



## **APPENDIX 4-3**

### **CONSTRUCTION AND ENVIRONMENT MANAGEMENT PLAN**

# **Construction and Environmental Management Plan**

Proposed Glenard Wind  
Energy Development





## DOCUMENT DETAILS

Client: **FuturEnergy Ireland**

Project Title: **Proposed Glenard Wind Energy Development**

Project Number: **190114**

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

Document File Name: **CEMP F – 2022.01.21 - 190114**

Prepared By: **MKO  
Tuam Road  
Galway  
Ireland  
H91 VW84**



Rev	Status	Date	Author(s)	Approved By
01	Draft	24/11/2020	PH	EM
02	Draft	30/06/2021	DOS	EM
03	Draft	17/12/2021	DOS	EM
04	Final	21/01/2022	DOS	EM

# Table of Contents

1.	<b>INTRODUCTION.....</b>	<b>1</b>
1.1	Scope of the Construction and Environmental Plan .....	1
2.	<b>SITE AND PROJECT DESCRIPTION.....</b>	<b>3</b>
2.1	Site Location.....	3
2.2	Description of the Development.....	3
2.3	Targets and Objectives .....	5
2.4	Construction Methodology Overview .....	5
2.4.1	Introduction.....	5
2.4.2	Overview of Proposed Construction Methodology.....	6
2.4.3	Temporary Construction Compounds.....	6
2.4.4	Borrow Pit.....	7
2.4.5	Peat and Spoil Repository.....	7
2.4.6	Tree Felling .....	8
2.4.7	Site Drainage Systems.....	9
2.4.8	Site Access Roads.....	10
2.4.8.1	Upgrade to Existing Roads or Tracks .....	10
2.4.8.2	Construction of New Excavated Roads.....	11
2.4.8.3	Construction of New Floating Roads.....	12
2.4.9	Turbine and Meteorological Mast Foundations .....	13
2.4.9.1	Crane Hardstands.....	14
2.4.10	Onsite Electricity Substation and Control Building.....	14
2.4.11	Site Underground Cabling.....	15
2.4.12	Grid Connection Construction Methodology.....	15
2.4.12.1	Existing Underground Services.....	17
2.4.12.2	Joint Bays.....	17
2.4.12.3	Grid Connection Watercourse/Culvert Crossings.....	17
2.4.13	Culvert Crossings on the Wind Farm Site.....	20
2.4.14	Wind Farm Site Watercourse Crossings.....	21
2.4.15	Decommissioning.....	23
3.	<b>ENVIRONMENTAL MANAGEMENT.....</b>	<b>24</b>
3.1	Introduction .....	24
3.2	Protecting Water Quality .....	24
3.2.1	Good Environmental Management During Construction.....	24
3.2.2	Site Drainage Principles.....	24
3.2.3	Best Practice Guidance .....	25
3.2.4	Site Drainage Design and Management .....	26
3.2.4.1	Pre-Construction Drainage .....	26
3.2.4.2	Construction Phase Drainage .....	26
3.2.4.3	Operational Phase Drainage Management .....	28
3.2.5	Forestry Felling.....	28
3.2.5.1	Forestry Felling Drainage Management.....	30
3.2.6	Borrow Pit Drainage .....	31
3.2.7	Peat and Spoil Repository Area Drainage.....	31
3.2.8	Floating Road Drainage .....	31
3.2.9	Cable Trench Drainage.....	31
3.3	Refuelling, Fuel and Hazardous Materials .....	32
3.4	Cement Based Products Control Measures.....	32
3.5	Peat Stability Management.....	33
3.5.1	General recommendations for Good Construction .....	34
3.5.2	Peat and Spoil Usage in Restoration of the Borrow Pit .....	34
3.5.3	Placement of Peat and Spoil in Repository Area.....	34
3.5.4	Placement of Peat and Spoil Along Access Roads .....	35
3.6	Dust Control.....	35
3.7	Noise Control .....	36



3.8	Invasive Species Management .....	36
3.8.1	Site Management .....	37
3.8.2	Establish Good Site Hygiene .....	37
3.9	Waste Management.....	37
3.9.1	Legislation .....	38
3.9.2	Waste Management Hierarchy .....	38
3.9.3	Construction Phase Waste Management .....	38
3.9.3.1	Description of the Works.....	38
3.9.3.2	Waste Arising and Proposals for Minimisation, Refuse and Recycling of Construction Waste .....	39
3.9.3.3	Waste Arising from Construction Activities .....	40
3.9.4	Waste Arising from Decommissioning.....	40
3.9.4.1	Reuse.....	41
3.9.4.2	Recycling .....	41
3.9.5	Implementation .....	41
3.9.5.1	Roles and Responsibilities .....	41
3.9.5.2	Training.....	41
3.9.5.3	Waste Management Plan Conclusion .....	42
4.	<b>ENVIRONMENTAL MANAGEMENT IMPLEMENTATION .....</b>	<b>43</b>
4.1	Roles and Responsibilities .....	43
4.1.1	Construction Manager /Site Supervisor .....	43
4.1.2	Environmental Clerk of Works .....	44
4.1.3	Project Ecologist .....	45
4.1.4	Project Hydrologist.....	45
4.1.5	Project Geotechnical Engineer/Geologist.....	46
4.2	Water Quality and Monitoring.....	46
5.	<b>EMERGENCY RESPONSE PLAN .....</b>	<b>47</b>
5.1	Overview.....	47
5.1.1	Roles and Responsibilities .....	47
5.1.2	Hazard Identification.....	48
5.1.3	Site Evacuation/Fire Drill.....	49
5.2	Environmental Emergency Response Procedure .....	49
5.2.1	Excessive Peat Movement.....	49
5.2.2	Onset of Peat Slide.....	49
5.2.3	Spill Control Measures.....	50
5.3	Contact the Emergency Services .....	51
5.4	Contact Details.....	51
5.4.1	Procedure for Personal Tracking.....	52
5.5	Induction Checklist .....	52
6.	<b>MITIGATION MEASURES .....</b>	<b>53</b>
7.	<b>MONITORING PROPOSALS .....</b>	<b>95</b>
8.	<b>PROGRAM OF WORKS .....</b>	<b>103</b>
8.1	Construction Schedule .....	103
9.	<b>COMPLIANCE AND REVIEW .....</b>	<b>104</b>
9.1	Site Inspections and Environmental Monitoring .....	104
9.2	Auditing .....	104
9.3	Environmental Compliance.....	104
9.4	Corrective Action Procedure .....	105
9.5	Construction Phase Review.....	105

# 1. INTRODUCTION

This Construction and Environmental Management Plan (CEMP) has been developed by MKO on behalf of FuturEnergy Glenard Designated Activity Company (DAC) who intend to An Bord Pleanála for planning permission for the construction of a wind energy development, comprising up to 15 no. wind turbines and associated infrastructure in Glenard and adjacent townlands near, Buncranca, Co. Donegal.

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 report provides the environmental management framework to be adhered to during the pre-commencement, construction and operational phases of the Proposed Development and it incorporates the mitigating principles to ensure that the work is carried out in a way that minimises the potential for any environmental impacts to occur.

This report is intended as a single, amalgamated document that can be used during the future phases 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.

## 1.1 Scope of the Construction and Environmental Plan

This report is presented as a guidance document for the construction of the proposed Glenard Wind Farm. 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 measures, 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.

## 2. SITE AND PROJECT DESCRIPTION

### 2.1 Site Location

The core of the proposed development site is located on the Inishowen Peninsula of Co. Donegal, approximately 5.9km east of town of Buncrana which overlooks Lough Swilly and 6.2km west of the village of Quigley’s Point (also known as Carrowkeel) which overlooks Lough Foyle. The site location is shown in Figure 2-1.

Access to the site, for Heavy Goods Vehicles (HGV) and abnormal loads (e.g. turbine components) will be via a proposed new entrance, in the northeast of the site, off a local access road which in turn is accessed from the L2731 local road. The current, existing access junctions, located in the north and south of the site will be utilised to provide access for general site traffic such as construction staff and Light Goods Vehicles (LGV).

Works required along the proposed delivery route, between the R240 Regional Road and the proposed new site entrance will form part of the planning application and are assessed as part of the EIAR.

Felling of commercial forestry is required as part of the proposed development.

The townlands within which the proposed development is located are listed in Table 2-1.

Table 2-1 Townlands within which the Project is located.

