent build-up of water in the excavation; ➤ The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters; ➤ The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, along with use of more specialist treatment systems such as a Siltbags; ➤ There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur; ➤ Silt traps will be placed in the existing drains upstream of any streams where construction works / tree felling is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area; ➤ Runoff from individual turbine hardstanding areas will be not discharged into the existing drain network but discharged locally at each turbine location through stilling ponds and buffered outfalls onto vegetated surfaces; ➤ Buffered outfalls which will be numerous over the site will promote percolation of drainage waters across vegetation and close to the point at which the 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>additional runoff is generated, rather than direct discharge to the existing drains of the site; and,</p> <ul style="list-style-type: none"> ➤ Drains running parallel to the existing roads requiring widening will be upgraded, widening will be targeted to the opposite side of the road. Velocity and silt control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt fences will be used during the upgrade construction works. Regular buffered outfalls will also be added to these drains to protect downstream surface 		
<i>Felling</i>					
MM65	Felling Licence	EIAR Section 4	Felling will be carried out under the terms of a licence application to the Forest Service, as per the Forest Service’s policy on granting felling licenses for wind farm developments		
MM66	Clear felling of Coniferous Plantation	EIAR Section 9	<p>Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods (from the guidance listed above) which are set out as follows:</p> <ul style="list-style-type: none"> ➤ Machine combinations (i.e. hand-held or mechanical) will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance; ➤ Trees will be cut manually inside the 50m buffer and using machinery to extract whole trees only; ➤ Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicle through watercourses will occur, as vehicles will use road infrastructure and existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works; ➤ Ditches which drain from the proposed area 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 (~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 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>there are steep gradients, and should avoid being placed at right angles to the contour;</p> <ul style="list-style-type: none"> ➤ 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 an area within the borrow pit where all rock has been excavated . Where possible, 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 50 metre buffer is required, it will be necessary to install double or triple sediment traps; ➤ Double silt fencing will also be put down slope of felling areas which are located inside the 50 metre buffer zone; ➤ All drainage channels will taper out before entering the aquatic 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, to the outside of the buffer zone; ➤ 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 minimized and controlled; ➤ Brash mats will be used to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road 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 a local 50 metre watercourse buffer. Straw bales and check dams to be emplaced on the down gradient side of timber storage/processing sites; 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ 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; ➤ No crossing of streams by machinery will be permitted and only travel perpendicular to and away from stream will be allowed; ➤ Checking and maintenance of roads and culverts will be on-going through the felling operation; ➤ Refuelling or maintenance of machinery will not occur within 100m of a watercourse. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required; ➤ A permit to refuel system will be adopted at the site; and, ➤ Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors 		
MM67	Clear Felling of Coniferous Plantation	EIAR Section 9	<p>Silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time, and allow settling of silt in a controlled manner.</p> <p>The following items shall be carried out during pre-felling inspections and after:</p> <ul style="list-style-type: none"> ➤ Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging 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 shall be identified. Ideally the pre-felling inspection shall be carried out during rainfall; ➤ Following tree felling all main drains shall be inspected to ensure that they are functioning; ➤ Extraction tracks nears drains need to 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 will be unblocked; and, 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ All accumulated silt will be removed from drains and 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 		
MM68	Clear Felling of Coniferous Plantation	EIAR Section 9	<p>Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The ‘before’ sampling should 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).</p> <p>Criteria for the selection of water sampling points include the following:</p> <ul style="list-style-type: none"> ➤ Avoid man-made ditches and drains, or watercourses that do not have year round flows, i.e. avoid ephemeral ditches, drains or watercourses; ➤ Select sampling points upstream and downstream of the forestry activities; ➤ It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry; ➤ Where possible, downstream locations should be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other land-uses where impact increases at third downstream location relative to second downstream location); and, ➤ The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed. ➤ Also, daily surface water monitoring forms will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
<i>Peat, Subsoils and Bedrock</i>					
MM69	Erosion of Exposed Subsoils and Peat	EIAR Section 9	The works programme for the construction stage of the development will also take account of weather forecasts and predicted rainfall in particular. Large excavations and movements of peat/subsoil or peat stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.		
MM70	Peat Management	EIAR Section 4, 9	<p>Peat removed from turbine locations and access roads will be used for landscaping, side-cast at appropriate locations and placed within the proposed borrow pit. Where possible, the upper vegetative layer will be placed with the vegetation of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the re-instated borrow pits.</p> <ul style="list-style-type: none"> ➤ During the initial placement of peat and subsoil, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the reinstatement areas. ‘Siltbuster’ treatment trains will be employed if previous treatment is not to a high quality. ➤ Drainage from peat reinstatement areas will ultimately be routed to an oversized swale and a number of stilling ponds pond and a ‘Siltbuster’ with appropriate storage and settlement designed for a 1 in 100 year 6 hour return period before being discharged to the on-site drains. ➤ Peat/subsoil reinstatement areas will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. Once re-vegetated and stabilised peat/subsoil reinstatement areas will no longer be a potential source of silt laden runoff. 		