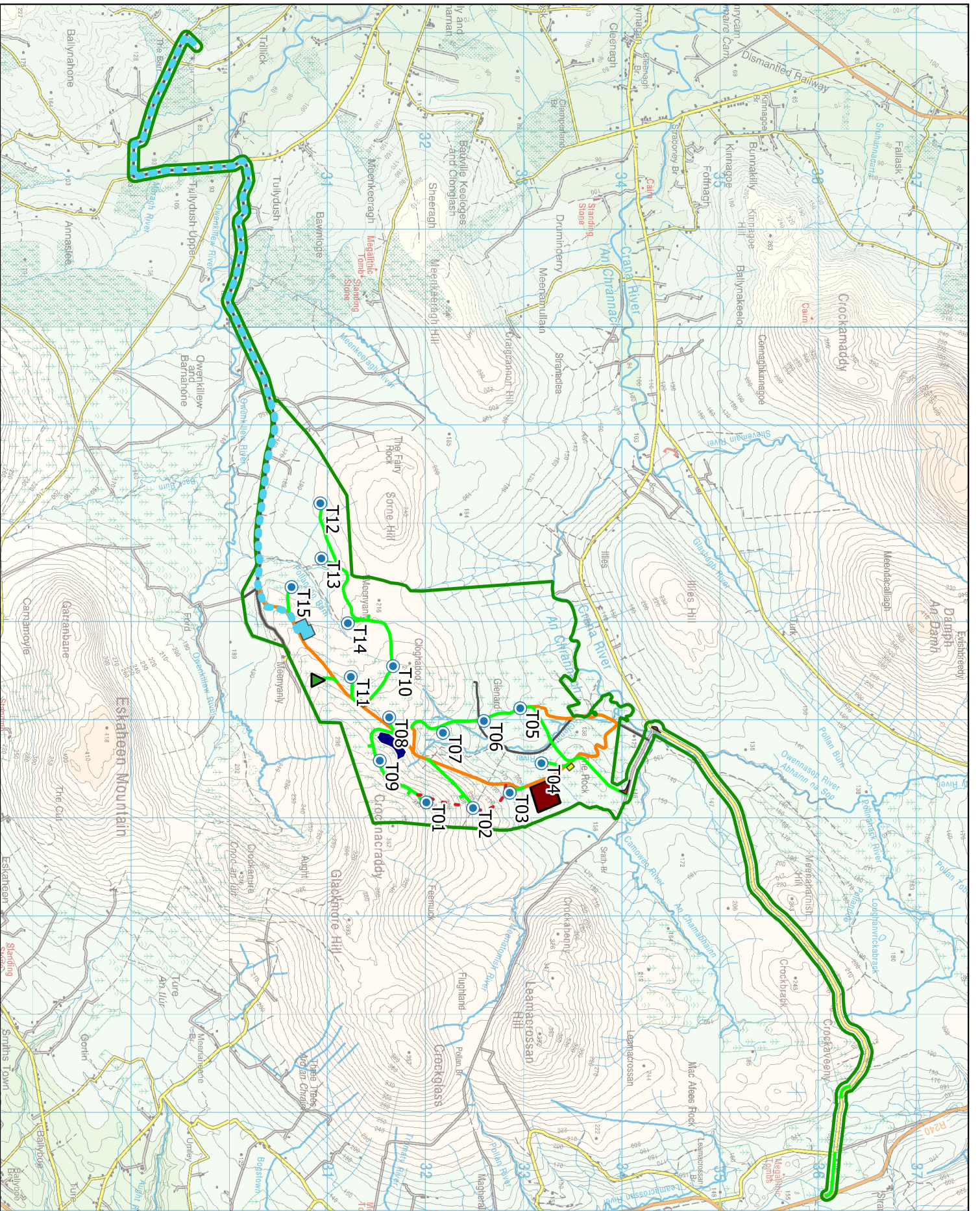
Townlands within which the proposed development is located:	
Glenard	Meenyanly
Illies	Sorne
Carrowmore or Glentogher	Meenakeeragh
Ballynahone	Tullydush Upper
Carnamoyle	Owenkillew and Barnahone
Annaslee	

### 2.2 Description of the Development

The proposed development comprises the construction of 15 No. wind turbines and all associated works. The proposed turbines will have a maximum blade tip height of up to 173 metres above the top of the foundation. The applicant is seeking a ten-year planning permission. The full description of the proposed development, as per the public planning notices, is as follows:

1. Construction of 15 No. wind turbines and associated hardstand areas with the following parameters:
  - a. a total tip height in the range of 162 metres minimum to 173 metres maximum,
  - b. hub height in the range of 96 metres minimum to 107 metres maximum, and
  - c. rotor diameter in the range of 132 metres minimum to 140 metres maximum
2. 1 no. 110kV permanent electrical substation including a control building with welfare facilities, all associated electrical plant and equipment, security fencing, all associated underground cabling, wastewater holding tank and all ancillary structures and works;





### Map Legend

- EIA Site Boundary
- Proposed Turbine Layout
- Proposed Substation Location
- Proposed Met Mast
- Proposed Borrow Pit
- Proposed Construction Compounds
- Proposed Peat and Spoil Repository Area
- Turbine Delivery Route Accommodation Works
- Proposed Grid Connection Route
- Proposed Amenity Walkway
- Proposed New Site Roads
- Existing Roads - Upgrade Proposed
- Existing Forestry Roads & Tracks



Microsoft product screen shots reprinted with permission from Microsoft Corporation  
 Ordnance Survey Ireland Licence No. AR 0021820 © Ordnance Survey Ireland/ Government of Ireland

Drawing Title  
**Site Layout Map (inc Turbine Accommodation Works Areas)**

Project Title  
**Glenard Wind Farm**

Drawn By  
**SD**

Checked By  
**EM**

Project No.  
**190114**

Drawing No.  
**Fig 2-1**

Scale  
**1:50000**

Date  
**01.02.2022**

**MKO**  
 Planning and Environmental Consultants  
 Team Road, Galway  
 Ireland, H91 VV94  
 +353 (0) 91 735611  
 Website: www.mkoc.ie



3. *All works associated with the permanent 110kV connection from the proposed substation to the national electricity grid, via underground cabling within permanent cable ducts in the townlands of Meenyanly, Carnamoyle, Sorne, Owenkillew and Barnahone, Meenakeeragh Tullydush Upper, Annaslee and Ballynahone to the existing Trillick 110kV substation in the townland of Ballynahone;*
4. *All associated underground electrical and communications cabling connecting the turbines to the proposed wind farm substation;*
5. *1 no. Meteorological Mast of 104 metres in height;*
6. *Upgrade of existing tracks and roads, provision of new permanent site access roads including a new site entrance (in the townland of Glenard);*
7. *1 no. borrow pit;*
8. *1 permanent no. peat and spoil repository area;*
9. *Permanent placement of peat and spoil along sections of site access roads as part of the peat and spoil management plan for the site;*
10. *2 no. temporary construction compounds;*
11. *Permanent recreation and amenity works, including marked trails, seating areas, amenity car park, and associated amenity signage;*
12. *All temporary works associated with the facilitation of turbine component and abnormal load delivery;*
13. *Construction of a permanent link road between the R240 Regional Road and the L1731 local road; construction of a second permanent link road on the L1731; permanent road widening at three locations along the L1731 (in the townlands of Carrowmore or Glentogher and Illies) all of which will facilitate the delivery of abnormal loads to the site during the construction period and may be used during the operational period if necessary or to facilitate the decommissioning of the wind farm. Following the construction period, access to the link roads will be closed off;*
14. *Site Drainage;*
15. *Site Signage;*
16. *Ancillary Forestry Felling to facilitate construction and operation of the proposed development; and*
17. *All associated site development works.*

This application is seeking a ten-year permission and 35 year operational life from the date of commissioning of the renewable energy development.

It is proposed to connect the development to the national electricity grid via an underground cable which will connect the proposed onsite substation to the existing Trillick 110kV substation, located 6.2km southwest of the core of the proposed development site in the townland of Ballynahone. The grid connection cabling route will measure approximately 8km in length.

2.3

## Targets and Objectives

In so far as the designs that have been completed to date, or are to be further completed in future, the construction phase works are designed to approved standards, which include specified materials, standards, specifications and codes of practice. The design of the project has considered environmental issues and this is enhanced by the works proposals.

The key site targets are as follows;

- Ensure construction works and activities are completed in accordance with mitigation and best practice approach presented in the EIAR, NIS and associated planning documentation;
- Ensure construction works and activities are completed in accordance with all planning documents 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;
- Adopt a sustainable approach to construction; and,
- Provide adequate environmental training and awareness for all project personnel.

The key site objectives are as follows;

- Using recycled materials if possible, e.g. excavated stone, overburden and peat material;
- Ensure sustainable sources for materials supply where possible;
- 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;
- Avoidance of vandalism;
- Keeping all watercourses free from obstruction and debris;
- Correct implementation of the sustainable drainage system (SuDS) drainage design principles;
- Keep impact of construction to a minimum on the local environment, watercourses, and wildlife;
- Correct fuel storage and refuelling procedures to be followed;
- Good waste management and house-keeping to be implemented;
- Air and noise pollution prevention to be implemented;
- Monitoring of the works and any adverse effects that it may have on the environment. Construction Methods and designs will be altered where it is found there is an adverse effect on the environment;
- Comply with all relevant water quality legislation listed throughout this document; and,
- Ensure a properly designed, constructed and maintained drainage system appropriate to the requirements of the site is kept in place at all times.

2.4

## Construction Methodology Overview

2.4.1

### Introduction

An experienced main contractor will be appointed for the civil works for the construction phase of the Proposed Development. The appointed contractor for the works will be required to comply with this CEMP and any revisions made to this document in the preparation of method statements for the various elements of the construction phase of the proposed development. An overview of the proposed Construction and Demolition Methodologies is provided below.