MM71	Peat Management	EIAR Section 4	<ul style="list-style-type: none"> ➤ Prior to commencing the construction of the excavated roads movement monitoring posts will be installed in areas where the peat depth is greater than 2.0m. ➤ Interceptor drains will be installed upslope of the access road alignment to divert any surface water away from the construction area. ➤ Excavation of roads will be in accordance with the design requirements. Excavation will take place to a competent stratum beneath the peat, removing all peat and soft clay present beneath the road footprint. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ Once excavated, peat will be temporarily stored in localised areas adjacent to excavations for roads and hardstands before being placed into the permanent peat storage areas within the borrow pits. All temporary storage areas will be upslope of founded roads/hardstands and will be inspected by a suitably qualified person before material is stored in the area. ➤ Road construction will be carried out in sections of approximately 50m lengths i.e. no more than 50m of access road should be excavated without re-placement with stone fill. ➤ Care shall be taken during peat excavation to ensure it is segregated from other soil types, therefore particular care should be taken to review recorded peat depths. ➤ Peat shall be separated and stored by type, namely the acrotelmic and catotelmic layers. ➤ Acrotelm (top about 0.3 to 0.4m of peat) is generally required for landscaping and shall be stripped and temporarily stockpiled for re-use as required. Acrotelm stripping shall be undertaken before the main excavations. ➤ Where possible, the acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage the growth of plants and vegetation. ➤ All catotelm peat (peat below about 0.3 to 0.4m depth) shall be transported immediately on excavation to the designated areas. ➤ Construction sequence planning shall minimise the time that peat is stockpiled before reuse. ➤ Peat stockpiles shall not be allowed to substantially erode or become dry. ➤ Material stockpiles shall be located at least 50m away from watercourses, including site ditches/shucks, to reduce the potential for sediment to be transferred into the wider hydrological system. ➤ Peat shall be stored in areas where the water table is high, or consideration shall be made for keeping the water table high where reasonably practical. ➤ Peat stockpile locations should be selected to limit re-handling as far as reasonably possible. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ Excavated peat shall be stored and reused within that immediate area to ensure peat is used to restore peatland habitat. ➤ The Contractor shall consult the Project Ecologist to agree on locations for material stockpiles and consider minimising impacting sensitive ecological receptors. ➤ The Contractor shall consult the site Geotechnical Engineer and review and take into account the Peat Stability Risk Assessment P20-051 by Fehily Timoney (April 2021), to avoid the risk of peat instability in peat excavations, peat stockpiling and all material stockpiling in areas underlain by peat. ➤ Run-off from stockpiles shall be directed through the site drainage system that shall include silt fences, settlement ponds and other drainage measures as appropriate. This shall be detailed in the Contractor's CEMP. 		
MM72	Peat instability and failure	EIAR Section 4. CEMP Section 3	The Contractor shall consult the site Geotechnical Engineer and review and take into account the Peat & Spoil Management Plan P20-051 by Fehily Timoney (April 2021) in Appendix 4-2 of the EIAR, to avoid the risk of peat instability in peat excavations, peat stockpiling and all material stockpiling in areas underlain by peat.		
MM73	Peat Management	EIAR Section 9	<ul style="list-style-type: none"> ➤ During the initial placement of peat and subsoil, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the peat reinstatement areas. 'Siltbuster' treatment trains will be employed if previous treatment is not to a high quality. ➤ Drainage from peat reinstatement areas will ultimately be routed to an oversized swale and a number of stilling ponds pond and a 'Siltbuster' with appropriate storage and settlement designed for a 1 in 100 year 6 hour return period before being discharged to the on-site drains. ➤ Peat/subsoil reinstatement areas will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. Once re-vegetated and stabilised peat/subsoil reinstatement areas will no longer be a potential source of silt laden runoff. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
<i>Flora and Fauna</i>					
MM74	Bats	EIAR Appendix 6-2	<p><u>Noise Disturbance</u> During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (SI 359/1996).</p> <p><u>Lighting Disturbance</u> Where lighting is required, directional lighting will be used to prevent overspill on to woodland/forestry edges. This will be achieved using lighting accessories, such as hoods, cowls, louvers and shields, to direct the light to the intended area only.</p>		
MM75	Bats	EIAR Appendix 6-2	<p><u>Bat Buffers</u> Felling of coniferous plantation will be conducted during the construction phase to facilitate the required bat buffers surrounding turbines located within or at the edge of conifer forestry habitats.</p>		
MM76	Birds	EIAR Section 7	The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Act 1976 – 2018. The removal of wetland vegetation and clearance/cutting of hedges and trees will be undertaken outside the breeding season (i.e. outside of the 1st of March and the 31st of August) including along the cable route.		
MM77	Birds	EIAR Section 7	<ul style="list-style-type: none"> ➤ The Site is located to the north of the North and West Clare regionally important area for hen harrier. The cable route is however within this hen harrier stronghold. In acknowledgement of the significance of this stronghold for hen harrier it is proposed to undertake all construction works associated with the relevant section of the cable route outside of the breeding season (i.e. outside of the 1st of March and the 31st of August). ➤ During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. ➤ Plant machinery will be turned off when not in use. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations 1996 (SI 359/1996) and other relevant legislation. 		
MM78	Flora and Fauna – Natural Woodland	EIAR Section 6	<p>The Proposed Development has been deliberately designed to minimise loss of Upland blanket bog Where the development footprint does occur on this habitat, the Proposed Development provides for the replacement of peatland habitat through the restoration of forestry (WD4) back to peatland. This is fully described in the site-specific Biodiversity Management Plan (BMP), provided in Appendix 6-4 of the EIAR.</p> <ul style="list-style-type: none"> ➤ The BMP aims to ensure that there will be no net loss of peatland habitat associated with the Proposed Development. ➤ It is proposed to undertaken enhancement of this area of peatland through the felling of stunted plantation forestry (WD4) and drain blocking within these areas. ➤ It is also proposed to remove encroaching conifers on adjoining peatland (establishing as a result of natural seed dispersal). The location and extent of the habitat replacement and enhancement areas are mapped in the Biodiversity Management Plan, Appendix 6-4 of the EIAR. These are located around Turbines no. 2, 4 and 8. 		
MM79	Invasive Species	EIAR Section 6 CEMP Section 3	<p>Measures will be in place to prevent the spread of these species during the proposed works. In addition, all necessary precautions will be taken to prevent the introduction of invasive species to the site from elsewhere. Best practice measures in relation to invasive species are described below:</p> <ul style="list-style-type: none"> ➤ All earthworks machinery will be thoroughly pressure-washed prior to arrival on site and prior to their further use elsewhere. ➤ Care will be taken not to disturb or cause the movement of invasive species fragments, either intentionally or accidentally. ➤ Stands of Rhododendron will be clearly demarcated by temporary fencing and tracking within them will be strictly avoided. ➤ Good construction site hygiene will be employed to prevent the spread of these species with vehicles thoroughly cleaned down prior to leaving any site 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>with the potential to have supported invasive species. All plant and equipment employed on the construction site (e.g. excavator, footwear, etc.) will be thoroughly cleaned down on site to prevent the spread of invasive plant. All clean down must be undertaken in areas with no potential to result in the spread of invasive species.</p> <ul style="list-style-type: none"> ➤ Any material that is imported onto any site will be verified by a suitably qualified ecologist to be free from any invasive species listed on the ‘Third Schedule’ of Regulations 49 & 50 of Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). This will be carried out by searching for rhizomes and plant material. ➤ The treatment and control of invasive alien species will follow guidelines issued by the National Roads Authority. The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (NRA 2010). 		
Ornithology					