## 2.4.2 Overview of Proposed Construction Methodology

The proposed anticipated construction methodology is summarised under the following main headings:

- > Temporary Construction Compounds;
- > Borrow Pit;
- > Peat and Spoil Repository
- > Tree Felling;
- > Site Drainage System;
- > Site Access Roads;
- > Turbine and Meteorological Mast Foundations;
- > Crane Hardstands;
- > Onsite Electricity Substation and Control Building;
- > Site Underground Cabling
- > Grid Connection Construction Methodology
- > Existing Underground Services
- > Joint Bays
- > Grid Connection Watercourse/Culvert Crossings
- > Watercourse Crossings
- > Transport Route Accommodation Works
- > Decommissioning

## 2.4.3 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. Drainage runs and associated settlement ponds (refer to Section 3.2.2 below) will be installed around the perimeter;
- > 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; and,
- > 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.



## 2.4.4 Borrow Pit

It is proposed to develop one on-site borrow pit, to be located approximately 156m northwest of T9, as shown in Figure 2-1. The borrow pit will typically be excavated and backfilled as follows:

- The areas to be used for both borrow pit 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;
- Interceptor drainage ditches will be excavated on all sides of the borrow pit to catch surface water runoff, and direct it to downstream re-distribution locations;
- The borrow pit will be constructed so that the base of the borrow pit is below the level of the adjacent section of access road.
- 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;
- As the borrow pit excavations 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 treatment will be employed to ensure no deterioration in downstream water quality occurs;
- Slopes within the excavated rock formed around the perimeter of the borrow pit will be formed at stable inclinations to suit local in-situ rock conditions.
- Infilling of the peat & spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress. Leaving in place upstands/segments of intact rock which will help to retain the placed peat & spoil and will allow the borrow pit to be developed and infilled in cells.
- A rock buttress is required at the downslope edge of the borrow pit to safely retain the infilled peat and spoil. The height of the rock buttresses constructed should be greater than the height of the infilled peat & spoil to prevent any surface peat & spoil run-off. A buttress up to 7m (approx.) in height is likely to be required.
- The rock buttress will be founded on competent strata. The founding stratum for the rock buttress should be inspected and approved by the project geotechnical engineer.
- In order to prevent water retention occurring behind the buttresses, the buttresses will be constructed of coarse boulder fill with a high permeability.
- The surface of the placed peat & spoil will be shaped to allow efficient run-off of surface water from the placed arising's.
- Control of groundwater within the borrow pit will be required.
- Further guidelines on the construction of the borrow pit are included within Section 7.4 of the Peat & Spoil Management Plan (Appendix 4-2 of the EIAR)

Post-construction, the borrow pit area will be permanently secured and a stock-proof fence will be erected around the borrow pit areas to prevent access to these areas. Appropriate health and safety signage will also be erected on this fencing and at locations around the fenced area.

## 2.4.5 Peat and Spoil Repository

One location has been identified as a suitable peat and spoil repository area and is shown in Figure 2-1. The Repository is located approximately 215m north of Turbine No. 3 and measures approximately 65,600 square metres. The repository areas is located adjacent to an existing road.

The placement of peat and spoil within the repository area will be undertaken as follows:

- A maximum height of 1m of peat will be placed in the Repository.

- An interceptor drain will be installed around the perimeter of the Repository. The drain will divert any surface water away from the Repository and hence prevent water from ponding in the area.
- The surface of the placed peat will be shaped to allow efficient run-off of surface water. Where possible, shaping of the surface of the peat will be carried out as placement of peat within the peat repository progresses. This will reduce the likelihood of debris run-off and ensure stability of the placed peat.
- The edge of the stored peat will be shaped at a slope of 1 (v): 5 (h). It is recommended that more intact peat (Acrotelm) is used to form this slope. Where possible, the acrotelm will 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, including the sloped edge.
- Low ground pressure machinery and bog mats will be required to place the peat in the Repository.
- Supervision by the Project Geotechnical Engineer is required for the construction of the Repository.

## 2.4.6 Tree Felling

The majority of the site (62%) currently comprises commercial coniferous forestry plantation. 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 and the other ancillary infrastructure.

A total of 80.5 hectares of forestry will be permanently felled within and around the footprint of the Proposed Development in order to facilitate infrastructure construction and turbine erection.

The tree felling activities required as part of the Proposed Development will be the subject of a Limited Felling Licence (LFL) application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments.

The estimated 80.5 hectares that will be permanently felled for the footprint of the turbines and the other infrastructure and turbine erection will be replaced or replanted on a hectare for hectare basis as a condition of any felling licence that might be issued in respect of the proposed wind farm development. Replanting is a requirement of the Forestry Act and is primarily a matter for the statutory licensing processes that are under the control of the Forest service.

The proposed methodology for the forestry felling activities is as follows:

Felling works will conform to current best practice Forest Service policies and strategic guidance documents as well as Coillte produced guidance documents, including the specific guidelines listed below, to ensure that the felling works provides minimal potential impacts to the receiving environment.

- 'Standards for Felling and Reforestation' (Department of Agriculture, Food and the Marine, 2019)
- 'Forest Operations & Water Protection Guidelines' (Coillte, 2009)
- 'Methodology for Clear Felling Harvesting Operations' (Coillte, 2009)
- 'Forestry and Water Quality Guidelines' (Forest Service, 2000)
- 'Forestry Biodiversity Guidelines' (Forest Service, 2000)
- 'Forestry Protection Guidelines' (Forest Service, 2002)
- 'Forestry Harvesting and Environmental Guidelines' (Forest Service, 2000)

The proposed methodology for the forestry felling activities is as follows:

- The extent of all necessary forestry felling areas will be identified and demarcated with markings on the ground in advance of any felling commencing.

- All roads and culverts will be inspected by the ECoW and contractor prior to any machinery being brought on site to commence the felling operation.
- Existing drains that drain an area to be felled towards surface watercourses will be blocked, and temporary silt/sediment traps (ie. check dam / silt fence) will be constructed to ensure collection of all silt within felling areas. These temporary silt traps will be cleaned out and backfilled once felling works are complete. This ensures there is no residual collected silt remaining in blocked drains after felling works are completed.
- New collector drains and sediment traps will be installed during ground preparation to intercept water upgradient of felling areas and divert it away. Collector drains will be excavated at an acute angle to the contour (0.3%-3% gradient), to minimise flow velocities.
- 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 removed from traps will be carefully disposed of in the peat repository areas.
- 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; however, the general proposed machine combination will comprise a harvester and a low-ground pressure harvester with a 14-tonne bunk capacity.
- Trees will be cut manually inside the 50m construction watercourse buffer and using machinery to extract whole trees only;
- Brush mats will be put in place 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.
- Brush mat renewal should take place when they become heavily used and worn. Provision should be made for brush mats along all off-road routes, to protect the soil from compaction and rutting.
- No tracking of vehicles through watercourses will occur. Vehicles will only use existing road infrastructure and established watercourse crossings.
- Brush which has not been pushed into the soil may be moved within the site to facilitate the creation of mats in more demanding locations.
- Extraction routes, and hence brush 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 prior to removal off site.

## 2.4.7 Site Drainage Systems

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 construction of the drainage will start from the downstream sections and progress upstream, connecting conveyance systems with other drainage features as each development phase progresses. They will be designed with sufficient flexibility to respond to an early phase incoming flow during the construction phase.

Detailed measures to address surface water management based upon the design criteria and philosophy will be implemented. The drainage system will be excavated and constructed in conjunction with the road and hard standing construction. Drains will be excavated, and settlement ponds constructed to eliminate any suspended solids within surface water running off the site. Surface water management and drainage design is dealt with in Section 3.2, Section 4.7 of the EIAR and in the Surface Water Management Plan (included as Appendix 4-4 of the EIAR).

## 2.4.8 Site Access Roads

The road construction design has taken into account the following key factors as stated in the Fehily Timoney & Company’s (FT) Peat & Spoil Management Plan in Appendix 4-2 of the EIAR:

- Buildability considerations
- Serviceability requirements for construction and wind turbine delivery and maintenance vehicles
- Minimise excavation arising
- Requirement to minimise disruption to peat hydrology

Whilst the above key factors are used to determine the road design the actual construction technique employed for a particular length of road are determined on the prevailing ground conditions encountered along that length of road.

The proposed upgrade to existing roadways and construction of new roadways will incorporate passing bays to allow traffic to pass easily while traveling around the site.

The 4 no. road construction types proposed are as follows:

- Existing Roads to be Upgraded
  - Excavate and Replace
  - Floating
- Proposed New Roads
  - Excavate and Replace
  - Floating

The locations where the above construction types are proposed is shown in Figure 1-1 of the Peat & Spoil Management Plan. This document is included as Appendix 4-2 of this EIAR.

### 2.4.8.1 Upgrade to Existing Roads or Tracks

It is proposed to utilise the existing road network at the site as much as possible (approximately 6.6km will be used). The general construction methodology for upgrading of existing sections of excavated and floating roads or tracks, as presented in FTC’s Peat & Spoil Management Plan in Appendix 4-2, is summarised below. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

18. *Access road construction will be to the line and level requirements as per design/planning conditions.*
19. *For upgrading of existing excavated access tracks (Type A - Figure 3-1) the following guidelines apply:*
  - (a) *Excavation of the widened section of access road will take place to a competent stratum beneath the peat, removing all peat and soft clay and backfilled with suitable granular fill.*
  - (b) *Benching of the excavation may be required between the existing section of access road and the widened section of access road depending on the depth of excavation required.*
  - (c) *The surface of the existing access track will be overlaid with up to 300mm of selected granular fill.*
  - (d) *A layer of geogrid/geotextile may be required at the surface of the existing access track where the existing track shows signs of excessive rutting, etc.*
  - (e) *For excavations in peat, side slopes will be not greater than 1(v): 3 (h). This slope inclination will be reviewed during construction, as appropriate. Where areas of weaker peat are encountered then slacker slopes will be required.*

20. For upgrading of existing access tracks constructed using a floated construction technique the following guidelines apply:
  - (a) The surface of the existing access track will be levelled prior to the placement any
  - (b) geogrid/geotextile, where necessary (to prevent damaging the geogrid/geotextile).
  - (c) Where coarse granular fill has been used in the existing access track make-up, a layer of geogrid will be placed on top of the existing access track.
  - (d) The geogrid will be overlaid with up to 500mm of selected granular fill.
  - (e) Additional geogrid and granular fill may be required in certain sections of the works, such as where excessive rutting is noted in the existing track.
21. The finished road width will have a running width of 5m, with wider sections on bends and at corners as shown on the site layout drawings submitted with the planning application.
22. Where the ground is sloping across a section of access road (side long ground) any road widening works required will be done on the upslope side of the existing access road, where possible.
23. At transitions between floating and existing excavated roads a length of road of about 10m will have all peat excavated and replaced with suitable fill. The surface of this fill will be graded so that the road surface transitions smoothly from floating to excavated road.
24. A final surface layer will be placed over the existing access track and graded to accommodate wind turbine construction and delivery traffic.

#### 2.4.8.2 Construction of New Excavated Roads

The excavation of peat and spoil and founding of access roads on competent stratum (below the peat) for new access roads will be carried out at various locations on the site. The proposed locations for new access roads on site are shown in Figure 2-1.

Excavate and replace type access roads are the conventional method for construction of access roads on peatland sites and the preferred construction technique in shallow peat (<2.0-2.5m) provided sufficient placement/reinstatement capacity is available on site for the excavated peat.

1. Prior to commencing the construction of the excavated roads movement monitoring posts will be installed in areas where the peat depth is greater than 1.5m.
2. Interceptor drains will be installed upslope of the access road alignment to divert any surface water away from the construction area.
3. Excavation will take place to a competent stratum beneath the peat.
4. 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.
5. Once excavated, peat will be placed within the borrow pit or the peat and spoil repository.
6. Excavation of materials with respect to control of peat stability.
  - (a) Acrotelm (top about 0.3 to 0.4m of peat) is generally required for landscaping and will be stripped and temporarily stockpiled for re-use as required. Acrotelm stripping will be undertaken prior to main excavations.
  - (b) Where possible, the acrotelm will be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation.
  - (c) All catotelm peat (peat below about 0.3 to 0.4m depth) will be transported immediately on excavation to the borrow pit or to the designated peat repository.
7. Side slopes in peat will be not greater than 1 (v): 3 (h). This slope inclination will be reviewed during construction, as appropriate. Where areas of weaker peat are encountered then slacker slopes will be required. Battering of the side slopes of the excavations will be carried out as the excavation progresses.
8. The excavated access road will be constructed of up to 1000mm of selected granular fill. Granular fill to be placed and compacted in layers in accordance with the TII Specification for Road Works.

9. *A layer of geogrid/geotextile may be required at the surface of the competent stratum should excessive rutting be noted in the track.*
10. *At transitions between floating and excavated roads a length of road of about 10 to 20m will have all peat excavated and replaced with suitable fill. The surface of this fill will be graded so that the road surface transitions smoothly from floating to excavated road.*
11. *Where slopes of greater than 5 degrees are encountered along with relatively deep peat (i.e. greater than 1.5m) and where it is proposed to construct the access road perpendicular to the slope contour sit is best practice to start construction at the bottom of the slope and work towards the top, where possible. This method avoids any unnecessary loading to the adjacent peat and greatly reduces any risk of peat instability.*
12. *A final surface layer will be placed over the excavated road and will be graded to accommodate wind turbine construction and delivery traffic.*

### 2.4.8.3 Construction of New Floating Roads

In a number of areas across the site of the Proposed Development it will be necessary to construct floating roads over peat.

The general construction methodology for the construction of floating, as presented in FTC's Peat and Spoil Management Plan in Appendix 4-2 of the EIAR, is summarised below.

1. *Prior to commencing floating road construction movement monitoring posts will be installed in areas where the peat depth is greater than 2.0m.*
2. *Base geogrid will be laid directly onto the existing peat surface along the line of the road in accordance with geogrid provider's requirements.*
3. *The make-up of the new floated access road will be up to 1,200mm thickness of selected granular fill with 2 no. layers of geogrid with the inclusion of a geotextile separator, where necessary.*
4. *Granular fill will be placed in layers and compacted in accordance with the TII Specification for Road Works, Series 600 (2013).*
5. *During construction of the floated access roads it may be deemed necessary to include pressure berms either side of the access road in some of the deeper peat areas. The inclusion of a 2 to 5m wide pressure berm (typically 0.5m in height) either side of the access road will reduce the likelihood of potential bearing failures beneath the access road.*
6. *The finished road width will have a running width of 5m, with wider sections on bends and corners.*
7. *Stone delivered to the floating road construction areas will be end-tipped onto the constructed floating road. Direct tipping of stone onto the peat will not be carried out.*
8. *To avoid excessive impact loading on the peat due to concentrated end-tipping all stone delivered to the floating road will be tipped over a minimum length of 10m of constructed floating road.*
9. *Where it is not possible to end-tip over a 10m length of constructed floating road then dumpers delivering stone to the floating road will carry a reduced stone load (not greater than half full) until such time as end-tipping can be carried out over a 10m length of constructed floating road.*
10. *Following end-tipping a suitable bulldozer will be employed to spread and place the tipped stone over the base geogrid along the line of the road.*
11. *A final surface layer will be placed over the full width of the floating road to provide a road profile and graded to accommodate wind turbine construction and delivery traffic.*

The proposed amenity walkways (as shown on Figure 2-1) will be constructed using a methodology similar to that of new floating roads, as outlined above. The walkways will measure approximately 2.5m in width.



2.4.9

## Turbine and Meteorological Mast Foundations

The wind turbines and meteorological mast foundations will be a reinforced concrete base designed to Eurocode 2/BS8110. Foundation loads will be provided by wind turbine and mast supplier, 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 ground bearing foundations and that the formation level of the turbine foundations will be on the lower mineral subsoil or bedrock. For completeness and depending on findings of the confirmatory ground investigations, reinforced concrete-piled foundations have also been considered. Turbine bases will measure approximately 25 metres in diameter, while the meteorological mast base will measure approximately 25 square metres. They will be formed a minimum of 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 and,
- The foundation excavation will be raised to formation level by compacted layers of well graded granular material, spread and compacted to provide a hard area for the turbine foundation.

Standard excavated reinforced concrete bases will be completed as follows:

- A layer of concrete 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 will 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 using vibrating pokers 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; and,
- 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.

- 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 Chapter 4 of the EIAR.

Reinforced concrete piled foundations will be completed 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;
  - No material will be removed from site and placement areas will be stripped of vegetation prior to placement in line with best working practices;
- A piling platform for the piling rig will be constructed. This will be done by laying geotextile on the existing surface and a stone layer will then be placed on top of the geotextile by an excavator and compacted in order to give the platform sufficient bearing capacity for the piling rig.
- The piling rig, fitted with an auger, will then bore through the soft material with a sleeve fitted around the auger to prevent the sidewalls of the peat from collapsing. The borehole is then extended to a suitable depth into the subsoil/bedrock.
  - When the auger and the sleeve are removed high tensile steel cages will be lowered into the boreholes. These steel cages will extrude above the level of the top of the concrete pile.
  - As the auger is removed concrete is pumped into the borehole.
  - Reinforcing steel on the top of the pile will tie to the foundation base steel.
  - The procedure for standard excavated reinforced concrete bases as outlined below can be applied from here.