MM80	Hen Harrier Enhancement Plan	EIAR Chapter 7 and Appendix 7-7	<p>Hen Harrier Enhancement Plan will be implemented to provide biodiversity gains locally with particular reference to hen harrier.</p> <p>Management prescriptions to be implemented by the applicant include:</p> <ul style="list-style-type: none"> ➤ Establishing linear strips of wildlife cover to increase the availability of foraging habitat for hen harrier locally. This measure will involve the sowing/planting of a wildlife seed crop. Wildlife seed crops will be sown by May 31st each year. The crop will be planted in a 9 metre wide strip along the sheltered side of existing hedges. The crop must be left in situ until March 15th the following year but its location can alternate between years. Crop strip must be a minimum of a 100 metres in length and fenced to prevent livestock grazing. An adaptive management approach will be instituted. A minimum of ten strips will be created. Passerine point counts will be undertaken monthly April to September inclusive in each monitoring year at 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>each of the ten wildlife seed crop strips. The monitoring aims to investigate to what extent seed crops increase the availability of prey species for hen harrier.</p> <ul style="list-style-type: none"> ➤ Hen harrier shows a strong preference for foraging in dense hedgerows ideally 3 to 4 metres wide. Landowners will restore hedgerows to these conditions. These will be widened by parallel planting of native hedgerow species. Restoring hedgerows will increase the availability of foraging habitat locally and establish connectivity between otherwise discrete land parcels. To ensure biodiversity; restored hedgerows should contain a minimum of two (woody plant) species per 10 metres. Suggested woody plant species could include hawthorn, blackthorn, willow spp., and holly. Existing vegetation will not be cleared to plant the new hedgerow and under no circumstance should herbicides be used. New hedges will be protected from grazing. Habitat management prescriptions for scrub and hedgerows are outlined below: <ul style="list-style-type: none"> ○ Retain existing areas of scrub and hedgerows; ○ Where there is evidence of scrub or hedgerow removal (since 2016), these habitats will be reinstated as part of individual farm plans ; ○ In open areas or where the extend of scrub and hedgerows is limited, create new areas of habitat; ○ In open areas or where the extend of scrub and hedgerows is limited, allow expansion of native hardwood scrub; ○ Trim established areas of gorse or willow scrub as the only means of preventing further encroachment onto grassland or access paths and tracks. Repeat annually if necessary; ○ Prevent any removal, burning or herbicide use on areas of established scrub; 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ○ If deemed necessary for road safety reasons, cut roadside hedgerows outside of the birds nesting season (March 1st – August 31st); ○ If deemed necessary for the protection of overhead electricity lines, cut hedgerows outside of the birds nesting season (March 1st – August 31st); ○ Hedgerow maintenance is permitted to prevent the hedge from “escaping”. In such cases, hedgerow trees should be left uncut, and the remainder of the hedgerow cut into an “A” shape, i.e. wider at the base than at the top; ○ Encroachment of scrub onto grassland can be controlled by cutting on an annual basis if required. Cutting, in this case, should not come closer than 1 metre from the base of the hedge; ○ Herbicides and pesticides will not be used within 5 metres of an existing hedgerow; and ○ Hedge cuttings will be piled into heaps and left to decay naturally. <p>➤ Habitat management prescriptions for heath and bog are outlined below:</p> <ul style="list-style-type: none"> ○ In general, maintain stocking levels of no greater than 0.15 livestock units (LU) per forage hectare; ○ In the specific case of blanket bog maintain stocking levels of up to 0.10 LU/ha; ○ No new forestry planting on the bog and heath areas within the enhancement area will be permitted; ○ Self-seeded conifers invading open areas of bog and heath will be removed; 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ○ Heath and bog habitats will be surveyed at least once every two years to ensure that new seedlings are removed; ○ Participating landowners will remove any self-seeding conifers as they appear or as they are noticed; ○ On areas of wet grassland, the application of chemical or organic fertiliser will be avoided; ○ All rhododendron or other invasive species must be removed in Year 1 of the plan. Ongoing control will be required in each subsequent year. Acceptable control methods are cutting/pulling or spot treatment with a suitable herbicide; ○ Consideration will be given to the creation of shallow pools 30- 50 cm deep to provide spawning sites for amphibians; and ○ In cases where the land is wet, limit grazing to the summer months. <p>➤ Habitat management prescriptions for managing rushes on wet grassland are outlined below:</p> <ul style="list-style-type: none"> ○ In general, rushes should be cut on a 2-year cycle unless there are specific reasons for a longer cycle, e.g. weak rush growth. ○ In most cases, active rush management should commence in year 1 of the plan and should only be delayed until year 2 or 3 where improved grassland is in reversion, where rush growth is very weak or where the rushes were cut or treated with herbicide in the year prior to joining the scheme. ○ On farms with a large area of rushy wet grassland (> 10 hectares), active rush management can be delayed on a portion of the area until Year 2 of the farm plan. The 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>area where active rush management is to be delayed for this reason should not normally exceed 50% of the wet grassland component of the farm.</p> <ul style="list-style-type: none"> ○ The planned rush management should be reviewed on an annual basis to determine if it is having the desired effect. If it is found during an annual inspection that rush recovery has been stronger or weaker than had been originally anticipated, the farm plan should be changed to adjust the cutting sequence for future years. <p>Grassland Fields >4 hectares in size</p> <p>In grassland fields over 4 hectares in area, the establishment of new hedges and/or exclosures is required. In grassland fields over 4 hectares in size, at least one exclosure or 100 metres of new hedgerow are required for each hectare or part thereof over 4 hectares. For example in a 6 hectare grassland plot, 2 exclosures or 200 metres of new hedgerows are required. If the plot in question is improved agricultural grassland in reversion, then these requirements are in addition to any additional hedgerow planting required as part of the reversion process.</p> <p>Exclosures will be 0.1-0.3 hectares in size. Livestock will be excluded from these exclosures through a permanent fence before the end of Year 1 of the management plan. The fence must be maintained in a stockproof condition. Where possible, exclosures should incorporate any existing patches of scrub. Exclosures are to be planted with native tree/ shrub species at a density of 1,000 plants per hectare (whips 40-80 cm in size are the preferred planting material). Planting must be completed before the end of Year 1 of the plan. The planting density may be reduced if some scrub already exists on the site.</p>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
Noise and Vibration					
MM81	Construction Phase Noise Control,	EIAR Section 11 CEMP Section 3	<p>The below practices be adopted during construction, including:</p> <ul style="list-style-type: none"> ➤ Managing the hours according to the CEMP during which site activities likely to create high levels of noise or vibration are permitted; ➤ Establishing channels of communication between the contractor/developer, Local 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; ➤ Keeping site access roads even to mitigate the potential for vibration from lorries. <p>Furthermore, a variety of practicable noise control measures will be employed. These include:</p> <ul style="list-style-type: none"> ➤ 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. 		
MM82	Construction Phase Noise Control,	EIAR Section 11	Operation of plant: all construction operations shall comply with guidelines set out in British Standard documents <i>'BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise'</i> .		
MM83	Construction Phase Noise Control,	EIAR Section 5, 11 CEMP Section 3	<p>The following list of measures will be considered, where necessary, to ensure compliance with the relevant construction noise criteria:</p> <ul style="list-style-type: none"> ➤ No plant used on site will be permitted to cause an on-going 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. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ 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 is required to operate before 07:00hrs or after 19:00hrs 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 Table 11-18 of the EIAR using methods outlined in British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise. ➤ The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good weather period or at critical periods within the programme it could occasionally be necessary to work out with these hours. It may also be necessary to commence turbine base concrete pours earlier due to time constraints incurred by the concrete curing process. Any such out of hours working would be agreed in advance with the local planning authority. <p>If rock breaking is employed in relation to site activities the following are examples of measures that will be considered as necessary in order to mitigate noise emissions from these activities:</p> <ul style="list-style-type: none"> ➤ Fit suitably designed muffler or sound reduction equipment to the rock breaking tool to reduce noise without impairing machine efficiency. ➤ Ensure all leaks in air line are sealed. ➤ Use a dampened bit to eliminate ringing. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ Erect acoustic screen between compressor or generator and noise sensitive area. When possible, line of sight between top of machine and reception point needs to be obscured. ➤ Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation. 		
<i>Air Quality/Dust</i>					
MM84	Construction Phase Dust Control	EIAR Section 4, 5 CEMP Section 3	<ul style="list-style-type: none"> ➤ In periods of extended dry weather, dust suppression may be necessary along haul roads, site roads, around borrow pit areas and other infrastructure to ensure dust does not cause a nuisance. If necessary, water will be taken from stilling ponds in the site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads, borrow pit and site compounds to prevent the generation of dust where required. Silty or oily water will not be used for dust suppression. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff. ➤ All plant and materials vehicles shall be stored in dedicated areas (on site). ➤ Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. ➤ Turbines and construction materials will be transported to the site on specified haul routes only. ➤ The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary. ➤ The site access roads will be checked weekly for damage/potholes and repaired as necessary. ➤ The transport of construction materials to the site that have significant potential to cause dust, will be undertaken in tarpaulin or similar covered vehicles where necessary. ➤ The transport of dry peat and spoil, that has the significant potential to generate dust, to the on-site borrow pits will be minimised. If necessary, excavated peat and spoil will be dampened prior to transport to the borrow pits. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ➤ All aggregate material for the construction of roads, cable route and turbine bases will be sourced onsite and will only be outsourced where necessary; therefore, reducing the need to transport this material to the site. ➤ Truck wheels will be washed to remove mud and dirt before leaving the site where they are deemed necessary and will be effective. 		
MM85	Construction Phase Air Quality	EIAR Section 10	<ul style="list-style-type: none"> ➤ All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. ➤ Turbines and construction materials will be transported to the site on specified routes only unless otherwise agreed with the Planning Authority. ➤ The majority of aggregate materials for the construction of the Proposed Development will be obtained from the two proposed borrow pits on the site. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements. ➤ The MRF facility will be local to the Proposed Development site to reduce the amount of emissions associated with vehicle movements. The nearest licensed waste facility to the site is Clean (Ireland) Refuse & Recycling Co. Ltd which is located approximately 15 km to the southwest of the Proposed Development. 		
<i>Cultural Heritage</i>					
MM86	Buffer Zones	EIAR Section 13	<p>One monument subject to statutory protection as defined in the Record of Monuments and is located within the EIAR site boundary for the Proposed Development. It consists of a multiple stone circle (CL031-052) located at Curraghodea townland at ITM E512804, N680240. Proposed Mitigation Measures include;</p> <ul style="list-style-type: none"> ➤ A 30m exclusion zone should be established by the contractor under the supervision of the appointed archaeologist prior to construction. The exclusion zone should be marked with permanent fence posts and durable high-visibility fencing with 'Keep Out' signage. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
Traffic					
MM87	Management of Large Deliveries	EIAR Section 14	<p>A comprehensive set of mitigation measures will be put in place before and during the construction stage of the project in order to minimise the effects of the additional traffic generated by the Proposed Development. For delivery of abnormal sized loads - The following are the main points to note for these deliveries which will take place after peak evening traffic:</p> <ul style="list-style-type: none"> ➤ The delivery of turbine components is a specialist transport operation with the transportation of components carried out at night when traffic is at its lightest and the impact minimised. ➤ The deliveries will be made in consultation with the relevant Authorities and An Garda Síochána. ➤ It is estimated that 64 abnormal sized loads will be delivered to the site, comprising 22 convoys of 3, undertaken over 22 separate nights. ➤ These nights will be spread out over an approximate period of 11 weeks and will be agreed in advance with the relevant authorities ➤ In order to manage each of the travelling convoys, for each convoy there will be two police escort vehicles that will stop traffic at the front and rear of the convoy of 3 vehicles. ➤ There will also be two escort vehicles provided by the haulage company for each convoy. 		
MM88	Construction Phase Traffic and Transport	EIAR Section 5, 14	<p>A detailed Traffic Management Plan (TMP), will be provided specifying details relating to traffic management and included in the CEMP prior to the commencement of the construction phase of the Proposed Development. The TMP will be agreed with the relevant Authorities and An Garda Síochána prior to construction works commencing on site. The detailed TMP will include the following:</p> <ul style="list-style-type: none"> ➤ Traffic Management Coordinator – a competent Traffic Management Co-ordinator will be appointed for the duration of the project and this person 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>will be the main point of contact for all matters relating to traffic management.</p> <ul style="list-style-type: none"> ➤ Delivery Programme – a programme of deliveries will be submitted to the County Council in advance of deliveries of turbine components to site. Liaison with the relevant local authorities and Transport Infrastructure Ireland (TII) will be carried out where required regarding requirements such as delivery timetabling. The programme will ensure that deliveries are scheduled in order to minimise the demand on the local network and minimise the pressure on the access to the site. ➤ Information to locals – Locals in the area will be informed of any upcoming traffic related matters e.g. temporary lane/road closures (where required) or delivery of turbine components at night, via letter drops and posters in public places. Information will include the contact details of the Project Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number will also be provided. ➤ A Pre and Post Construction Condition Survey – Where required by the local authority, a pre-condition survey of roads associated with the Proposed Development can be carried out immediately prior to construction commencement to record an accurate condition of the road at the time. A post construction survey will be carried out after works are completed to ensure that any remediation works are carried out to a satisfactory standard. Where required the timing of these surveys will be agreed with the local authority. All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers. ➤ Liaison with the relevant local authority - Liaison with the County Council and An Garda Síochána, will be carried out during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required. Once the surveys have been carried out and “prior to commencement” status of the relevant roads established, (in compliance with the provisions 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>of the CEMP), the Roads section will be informed of the relevant names and contact numbers for the Project Developer/Contractor Site Manager as well as the ECoW.