#### 2.4.9.1 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.

#### 2.4.10 Onsite Electricity Substation and Control Building

Once tree felling as described in Section 2.4.2.3, above, is completed, the onsite substation will be constructed by the following methodology:

- The area of the onsite substation will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed to nearby temporary storage area for later use in landscaping. Any excess material will be sent to one of the on-site peat repositories or the proposed borrow pit, for reinstatement purposes.
- The dimensions of the onsite substation area have been designed to meet the requirements of the ESB and the necessary equipment to safely and efficiently operate the proposed wind farm;
- A control building will be built within the onsite substation compound;
- The foundations will be excavated down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix;
- 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 & internal partition walls formed. Scaffold will be erected around the outside of the building for this operation;



- The 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.
- Perimeter fencing will be erected.
- The construction and components of the substation are to Eirgrid specifications.

#### 2.4.11 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.

Clay plugs 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. While the majority of the cable trenches will be backfilled with native material, clay subsoils of low permeability will be used to prevent conduit flow in the backfilled trenches. Backfill material will be imported onto the site should sufficient volumes not be encountered during the excavation phase of roadway and turbine foundation construction.

#### 2.4.12 Grid Connection Construction Methodology

The underground cabling (UGC) works will consist of the installation of ducts in an excavated trench to accommodate power cables, and a fibre communications cable to allow communications between the proposed 110kV Glenard Wind Farm substation and 110kV Trillick substation.

The proposed UGC will consist of 3 No. 160mm diameter HDPE power cable ducts and 2 No. 125mm diameter HDPE communications duct to be installed in an excavated trench, typically 600mm wide by 1,315mm deep, with variations on this design to adapt to bridge crossings, service crossings and watercourse crossings, etc. The power cable ducts will accommodate 1 No. power cables per duct. The communications duct will accommodate a fibre cable to allow communications between the proposed Glenard Wind Farm substation and the existing Trillick 110kV substation. The ducts will be installed, the trench reinstated in accordance with landowner or Donegal County Council specification, and then the electrical cabling/fibre cable is pulled through the installed ducts in approximately 700/800m sections. Construction methodologies to be implemented and materials to be used will ensure that the UGC is installed in accordance with the requirements and specifications of Eirgrid.

The underground cable required to facilitate the grid connection will be laid beneath the surface of the site and/or public road using the following the methodology summarised below, and outlined in detail in TLI Group's Glenard Wind Farm 110kV Grid Connection – Construction Methodology included as Appendix 4-5 of this EIAR:

- The Contractor, and their appointed Site Manager, will prepare a targeted Method Statement concisely outlining the construction methodology and incorporating all mitigation and control measures included within the EIAR and as required by planning conditions where relevant;
- All existing underground services along the UGC route shall be confirmed prior to the commencement of construction works;

- At watercourse crossings, the contractor will be required to adhere to the environmental control measures outlined within the EIAR, the Construction Environmental Management Plan (CEMP) and best practice construction methodologies;
- Where the cable route intersects with culverts, the culvert will remain in place (where possible) and the ducting will be installed either above or below the culvert to provide minimum separation distances in accordance with ESB and Irish Water specifications;
- Traffic management measures will be implemented in accordance with those included in Section 14.1 of the EIAR, and a detailed Traffic Management Plan will be prepared and agreed with Donegal County Council;
- Excavated material will be temporarily stockpiled onsite for re-use during reinstatement. Stockpiles will be restricted to less than 2m in height. Stockpiles will be located a minimum of 50m from surface water features and all stockpiling locations will be subject to approval by the Site Manager and Project Ecological Clerk of Works (ECoW);
- Excavated material shall be employed to backfill the trench where appropriate and any surplus material will be transported to the proposed on-site borrow pit;
- Any earthen (sod) banks to be excavated will be carefully opened with the surface sods being stored separately and maintained for use during reinstatement;
- The excavated trench will be dewatered if required, from a sump installed within the low section of the opened trench. Where dewatering is required, dirty water will be fully and appropriately attenuated, through silt bags, before being appropriately discharged to vegetation or surface water drainage feature (please refer to Chapter 9 of the EIAR);
- Where required, grass will be reinstated by either seeding or by replacing with grass turves;
- No more than a 100m section of trench will be opened at any one time. The second 100m will only be excavated once the majority of reinstatement has been completed on the first;
- The excavation, installation and reinstatement process will take on average of 1 no. day to complete a 100m section;
- Where the cable is being installed in a roadway, temporary reinstatement may be provided to allow larger sections of road to be permanently reinstated together;
- Following the installation of ducting, pulling the cable will take approximately 1 no. day between each joint bay, with the jointing of cables taking approximately 1 week per joint bay location.



### 2.4.12.1 Existing Underground Services

In order to facilitate the installation of the proposed UGC, it may be necessary to relocate existing underground services such as water mains or existing cables. In advance of any construction activity, the contractor will undertake additional surveys of the proposed route to confirm the presence or otherwise of any services. If found to be present, the relevant service provider will be consulted with in order to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works.

If existing low voltage underground cables are found to be present, a trench will be excavated, and new ducting and cabling will be installed along the new alignment and connected to the network on either end. The trench will be backfilled with suitable material to the required specification. Warning strip and marking tape will be laid at various depths over the cables as required. Marker posts and plates will be installed at surface level to identify the new alignment of the underground cable, the underground cables will then be re-energised.

In the event that water mains are encountered the water supply will be turned off by the utility so work can commence on diverting the service. The section of existing pipe will be removed and will be replaced with a new pipe along the new alignment of the service. The works will be carried out in accordance with the utility standards.

### 2.4.12.2 Joint Bays

Joint Bays are to be installed approximately every 700m - 800m along the UGC route to facilitate the jointing of 2 No. lengths of UGC. Joint Bays are typically 2.5m x 6m x 1.75m pre-cast concrete structures installed below finished ground level. Joint Bays will be located in the non-wheel bearing strip of roadways, however given the narrow profile of local roads this may not always be possible.

In association with Joint Bays, Communication Chambers are required at every joint bay location to facilitate communication links between the proposed Glenard Wind Farm substation and the existing 110kV substation at Trillick. Earth Sheath Link Chambers are also required at every joint bay along the cable route. Earth Sheath Links are used for earthing and bonding cable sheaths of underground power cables, so that the circulating currents and induced voltages are eliminated or reduced. Earth Sheath Link Chambers and Communication Chambers are located in close proximity to Joint Bays. Earth Sheath Link Chambers and Communication Chambers will typically be pre-cast concrete structures with an access cover at finished surface level.

The precise siting of all Joint Bays, Earth Sheath Link Chambers and Communication Chambers, within the curtilage of the public road, is subject to approval by ESNB.

### 2.4.12.3 Grid Connection Watercourse/Culvert Crossings

There are a total of 11 watercourse and culvert crossings along the proposed cable route, of which 6 no. are stream crossings. The proposed cable route will involve 6 No. bridge crossings, including 5 No. HDD crossings and 1 No. bridge replacement works. A schedule of the culverts identified and the proposed crossing method to be implemented is detailed in Appendix 4-6 of this EIAR and the locations are shown on the site layout drawings included in Appendix 4-1. Where the cable route intersects with existing watercourses, a detailed construction method statement will be prepared by the Contractor prior to the commencement of construction and is to be approved by the Local Authority and relevant environmental agencies. The cable will be located within the bridge deck where there is sufficient depth and width available on the bridge, where there is insufficient depth and width available horizontal directional drilling (HDD) may be employed as an alternative.

It is proposed to cross existing culverts using open trenching with either an undercrossing or an overcrossing, depending on the depth of the culvert. A confirmatory site survey of all culverts will be completed as part of the next phase of the project prior to construction to confirm the findings of the design phase surveys

Inland Fisheries Ireland have published guidelines relating to construction works along water bodies entitled “*Requirements for the Protection of Fisheries Habitats during Construction and Development Works at River Sites*”, and these guidelines will be adhered to during the construction of the proposed development.

#### 2.4.12.3.1 Bridge Deck Replacement

Temporary dams will be used during the construction to divert and contain the flow from the works area to allow the work to be completed in the dry; this will prevent any material entering the watercourse. Barrier dams will be positioned around each abutment in turn. The stream will continue to flow on the other side of the channel to the works. Sandbag dams, using 25kg sandbags will be formed around the works area. Bags will be lowered from the road, either with an independent crane or one fixed to the back of a truck. Pumps will be used to dry the dammed area and will remain in place. The pumps will out-fall to a bunded area.

The Contractor shall employ best practice settling systems to ensure maximum removal of suspended solids prior to discharge of any surface water or groundwater from excavations to receiving waterbodies. This may include treatment via settlement tanks. Another effective method to collect harmful sediments from the pumped water will be the provision of Silt Dewatering Bags to protect the surrounding environment.

There will be no direct pumping of water from the works to watercourses at any time.

#### Demolition of Existing Structures

The demolition and construction work to the bridge will be undertaken in the dry works area created between the dams once a sequence or predefining scenarios have occurred.

- Sediments will be laid on the riverbed to trap disturbed sediment that may pollute aquatic habitats downstream. These mats are an effective tool for the protection of watercourses from sedimentation damage during in stream construction activities.
- Install solid crash mat/scaffold above water level; this crash mat/scaffold extends under the entire the plan area of the bridges;
- Install debris netting;
- Weather conditions will be considered when planning construction activities with the works to be undertaken during low flows in the river.
- Once the area within the Owenkillew River to be worked upon is dry, the works can commence.