</p> <ul style="list-style-type: none"> ➤ Implementation of temporary alterations to road network at critical junctions – at locations highlighted in section 14.1.8. In addition, in order to minimise the impact on the existing environment during turbine component deliveries the option of blade adaptor trailers will also be used where deemed practicable. Any alterations required will require prior discussion and agreement with the Municipal District Office. ➤ Identification of delivery routes – These routes will be agreed with the County Council and adhered to by all contractors. ➤ Delivery times of large turbine components - The management plan will include the option to deliver the large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage. ➤ Travel plan for construction workers – While the assessment above has assumed the worst case in that construction workers will drive to the site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of routes to / from the site and identification of an area for parking. ➤ Road Opening Licence – Roads works associated with the grid connection cabling will be undertaken in line with the requirements of a road opening licence as agreed with Clare County Council. ➤ Drainage - The Applicant will engage with the Municipal District Engineers Office and agree any necessary additions or changes to the existing surface drainage infrastructure (temporary or otherwise) prior to the commencement of any construction activities on site. ➤ Additional measures - Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including wheel washing facilities where necessary on site and sweeping / cleaning of local roads as required. 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>➤ Re-instatement works - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.</p>		
MM89	Construction Phase Traffic and Transport	EIAR Section 14	Truck wheels washing facilities will be available on site where deemed necessary and will be effective.		
Operational Phase					
MM90	Wastewater Management	EIAR Section 4	The removal and disposal of wastewater from the site will be carried out by a fully permitted waste collector holding valid Waste Collection Permits as issued under the Waste Management (Collection Permit) Regulations, 2007.		
MM91	Electrical Substation	EIAR Section 4, 8, 9 NIS Section 5 CEMP Section 3, 5	The electrical substation will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage of any associated chemicals and to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;		
MM92	Human Health	EIAR Section 5	An operational phase Health and Safety Plan will be developed to fully address identified Health and Safety issues associated with the operation of the site and providing for access for emergency services at all times.		
MM93	Site Drainage	EIAR Section 9 NIS Section 5	<p>The operational phase drainage system of the Proposed Development will be maintained into the operational phase as described below and as shown on the Drainage drawings submitted with this planning application:</p> <p>➤ Interceptor drains will be maintained up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then</p>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>be directed to areas where it can be re-distributed over the ground by means of a level spreader;</p> <ul style="list-style-type: none"> ➤ Swales/road side drains will be used to collect runoff from access roads and turbine hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling; ➤ On steep sections of access road transverse drains ('grips') will be constructed in the surface layer of the road to divert any runoff off the road into swales/road side drains; ➤ Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock; ➤ Settlement ponds, emplaced downstream of road swale sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and, ➤ Settlement ponds will be designed in consideration of the greenfield runoff rate. 		
MM94	Site Drainage	EIAR Section 4	The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.		
MM95	Surface Water Quality	CEMP Section 4	Monthly sampling for laboratory analysis for a range of parameters adopted during pre-commencement and construction phases will continue for six months after construction, in particular large excavation and heavy civil works. The Project Hydrologist will monitor and advise on the readings being received from the testing laboratory.		
MM96	Site Drainage	EIAR Section 4	Drainage swales and silting ponds will remain in place to collect runoff from roads and hardstanding areas of the Proposed Development during the operational phase.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM97	Fuel Control	EIAR Section 9	Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures		
MM98	Land on Decommissioning	EIAR Section 9	During decommissioning, it may be possible to reverse or at least reduce some of the potential impacts caused during construction by rehabilitating construction areas such as turbine bases and hard standing areas. This will be done by covering with peatland vegetation/scraw or poorly humified peat to encourage vegetation growth and reduce run-off and sedimentation.		
MM99	Telecoms and other service interference	EIAR Section 14	<p>It is standard practice of 2RN to produce a Protocol Document for wind farm developments, which will be signed by the developer. The Protocol Document ensures that in the event of any interference occurring to television or radio reception due to operation of the wind farm, the required measures, as set out in the document, will be carried out by the developer to rectify this. The Protocol Document ensures that the appropriate mitigation is carried out in the event of unanticipated broadcast interference arising to television or radio reception as a result of the Proposed Development.</p> <p>In the event of interference occurring to telecommunications, the Department of the Environment, Heritage and Local Government Wind Farm Planning Guidelines (2006) state that these effects are generally easily dealt with by the use of divertor relay links out of line with the proposed wind turbines.</p>		
MM100	Flora and Fauna	EIAR Section 4, 7	A detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Development, refer to Appendix 7-6 of the EIAR for further details. The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the project. Surveys will be scheduled to coincide with Years 1, 2, 3, 5, 10 & 15 of the life-time of the proposed renewable energy development. Monitoring measures are broadly based on guidelines issued by the Scottish Natural Heritage (SNH, 2009). The following individual components are proposed:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> > Flight activity surveys: breeding season vantage point surveys > Targeted bird collision surveys (corpse searches) will be undertaken with trained dogs. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust. 		
MM101	Flora and Fauna	EIAR Section 4, 7	Post-construction habitat condition monitoring will be undertaken 1 year post construction to ensure that there are no negative effects on marsh fritillary habitat.		