It will be requirement to remove and take down the existing structures above ground level. This will require a tracked excavator to be deployed for in-river works to remove the debris from the Owenkillew River and to reduce the levels of the intermediate support and abutments whilst reducing the intermediate support to above water level and the end supports to above ground level.

Prior to taking down the supports, the existing elements of the deck superstructure will be removed.

The following gives an indicative sequence of the demolition works:

- Install temporary support to deck at each end;
- Release deck from intermediate supports and abutment.

- Lift deck and remove to tip off site.
- Reduce existing abutment and approach embankment to above ground level.

### Installation of Prefabricated/Preformed Structures

Construction of the new structure will require transportation, handling and lifting of prefabricated elements. The use of prefabricated units facilitates the speed of construction and minimises the period of time required for works over water.

The following gives an indication of the envisaged construction sequence:

- Maintain solid crash mat/scaffold and debris netting;
- Install double silt fence around extents of embankments;
- Sedimats will be laid on the riverbed and along the banks of the watercourse
- Fabricate beam / girder units (off site);
- Excavate to the base of bank seat level. If dewatering of excavation is required, the water will be pumped for treatment via settlement tanks. There will be no direct pumping of water from the works to watercourses at any time;
- Install and test bored piles at the locations (if required);
- Construct reinforced concrete bankseat abutments and approach retaining walls;
- Transport prestressed concrete bridge beams to site and crane into place from adjacent lands;
- Fix reinforcement and pour concrete deck slab and parapet upstands at both structures;
- Install back of wall drainage and below ground waterproofing;
- Backfill bankseat excavation with Class 6N granular fill and construct road embankments on approaches;
- Install new parapets;
- Complete road surfacing and finishes;
- Remove scaffold, debris netting, Sedimats, sandbagsand silt fence.



### 2.4.12.3.2 **Horizontal Directional Drilling**

It is proposed to implement Horizontal Directional Drilling (HDD) for 4 no. crossings. However, following confirmatory site investigations prior to construction it may be necessary to utilise HDD for additional crossings.

Horizontal Direction Drilling (HDD) is a method of drilling under obstacles such as bridges, culverts, railways, water courses, etc. in order to install cable ducts under the obstacle. This method is employed where installing the ducts using standard installation methods is not possible. The proposed HDD methodology is as follows: -

- A works area of circa .40 square metres will be fenced on both sides of a crossing
- The drilling rig and fluid handling units will be located on one side of the bridge and will be stored on double bundled 0.5mm PVC bunds which will contain any fluid spills and storm water run-off.
- Entry and exit pits (1m x 1m x 2m) will be excavated using an excavator, the excavated material will be temporarily stored within the works area and used for reinstatement or disposed of to a licensed facility.
- A 1m x 1m x 2m steel box will be placed in each pit. This box will contain any drilling fluid returns from the borehole.
- The drill bit will be set up by a surveyor, and the driller will push the drill string into the ground and will steer the bore path under the watercourse.
- A surveyor will monitor drilling works to ensure that the modelled stresses and collapse pressures are not exceeded.
- The drilled cuttings will be flushed back by drilling fluid to the steel box in the entry pit.
- Once the first pilot hole has been completed a hole-opener or back reamer will be fitted in the exit pit and will pull a drill pipe back through the bore to the entry side.
- Once all bore holes have been completed, a towing assembly will be set up on the drill and this will pull the ducting into the bore.
- The steel boxes will be removed, with the drilling fluid disposed of to a licensed facility.
- The ducts will be cleaned and proven and their installed location surveyed.
- The entry and exit pits will be reinstated to the specification of ESB Networks and the landowner.

A joint bay or transition chamber will be installed on either side of the bridge following the horizontal directional drilling as per ESB/Eirgrid requirements.

### 2.4.13 **Culvert Crossings on the Wind Farm Site**

Culverts will be required where site roads, crane pads and turbine pads cross main forestry drainage networks.

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

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 required will be installed outside of the salmonid spawning season, October to June in any year, in accordance with Inland Fisheries Ireland best practice (IFI, 2016). This will ensure no potential impacts on salmonid spawning habitat.

All of the above works will be supervised by the Environmental Clerk of Works and the project hydrologist.

#### 2.4.14 Wind Farm Site Watercourse Crossings

It is proposed to construct new, clear-span crossings watercourse crossings along the wind farm access roads at 4 no. locations using a bottomless box culvert. The locations of these crossings are shown on the layout drawings included in Appendix 4-1 of this EIAR. The clearspan watercourse crossing methodologies presented below will ensure that no instream works are necessary.

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

- The access road on the approach either side of the watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of the watercourse crossing.
- All drainage measures along the proposed road will be installed in advance of the works.
- A foundation base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry concrete lean mix. The base will be excavated along the stream bank with no instream works required.
- Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of pre-cast concrete slab across the watercourse to provide temporary access for the excavator. Plant and equipment will not be permitted to track across the watercourse.
- Once the foundation base has been completed, the pre-cast concrete box culvert will be installed using a crane which will be set up on the bank of the watercourse and will be lifted into place from the bank with no contact with the watercourse.
- Where the box culvert is installed in sections, the joints will be sealed to prevent granular material entering the watercourse,
- Once the crossing is in position stone backfill will be placed and compacted against the structure up to the required level above the foundations.

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.

The watercourse crossings will be constructed to the specifications of the OPW bridge design guidelines 'Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945', and in consultation with Inland Fisheries Ireland. Abutments will be constructed from precast units combined with in-situ foundations, placed within an acceptable backfill material.

Proposed Mitigation Measures for watercourse crossings are detailed below as detailed in Section 9.3 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 and the project hydrologist.



## 2.4.15 Decommissioning

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of 35 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Development will be decommissioned fully. The onsite substation will remain in place as it will be under the ownership of the ESB and will form a permanent part of the national electricity grid.

Upon decommissioning of the Proposed Development, the wind turbines would be disassembled in reverse order to how they were erected. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and will 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 significant environment nuisances such as noise, dust and/or vibration. Site roadways will be left in situ, for future forestry operations. The amenity and recreation infrastructure will also be left in-situ. Underground cables, including grid connection, will be removed and the ducting left in place.

A Decommissioning Plan has been prepared and included as Appendix 4-6 of the EIAR, which will be agreed with the local authority prior to any decommissioning. The plan provides details of the methodologies that will be adopted, throughout decommissioning, the environmental controls that will be implemented, the Emergency Response Procedure to be adopted, methods for reviewing compliance and an indicative programme of decommissioning works.

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 have been assessed in the EIAR.

As noted in the Scottish Natural Heritage report (SNH) Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore:

*“best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm”.*

## 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, dust and noise control measures and a waste management plan for the site.

While the drainage design measures are presented in Chapter 4 of the EIAR and the drainage management measures and water quality and monitoring measures are included in this CEMP, the Surface Water Management Plan compiles all of these into a single document. The SWMP is an accompanying document for this CEMP and is included as Appendix 4-4 of the EIAR.

### 3.2 Protecting Water Quality

#### 3.2.1 Good Environmental Management During Construction

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 will 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 could potentially be impacted. Given that this site has an established drainage network and existing watercourse crossing points, there will be no adverse impacts on watercourses.

#### 3.2.2 Site Drainage Principles

The site drainage features have been outlined in Chapter 4, Section 4.7 of the EIAR in addition to the drainage design and management 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. The Proposed Development's drainage design has therefore been proposed specifically with the intention of having no negative impact on the water quality of the site and its associated rivers and lakes, and consequently no impact on downstream catchments and ecological ecosystems.

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. There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses. Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Development.

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 Best Practice Guidance

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

There is no one guidance document that deals with drainage management and water quality controls for wind farms and other renewable energy developments. However, a selection of good practice approaches have been adopted in preparation of this drainage design, 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 all drainage management is prepared in accordance with guidance contained in the following:

- Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte (2009): Forest Operations & Water Protection Guidelines;
- Forest Service (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;
- Forest Service, (2000): Code of Best Forest Practice – Ireland. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford;
- COFORD (2004): Forest Road Manual – Guidelines for the design, construction and management of forest roads;
- MacCulloch (2006): Guidelines for risk management of peat slips on the construction of low volume low cost roads over peat (Frank MacCulloch Forestry Civil Engineering Forestry Commission, Scotland);
- National Roads Authority (2005): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Wind Farm Development Guidelines for Planning Authorities (September 1996);
- Eastern Regional Fisheries Board: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works Adjacent to Waters;
- Scottish Natural Heritage, 2010: Good Practice During Wind Farm Construction;
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Water Courses (UK Guidance Note);
- CIRIA Report No. C648 (2006): CIRIA (Construction Industry Research and Information Association) guidance on ‘Control of Water Pollution from Linear Construction Projects’;
- CIRIA Report Number C532 (2001): Control of water pollution from construction sites - Guidance for consultants and contractors.; and,
- Control of water pollution from linear construction projects -Technical guidance. CIRIA C648 London, 2006.