MM102	Flora and Fauna	EIAR Section 4, 7	<p><u>Blade Feathering</u> Blade feathering will be implemented as a standard across all proposed turbines when wind speeds are below the cut-in speed of the turbine.</p> <p><u>Bat Buffers</u> The required bat buffers surrounding turbines located within or at the edge of conifer forestry habitat will remain free from vegetation for the duration of the operational phase of the proposed development.</p> <p><u>Bat Monitoring Plan</u> Post-construction bat monitoring will be undertaken for at least three years' post construction of the renewable energy development. The monitoring will also include corpse searching in the areas surrounding the turbines to gather data on any actual collisions. The results of post construction monitoring shall be utilised to assess changes in bat activity patterns and to inform the design of any advanced site specified mitigation requirements, including curtailment if deemed necessary following post construction monitoring.</p> <p><u>Lighting</u> The applicant commits to the use of lights during operation in line with guidance that is provided in the Institute of Lighting Professionals Guidance Note 08/18 Bats and artificial lighting in the UK and Dark Sky Ireland Lighting Recommendations. Exterior lighting will be designed to minimise light spillage by using directional accessories (Stone, 2013).</p>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM103	Flora and Fauna	EIAR Section 6	<p>The Proposed Development has the potential to result in enhancement of the surrounding areas through habitat rehabilitation management (as described in the Biodiversity Management Plan) that will be implemented during the construction phase of the Proposed Development and maintained during the operational phase. Details of the management that will be undertaken are provided in the Biodiversity Management Plan in Appendix 6-4 of the EIAR. These include:</p> <ul style="list-style-type: none"> ➤ Restoring areas of stunted forestry back to peatland, ➤ Drain blocking within degraded peatlands, 		
MM104	Noise and Vibration	EIAR Section 11	<p>Commissioning noise surveys will be undertaken to ensure compliance with any noise conditions applied to the development. In the unlikely instance that an exceedance of these noise criteria is identified, the assessment guidance outlined in the IoA GPG and Supplementary Guidance Note 5: Post Completion Measurements (July 2014) should be followed and relevant corrective actions will be taken.</p>		
MM105	Air and Climate	EIAR Section 10	<p>Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise.</p>		
MM106	Shadow Flicker	EIAR Section 5	<p>Where daily or annual shadow flicker exceedances are experienced at buildings, a site visit will be undertaken firstly to determine the existing screening and window orientation. This will determine if the receptor has an actual line of sight to any turbine. Once this is completed and all of the potential receptors identified, the following measures will be employed,</p> <p>Screening Measures</p>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>In the event of an occurrence of shadow flicker exceeding guideline threshold values of 30 minutes per day at residential receptor locations, mitigation options will be discussed with the affected homeowner, including:</p> <ul style="list-style-type: none"> ➤ Installation of appropriate window blinds in the affected rooms of the residence; ➤ Planting of screening vegetation; ➤ Other site-specific measures which might be agreeable to the affected party and may lead to the desired mitigation which includes the option of a . ➤ Shadow flicker control unit which allows a wind farm’s turbines to be programmed and controlled using the wind farm’s Supervisory Control and Data Acquisition (SCADA) control system to change a particular turbine’s operating mode during certain conditions or times, or even turn the turbine off if necessary. 		
MM107	Human Health	EIAR Section 5	<ul style="list-style-type: none"> ➤ Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits. ➤ Staff associated with the project will conduct frequent visits, which will include inspections to establish whether any signs have been defaced, removed or are becoming hidden by vegetation or foliage, with prompt action taken as necessary. ➤ Signs will also be erected at suitable locations across the site as required for the ease and safety of operation of the proposed renewable energy development. These signs include: <ul style="list-style-type: none"> ○ Buried cable route markers at 50m (maximum) intervals and change of cable route direction; ○ Directions to relevant turbines at junctions; ○ “No access to Unauthorised Personnel” at appropriate locations; ○ Speed limits signs at site entrance and junctions; ○ “Warning these Premises are alarmed” at appropriate locations; ○ “Danger HV” at appropriate locations; 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> ○ “Warning – Keep clear of structures during electrical storms, high winds or ice conditions” at site entrance; ○ “No unauthorised vehicles beyond this point” at specific site entrances; and ○ Other operational signage required as per site-specific hazards. <p>➤ An operational phase Health and Safety Plan will be developed to fully address identified Health and Safety issues associated with the operation of the site and providing for access for emergency services at all times</p>		
Decommissioning Phase					
MM108	Decommissioning	EIAR Chapter 4	Prior to the end of the operational period the Decommissioning Plan (Appendix 4-8 of the EIAR) will be updated in line with decommissioning methodologies that may exist at the time and will agreed with the competent authority at that time.		
MM109	Decommissioning	DP Section 3	Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of the material proposed for turbine foundation backfilling. The invasive species survey will also be undertaken along the cable route to identify invasive species at joint bay locations where excavation to expose the cabling for removal will be required.		
MM110	Decommissioning	EIAR Chapter 4 DP Section 2	On removal of turbines, the covering of the foundation will be completed using material imported to site as the required quantity of material does not currently exist at the site. The imported soil will be spread and graded over the foundation using a tracked excavator and revegetation enhanced by spreading of an appropriate seed mix to assist in revegetation and accelerate the resumption of the natural drainage management that will have existed prior to any construction		
MM111	Flora and Fauna, Site Rehabilitation	EIAR Section 6	During decommissioning, it may be possible to reverse or at least reduce some of the potential impacts caused during construction by rehabilitating construction areas such as turbine bases and hard standing areas. This will be done by covering with peatland		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			vegetation/scraw or poorly humified peat to encourage vegetation growth and reduce run-off and sedimentation.		
MM112	Decommissioning	EIAR Chapter 4 DP Section 3	<p>The following mitigation measures are proposed to avoid release of hydrocarbons at the site:</p> <ul style="list-style-type: none"> ➤ Road-going vehicles will be refuelled off site wherever possible; ➤ On-site refuelling will be carried out at designated refuelling areas at various locations throughout the site. Machinery will be refuelled directly by a fuel truck that will come to site as required ➤ Only designated trained and competent operatives will be authorised to refuel plant on site. ➤ Fuel volumes stored on site should be minimised. Any fuel storage areas will be bunded appropriately; ➤ The plant used will be regularly inspected for leaks and fitness for purpose; and, ➤ An emergency plan for the decommissioning phase to deal with accidental spillages will be developed (refer to Section 4) Spill kits will be available to deal with and accidental spillage in and outside the refuelling area. <p>A programme for the regular inspection of plant and equipment for leaks and fitness for purpose will be developed at the outset of the decommissioning phase.</p>		
MM113	Decommissioning	EIAR Section 7	<p>A Decommissioning Plan has been prepared (see Appendix 4-8 of the EIAR) The following measures are proposed for the decommissioning phase:</p> <ul style="list-style-type: none"> ➤ During the decommissioning phase, disturbance limitation measures will be as per the construction phase (see Chapter 7 of the EIAR). ➤ Plant machinery will be turned off when not in use. ➤ All plant and equipment for use will comply with the Construction Plant and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations 2001 (S.I. No. 632 of 2001). 		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			A project ecologist will be appointed to oversee the decommissioning phase, with similar duties to those outlined above during the construction phase.		
MM114	Decommissioning	EIAR Chapter 14 DP Section 3	<p>The Traffic Management Plan has been prepared to consider the decommissioning as a standalone project. The removal of turbines from site will be undertaken for a specialist haulier. The traffic management arrangements although similar to that implement for turbine delivery as outlined in the EIAR will be agreed in advance of decommissioning (early or after 25 years of operation) with the competent authority.</p> <p>A traffic management plan has been prepared for the removal of cabling from cable ducts on the proposed underground cabling route.</p>		

7. MONITORING PROPOSALS

All monitoring proposals relating to the pre-commencement, construction and operational phases of the Proposed Development were set out in various sections of the EIAR, NIS and Biodiversity Enhancement Plan prepared as part of the planning permission application to Clare County Council.

This section of the Construction and Environment Management Plan groups together all of the monitoring proposals presented in the EIAR. The monitoring proposals are presented in the following pages.

By presenting the monitoring proposals in the below format, it is intended to provide an easy to audit list that can be reviewed and reported on during the future phases of the project. The tabular format in which the below information is presented, can be further expanded upon during the course of future project phases to provide a reporting template for site compliance audits.

Table 7-1 Monitoring Measures

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
Pre-Commencement Phase						
MX1	Drainage Maintenance	EIAR Section 4 CEMP Section 4	An inspection and maintenance plan for the drainage system on site will be prepared in advance of commencement of any works. Regular inspections of all installed drainage systems will be necessary, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water at parts of the systems where it is not intended. The inspection of the drainage system will be the responsibility of the site ECoW or the Project Hydrologist.	On going	Monthly	Project Hydrologist
MX2	Clear Felling of Coniferous Plantation	EIAR Section 9	Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The ‘before’ sampling should 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). Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will also be undertaken as per water monitoring programme for the overall Proposed Development and each primary watercourse along the route.	As Required	Monthly	ECoW
MX3	Drainage Inspection	CEMP Section 3	Prior to commencement of works in sub-catchments across the site main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage.	As Required	Monthly	Project Hydrologist
MX4	Flora & Fauna	EIAR Section 6	Pre-commencement surveys will be undertaken for marsh fritillary to determine long term trends of the population within the site. Vegetation structure and suitability will be	Once	As required	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			monitored following the NBDC survey methodology (NBDC, 2020).			
MX5	Invasive Species	EIAR Section 6 CEMP Section 3	A pre-commencement invasive species survey shall be completed for the site.	Once	As required	Project Ecologist
MX6	Archaeology	EIAR Section 13	<p>The following areas should be subject to pre-construction stage licensed archaeological testing:</p> <ul style="list-style-type: none"> ➤ Proposed new roads in non-forested areas ➤ Turbine bases and hardstands for T3, T5, T6 and T7 ➤ Proposed Borrow pit south of T5 ➤ Sections of proposed cable route that traverse green field sections ➤ A report on the results of the testing should be undertaken prior to the commencement of development and submitted to the relevant authorities of Archaeological monitoring of ground works during construction. ➤ A report on the results of the monitoring shall be compiled and submitted to the relevant authorities on completion of the project. 	As Required	As Required	Project Archaeologist
MX7	Birds	EIAR Section 7	Pre-commencement bird surveys will be undertaken prior to the initiation of works at the Site. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas, where access allows. If winter roost sites or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located, and earmarked for monitoring at the beginning of the	Once	As required	Project Ornithologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			first winter season or breeding season (respectively) of the construction phase. If it is found to be active during the construction phase no works shall be undertaken within a 500m buffer in line with best practise. No works shall be permitted within the buffer until it can be demonstrated that the roost or nest is no longer occupied.			
Construction Phase						
MX8	Archaeological Monitoring	EIAR Section 13	Archaeological monitoring of all ground works during construction (in areas of previously undisturbed ground). The National Monuments Service will be informed of such findings to discuss how best to proceed. If archaeological finds, features or deposits are uncovered during archaeological monitoring, the developer will be prepared to provide resources for the resolution of such features whether by preservation by record (excavation) or preservation in situ (avoidance). Once the project is completed, a report on the results of the monitoring will be compiled and submitted to the relevant authorities.	As Required	As Required	Project Archaeologist
MX9	Flora and Fauna	EIAR Section 6	Habitat condition monitoring will be undertaken during construction and in year 1 post construction to ensure that there are no negative effects on marsh fritillary habitat	Once	As required	Project Ecologist
MX10	Water Quality and Monitoring	CEMP Section 3	The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the ECoW on-site. The ECoW or Project Hydrologist will respond to changing weather, ground or drainage conditions on the ground as the project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible.	Daily	As Necessary	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX11	Water Quality and Monitoring	EIAR Section 9	Daily surface water monitoring forms will be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection.	Daily	As Necessary	ECoW
MX12	Surface Water Quality	CEMP Section 4	Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken as per water monitoring programme for the Proposed Development and each primary watercourse along the route. This will not be restricted to just these locations around the proposed renewable energy development site with further sampling points added as deemed necessary by the ECoW in consultation with the Project Hydrologist and Site Manager. In-situ field monitoring will be completed on a Monthly basis. In-situ field monitoring will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period. The Project Hydrologist will monitor and advise on the readings collected by in-situ field monitoring.	As Required	Monthly	ECoW
MX13	Clear felling of Coniferous Plantation	EIAR Section 9	Checking and maintenance of roads and culverts will be ongoing through any felling operation. No tracking of vehicle through watercourses will occur, as vehicles will use road infrastructure and existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works;	As Required	Monthly	ECoW
MX14	Plant and Equipment Inspections	EIAR Section 9 CEMP Section 4	The plant used should be regularly inspected for fuel leaks, unnecessary noise generation and general fitness for purpose.	As Required	Monthly	ECoW
MX15	Plant and Equipment Inspections	CEMP Section 3	Local areas of the haul route will be condition monitored and maintained, if necessary.	Daily	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX16	Flora and Fauna	CEMP Section 3	<p>A Project Ecologist will be appointed. The responsibilities and duties of the Project Ecologist will include the following:</p> <ul style="list-style-type: none"> ➤ Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided. ➤ Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Development area. ➤ Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise. ➤ Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. ➤ Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress. 	As required	As required	Project Ecologist
MX17	Noise and Vibration	CEMP Section 4	Monitoring typical levels of noise and vibration during critical periods and at sensitive locations will be carried out.	Daily	Monthly	ECoW
Operational Phase						
MX18	Flora and Fauna	EIAR Section 6	Habitat condition monitoring will be undertaken during construction and in year 1 post construction to ensure that there are no negative effects on marsh fritillary habitat	As required	As required	Project Ecologist
MX19	Surface Water Quality	CEMP Section 4	Monthly sampling for laboratory analysis for a range of parameters adopted during pre-commencement and construction phases will continue for six months during the operational phase. The Project Hydrologist will monitor and advise on the readings being received from the testing laboratory.	Monthly	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX20	Drainage Inspections	CEMP Section 3	The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.	Monthly	Monthly	ECoW
MX21	Ornithology	EIAR Section 4, 7	<p>A detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Development, refer to Appendix 7-6 of the EIAR for further details. The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the project. Surveys will be scheduled to coincide with Years 1, 2, 3, 5, 10 & 15 of the lifetime of the proposed renewable energy development. Monitoring measures are broadly based on guidelines issued by the Scottish Natural Heritage (SNH, 2009). The following individual components are proposed:</p> <ul style="list-style-type: none"> ➤ Flight activity surveys: breeding season vantage point surveys ➤ Targeted bird collision surveys (corpse searches) will be undertaken with trained dogs. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust. 	Years 1, 2, 3, 5, 10 & 15	Annually	Project Ornithologist
MX22	Ornithology	Appendix 7-7	<p>The monitoring measures will include:</p> <ul style="list-style-type: none"> ➤ The area proposed for enhancement will be the subject of ongoing monitoring during the operational phase of the wind farm to ensure it is offering supporting habitat for breeding hen harrier. The ongoing monitoring will take place during the breeding bird season. The monitoring will seek to identify whether optimal hen harrier habitat has been created within areas under active management and will be conducted by way of vantage 	1, 2, 3, 5, 10 and 15	As required	Project Ornithologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			<p>point surveys. These surveys will be undertaken once a month March to August inclusive.</p> <ul style="list-style-type: none"> ➤ Passerine point counts will be undertaken monthly from April to September inclusive in each monitoring year at each of the enhancement areas. The location of enhancement areas is provided in Figure 1-1 above. The monitoring aims to investigate to what extent enhancement measures e.g. seed crops, increase the availability of prey species for hen harrier. ➤ Areas of favourable hen harrier foraging habitat (i.e. scrub, blanket bog, wet heath and heather banks) within the enhancement areas should be accurately mapped and should be monitored annually to check that the areas so covered have not altered in size and that the grazing regime that is in place is maintaining the current state of these habitats (i.e. neither poaching nor overgrowth of open areas is occurring). As well as mapping, this monitoring should be recorded by means of fixed point photography. 			
MX23	Ornithology	Appendix 7-7	<p>Audits will be required to ensure the effectiveness of the enhancement plan. The audit will assess:</p> <ul style="list-style-type: none"> ➤ Objectives of the individual farm plan; ➤ Implementation of the plan; and ➤ Adherence to requirements of the farm plan. 	Every five years	As required	Project Ornithologist
MX24	Flora and Fauna	EIAR Section 4, 6	<p><u>Bat Monitoring Plan</u></p> <p>Post-construction bat monitoring will be undertaken for at least three years' post construction of the renewable energy development. The monitoring will also include corpse</p>	Years 1, 2, 3	Annually	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			<p>searching in the areas surrounding the turbines to gather data on any actual collisions.</p> <p>The results of post construction monitoring shall be utilised to assess changes in bat activity patterns and to inform the design of any advanced site specified mitigation requirements, including curtailment if deemed necessary following post construction monitoring.</p>			
MX25	Flora and Fauna	EIAR Section 6	<p>The Proposed Development has the potential to result in enhancement of the surrounding areas through habitat rehabilitation management (as described in the Biodiversity Management Plan) that will be implemented during the construction phase of the Proposed Development and maintained during the operational phase. Details of the management that will be undertaken are provided in the Biodiversity Management Plan in Appendix 6-4 of the EIAR. These include:</p> <ul style="list-style-type: none"> ➤ Restoring areas of stunted forestry back to peatland, ➤ Drain blocking within degraded peatlands ➤ Surface Peat Assessments ➤ Vegetation Sampling ➤ Hydrological Monitoring 	As required	As required	Project Ecologist
Decommissioning Phase						
MX26	Decommissioning	DP Section 3	The Site Manager in consultation with the ECoW will be responsible for employing the services of a suitably qualified ecologist and any other suitably qualified professionals as required throughout the decommissioning works.	As required	As required	Site Manager
MX27	Decommissioning	DP Section 3	Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of any material proposed	As required	As required	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			for use as part of foundation backfilling. The invasive species survey will also be undertaken along the cable route to identify invasive species at joint bay locations where excavation to expose the cabling for removal will be required.			