## 3.2.4 Site Drainage Design and Management

The proposed site drainage features for this site are outlined in Section 4.7 of the EIAR. 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

There is an existing drainage network across the site. There are three main watercourses which drain the proposed development site and there are numerous manmade drains that are in place predominately to drain the forestry plantations. This existing drainage system will continue to function as it is during the pre-construction phase.

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 attend the site to set out and assist with the implementation of the proposed drainage controls as outlined in Section 2.5 of the SWMP and shown in the drainage design drawings included in Appendix A of the SWMP. 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.

The implementation of a Schedule of Works Operation Record (SOWOR) will continue through the construction phase of the project. The SOWOR provides number of abandonment triggers which will ensure that site management are well informed as to the level of incident that will require the abandonment of works. The various triggers both pre-commencement and abandonment ensure best practice in terms of water quality management is maintained prior to commencement and during the various felling and construction phases.

Best practice and practical experience on other similar projects suggest that in addition to the drainage plans that are included in and as part of this application, there are additional site based decisions 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.

#### 3.2.4.2.1 Preparative Site Drainage Management

All materials and equipment necessary to implement the drainage measures outlined above 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 drainage design measures as necessary. The drainage measures outlined in the above will be installed prior to, or at the same time as the works they are intended to drain.

### 3.2.4.2.2 **Pre-emptive Site Drainage Management**

The works programme for the initial 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 vegetation 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.

The following forecasting systems are available and will be used on a daily basis at the site to direct proposed construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Eireann website ([www.met.ie/forecasts](http://www.met.ie/forecasts)). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates;
- MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale;
- 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events;
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website ([www.met.ie/latest/rainfall\\_radar.asp](http://www.met.ie/latest/rainfall_radar.asp)). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and,
- Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.

Using the threshold rainfall values, listed below, will allow work to be safely controlled (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event.

Works will be suspended if forecasting suggests either of the following is likely to occur:

- >10 mm/hr (i.e. high intensity local rainfall events);
- >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
- >half monthly average rainfall in any 7 days.

Prior to works being suspended the following control measures shall be completed:

- Secure all open excavations;
- Provide temporary or emergency drainage to prevent back-up of surface runoff; and,
- Avoid working during heavy rainfall (listed above) and for up to 24 hours after heavy events to ensure drainage systems are not overloaded.

### 3.2.4.2.3 **Reactive Site Drainage Management**

The detailed drainage plan prepared for the site has provided for reactive management of drainage measures. The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat potentially silt-laden water from the works areas, will be monitored continuously by the Environmental Clerk of Works (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. This may require the installation of additional check dams, interceptor drains or swales as deemed necessary on-site. The drainage design may have to be

modified on the ground as necessary, and the modifications will draw on the various features outlined above in whatever combinations are deemed to be most appropriate to the situation on the ground at a particular time.

In the unlikely event that works are giving rise to siltation of watercourses, the ECoW or project hydrologist will stop all works in the immediate area around where the siltation is evident. The source of the siltation will be identified and additional drainage measures, as outlined in Section 2.5 above, will be installed in advance of works recommencing.

### 3.2.4.3 Operational Phase Drainage Management

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 below:

- Some interceptor drains will be left in place, upgradient of the proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader.
- Swales/road side drains will remain in place 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 put in place 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, along with the entire drainage network, will be ongoing through the construction period.

In the operational phase of the wind farm, the reliance on the drainage system summarised above will become reduced as areas naturally revegetate. Once areas revegetate, this will result in a resumption of the natural drainage management that will have existed prior to any construction.

### 3.2.5 Forestry Felling

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.

Water protection 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 in Section 3.2.3 above. The water protection measures to be adopted during felling operations are set out as follows:

- 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 vehicles 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 there are steep gradients, and shall avoid being placed at right angles to the contour;
- Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the peat disposal areas. 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;
- Brush 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. Brush mat renewal shall take place when they become heavily used and worn. Provision shall be made for brush mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction shall be suspended during periods of high rainfall (refer to Section 3.2.4.2.2 above) ;
- 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;
- Works will be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water run-off;
- Checking and maintenance of roads and culverts will be on-going through the felling operation;
- No crossing of streams by machinery will be permitted and only travel perpendicular to and away from streams will be allowed;
- Refuelling or maintenance of machinery will not occur within 100m of a watercourse. Mobile bowser, drip kits, trained 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.



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

### 3.2.5.1 Forestry Felling Drainage Management

Before the commencement of any felling works, an Environmental Clerk of Works (ECoW) shall be appointed to oversee the keyhole and extraction works. The ECoW shall be experienced and competent, and shall have the following functions and operate their record using a Schedule of Works Operation Record (SOWOR), as proposed in the planning application:

- 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 Tool Box Talk (TBT) to all relevant parties involved in site operations, prior to the commencement of the works.
- Conduct daily and weekly inspections of all water protection measures and visually assess their integrity and effectiveness in accordance with Section 3.4 (Monitoring and Recording) and Appendix C (Site Monitoring Form (Visual Inspections)) 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.
  - The following minimum analytical suite shall be used:
    - pH,
    - Electrical Conductivity,
    - Temperature
    - Total Suspended Solids, Biochemical Oxygen Demand, Total Phosphorus, Ortho-Phosphate, Total Nitrogen, and Ammonia.
- Review of operator’s records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions.
- Prepare and maintain a contingency plan.
- Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed.
- Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the ECoW.



### 3.2.6 Borrow Pit Drainage

While surface water will be contained in the borrow pits area, the design proposal is to control the level of water in the borrow pit area by creating a single point outlet from the basin-like area that will ensure the water does not overtop the pit area. Run-off from the proposed borrow pit area will be controlled via a single outlet that will be installed at the edge of the borrow pit. The single outfall point will be constructed to manage runoff from the borrow pit and its immediate surrounds. Interceptor drains will already have been installed upgradient of the borrow pit area before any extraction begins.

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 and level spreader, which will receive the water from the single outlet.

### 3.2.7 Peat and Spoil Repository Area Drainage

During the initial placement of peat and subsoil at the repository area, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the repository area. ‘Siltbuster’ treatment trains will be employed if previous treatment is not to a high quality.

Drainage from the repository area will ultimately be routed to an oversized swale and a stilling ponds designed for a 24 hour retention time, and for for a 1 in 10 year return period, before being discharged to the on-site drains.

The repository area 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.

### 3.2.8 Floating Road Drainage

Where sections of floating road are to be installed, cross drains will be installed beneath the road construction corridor to maintain existing clean water drainage paths. Large surface water drainage pipes will be placed to form the cross-drains below the level of the proposed road sub-base. These drainage pipes will be extended each side of the proposed road and cable trench construction corridor, along the paths of the existing drains.

With the exception of the installation of cross drains under the floating road corridor, minimal additional drainage will be installed to run parallel to the roads, in order to maintain the natural hydrology of the peatland areas over which the roads will be floated.

### 3.2.9 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, will be transported to one of the peat repository areas, the on-site borrow pit or used for landscaping and reinstatements of other areas elsewhere on site.

On steeper slopes, silt fences, as detailed in Section 2.5 of the SWMP 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.

### 3.3 Refuelling, Fuel and Hazardous Materials

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

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Off-site refuelling shall occur at a controlled fuelling station;
- On-site refuelling will take place using a mobile double skinned 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 wind farm.
  - 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 compound when not in use.
  - Only designated trained and competent operatives, with a permit to refuel, 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.
- Onsite refuelling will be carried out by trained personnel only;
- A permit to fuel system will be put in place;
- Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Fuels volumes stored on site shall be minimised. The fuel storage areas, within the temporary construction compounds, will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;
- The electrical control buildings (at the 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 of this CEMP). Spill kits will be available to deal with any accidental spillage in and outside the refuelling area.

### 3.4 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 (refer to Section 3.9 below).

The 50 m wide river buffer zone 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 shoot wash out areas

### 3.5

## 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.

### 3.5.1 General recommendations for Good Construction

Based on the recommendations and control measures given in the FT Peat Stability Assessment (Appendix 8-1 of the EIAR) report being strictly adhered to during construction and the detailed stability assessment carried out for the peat slopes which showed that the site has an acceptable margin of safety.

The risk assessment at each turbine location identified a number of control measures to further reduce the potential risk of peat failure. Access roads to turbines will be subject to the same relevant control measures that apply to the nearest turbine as detailed in the FT Peat Stability Assessment Report.

The following measures which will be implemented during the construction phase of the project will assist in the management of the risks for this site.

- Appointment of experienced and competent contractors;
- The site will be supervised by experienced and qualified personnel;
- Allocate sufficient time for the project (be aware that decreasing the construction time has the potential to increase the risk of initiating a localised peat movement);
- Prevent undercutting of slopes and unsupported excavations;
- Maintain a managed robust drainage system;
- Prevent placement of loads/overburden on marginal ground;
- Set up, maintain and report findings from monitoring systems (as outlined in the Geotechnical and Peat Stability Assessment);
- Ensure construction method statements are developed and agreed before commencement of construction and are followed by the contractor; and,
- Revise and amend the Construction Risk Register as construction progresses to ensure that risks are managed and controlled for the duration of construction.
- Maintain hydrology of area as far as possible by maintaining existing drains to water pressures in the peat to avoid peat becoming “boyant”
- Use of experienced geotechnical staff for site investigations
- 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.
- Potential requirement for small buttress on upslope side of access road to retain peat should any instability be noted.