8. PROGRAMME OF WORKS

8.1 Construction Schedule

The construction phase will take approximately 12 – 18 months to complete from starting on site to the commissioning of the electrical system and export of electricity from site.

The EIAR stipulated that in the interest of breeding birds, construction would not commence during the breeding bird season, which runs from March to August. The EIAR also stipulated that construction including the removal of conifers (forestry) by felling may commence at any stage from September onwards to the end of February thus avoiding the period from the 1st of March to the 31st of August inclusive, as prescribed in the Wildlife Acts, so that construction activities are ongoing by the time the next breeding bird season comes around and can continue throughout the next breeding season.

The phasing and scheduling of the main construction task items are outlined in Figure 8-1 below, where 1st January has been selected as an arbitrary start date for construction activities.

ID	Task Name	Task Description	Q1			Q2			Q3			Q4			Q1			Q2		
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1	Site Health & Safety		[Blue bar spanning all months]																	
2	Site Compound	Site Compound, Site Access, Fencing, Gates	[Blue bar]																	
3	Site Roads	Excavate/upgrade roads; Install drainage measures; Install culvert; Install water protection measures;	[Blue bar]																	
4	Turbine Hardstands	Excavate base; construct hardstanding areas				[Blue bar]														
5	Turbine Foundations	Fix steel; Erect shuttering; Concrete pour							[Blue bar]											
6	Substation Construction & Electrical Works	Construct Substation; Underground cabling between turbines;	[Blue bar]																	
7	Backfilling & Landscaping														[Blue bar]					
8	Turbine Delivery & Erection														[Blue bar]					
9	Substation Commissioning														[Blue bar]					
10	Turbine Commissioning														[Blue bar]					

Figure 8-1 Indicative Construction Schedule

9. COMPLIANCE AND REVIEW

9.1 Site Inspections and Environmental Audits

Routine inspections of construction activities will be carried out on a daily and weekly basis by the ECoW and the Construction Manager to ensure all controls to prevent environmental impacts, relevant to the construction activities taking place at the time, are in place.

Environmental inspections will ensure that the works are undertaken in compliance with this CEMP and all other planning application documents. Only suitably trained staff will undertake environmental site inspections.

9.2 Auditing

An Environmental audit will first be carried out prior to the construction phase of the development to ensure the implementation of pre-construction mitigation measures, completion of baseline studies and implementation of pre-construction felling mitigation measures. Further environmental audits will be carried on a monthly basis during the construction phase of the project and again after the commissioning of the wind turbines.

In contrast to monitoring and inspection activities, audits are designed to shed light on the underlying causes of non-compliance, and not merely detect the non-compliance itself. In addition, audits are the main means by which system and performance improvement opportunities may be identified.

Environmental audits will be carried out by the ECoW on behalf of the Project Developer, in an and objective manner. Environmental audits will be conducted at planned intervals to determine whether the CEMP is being properly implemented and maintained. The results of environmental audits will be provided to the Project Developer and project contractor.

An audit of compliance with the pre-commencement mitigation measures will be completed by the ECoW prior to the commencement of the construction phase of the development. An audit of compliance with the construction phase mitigation measures will be completed monthly during the construction phase. The findings of each audit will be documented by the ECoW in an audit report within the EMP for the site. The audit report will be made available to Clare County Council on request.

Once the proposed renewable energy development is operational and turbines have been commissioned, a report of compliance with operational phase mitigation measures will be prepared.

9.3 Environmental Compliance

The following definitions shall apply in relation to the classification of Environmental Occurrences during construction of the proposed renewable energy development:

Environmental Near Miss: An occurrence which if not controlled or due to its nature could lead to an Environmental Incident.

Environmental Incident: Any occurrence which has potential, due to its scale and nature, to migrate from source and have an environmental impact beyond the site boundary.

Environmental Exceedance Event: An environmental exceedance event occurs when monitoring results indicate that limits for a particular environmental parameter (as indicated in the Environmental Monitoring Programme) has been exceeded.

An exceedance will immediately trigger an investigation into the reason for the exceedance occurring and the application of suitable mitigation where necessary.

Exceedance events can be closed out on achieving a monitoring result below the assigned limit for a particular environmental parameter.

Environmental Non-Compliance: Non-fulfilment of a requirement and includes any deviations from established procedures, programs and other arrangements related to the EMP.

9.4

Corrective Action Procedure

A corrective action is implemented to rectify an environmental problem on-site. Corrective actions will be implemented by the Construction Manager, as advised by the Site ECoW. Corrective actions may be required as a result of the following;

- > Environmental Audits;
- > Environmental Inspections and Reviews;
- > Environmental Monitoring;
- > Environmental Incidents; and,
- > Environmental Complaints.

A Corrective Action Notice will be used to communicate the details of the action required to the main contractor. A Corrective Action Notice is a form that describes the cause and effect of an environmental problem on site and the recommended corrective action that is required. The Corrective Action Notice, when completed, will include details of close out and follow up actions.

If an environmental problem occurs on site that requires immediate attention direct communications between the Construction Manager and the ECoW will be conducted. This in turn will be passed down to the site staff involved. A Corrective Action Notice will be completed at a later date.

9.5

Construction Phase Review

The project contractor's CEMP will be the subject of review by the ECoW on behalf of the project developer whenever a revised version of the CEMP is presented for approval.