### 3.5.2 Peat and Spoil Usage in Restoration of the Borrow Pit

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 outlined in Section 2.4.4 above. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

### 3.5.3 Placement of Peat and Spoil in Repository Area

The placement of peat and spoil, excavated during the construction phase of the proposed development, as presented in Fehily Timoney’s Peat & Spoil Management Plan in Appendix 4-2 of the EIAR, is outlined in Section 2.4.5 above. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

### 3.5.4 Placement of Peat and 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, as presented in Fehily Timoney's Peat & Spoil Management Plan in Appendix 4-2 of the EIAR, for the placement of peat and spoil alongside the access road will be adhered to during the construction of the proposed development:

- The potential peat placement area location identified is alongside the proposed access roads in the north of the site close to the construction compound where the topography is typically flat. The placement of peat alongside the access roads will be restricted to areas where the peat depth is less than 3m.
- Given the relatively flat topography present at the northern part of the site, the placement of peat alongside the access roads is deemed appropriate.
- The peat placed adjacent to the new proposed access roads will be restricted to a maximum height of 1m over a 10m wide corridor on both sides of the access road.
- The placement of excavated peat will not take place until the adequacy of the ground to support the load is confirmed by the Project Geotechnical Engineer. The placement of peat and spoil within the placement areas will require the use of long reach excavators, low ground pressure machinery and bog mats, where necessary, particularly for drainage works.
- Where there is any doubt as to the stability of the peat surface then no material will 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 will be shaped to allow efficient run-off of surface water. Where possible, shaping of the surface of the peat and spoil will 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 will be not greater than 1 (v): 3 (h). 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 will 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 will be sidecast in buffer zones adjacent to watercourses.
- Movement monitoring instrumentation will be required adjacent to the access road where peat has been placed. The locations where monitoring is required will be identified by the Project Geotechnical Engineer.
- Supervision by the Project Geotechnical Engineer is required 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.

### 3.6 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.
- 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.

### 3.7 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,

### 3.8 Invasive Species Management

A baseline invasive species survey was 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. No invasive species were recorded within the ELAR study area boundary, which includes, or the grid connection route and turbine delivery works area, nor were they recorded along and the turbine delivery routes.

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.

### 3.8.1 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 supervisor, the management plan for the site must be amended by an appropriately qualified person to mitigate against the risk.

### 3.8.2 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.

### 3.9 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.



### 3.9.1 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.

### 3.9.2 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.

### 3.9.3 Construction Phase Waste Management

#### 3.9.3.1 Description of the Works

The construction of the development will involve the construction of 15 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	EW 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
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 bunded 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.

### 3.9.3.2 Waste Arising and Proposals for Minimisation, Refuse 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.

### 3.9.3.3 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.

### 3.9.4 Waste Arising from Decommissioning

The design life of the proposed renewable energy development is 35 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	EWC 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

### 3.9.4.1 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.

### 3.9.4.2 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.

## 3.9.5 Implementation

### 3.9.5.1 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.

### 3.9.5.2 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.

### 3.9.5.2.1 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

### 3.9.5.3 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 Site Supervisor/Construction Manager and/or Environmental Clerk of Works (ECoW) are the project focal point relating to construction-related environmental issues.

In general, the ECoW will maintain responsibility for monitoring the works and Contractors/Sub-contractors from an environmental perspective. The ECoW will act as the regulatory interface on environmental matters by reporting to and liaising with Donegal County Council and other statutory bodies as required.

The ECoW will report directly to the Site Supervisor/Construction Manager. An ECoW, Project Ecologist, Project Hydrologist, Project Geotechnical engineer will visit the site regularly and report to the Site Environmental Office. This structure provides a “triple lock” review/interaction by external specialists. An organogram structure for the construction stage is as follows:

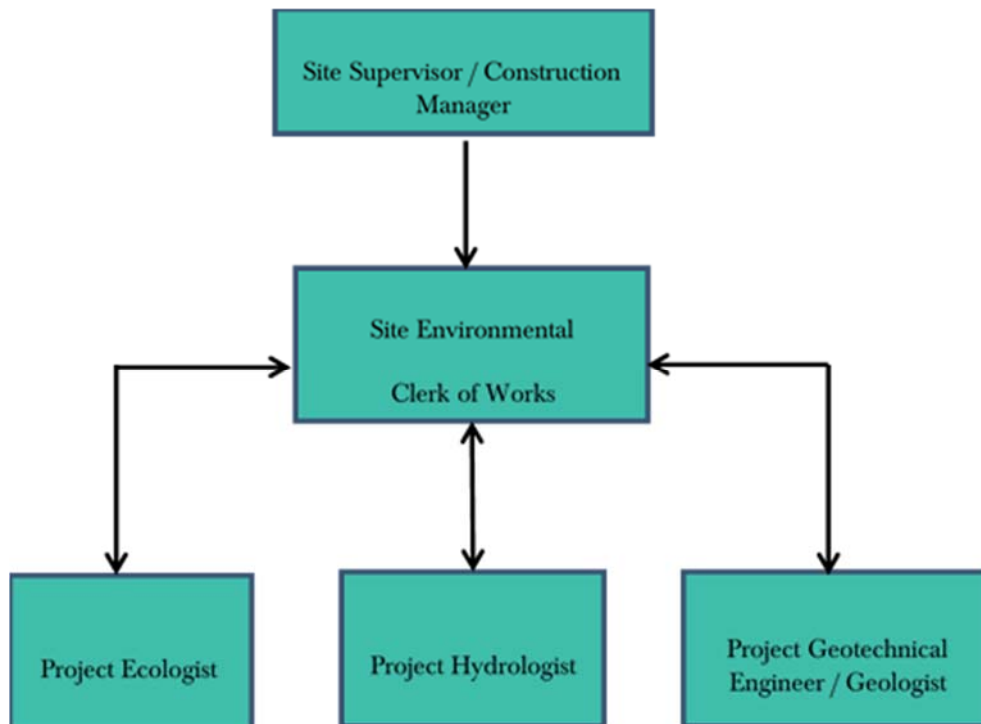


Figure 4-1 Site Management Chain of Command

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 /Site Supervisor

The Construction Manager / Site Supervisor will have overall responsibility for the organisation and execution of all related environmental activities as appropriate, in accordance with regulatory and project environmental requirements. The duties and responsibilities of the Site Supervisor/Construction Manager will include:

- Ensure that all works are completed safely and with minimal environmental risk;
- Approve and implement the Project CEMP and supporting environmental documentation, and ensure that all environmental standards are achieved during the construction phase of the project;
- Take advice from the Environmental Clerk of Works on legislation, codes of practice, guidance notes and good environmental working practice relevant to their work;
- Ensure compliance through audits and management site visits;
- Ensure timely notification of environmental incidents; and,
- Ensure that all construction activities are planned and performed such that minimal risk to the environment is introduced.

Ensure that all construction activities are planned and performed such that minimal risk to the environment is introduced.

## 4.1.2 Environmental Clerk of Works

The main contractor 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, and to monitor all site works and to ensure that methodologies and mitigation are followed throughout construction to avoid negatively impacting on the receiving environment.

The ECoW will report to the Site Supervisor/Construction Manager. The responsibilities and duties of the ECoW will include the following:

- Preparation and update of the CEMP as required, and supporting environmental documentation and review/approval of contractor method statements;
- Undertake inspections and reviews to ensure the works are carried out in compliance with the CEMP;
- Monitor the implementation of the CEMP, particularly all proposed/required Environmental Monitoring;
- Generate environmental reports as required to show environmental data trends and incidents 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;
- Ensure the specified mitigation measures are initiated and adhered to during the construction phase;
- Liaise with Project Ecologist, Project Hydrologist, Project Geotechnical Engineer and any other members of the project team to ensure regular site visits and audits/inspections are completed;
- Ensure adequate arrangements are in place for site personnel to identify potential environmental incidents;
- Ensure that details of environmental incidents are communicated in a timely manner to the relevant regulatory authorities, initially by phone and followed up as soon as is practicable by e-mail;
- 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; and,



- Identify environmental training requirements and arrange relevant training for all levels of site based staff/workers.

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 report to the ECoW and is responsible for the protection of sensitive habitats and species encountered during the construction phase of the proposed renewable energy development. The Project Ecologist will not be full time on site but will visit the site at least once a month during construction.

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

- Review and input to the final construction phase CEMP in respect of ecological matters;
- In liaison with Environmental Clerk of Works, oversee and provide advice on all relevant ecology mitigation measures set out in the EIAR and planning permission conditions;
- Regular inspection and monitoring of the development, through all phases of construction/operation and provide ecological advice as required;
- Carry out ecological monitoring and survey work as may be required by the planning authority.

Carry out ecological monitoring and survey work as may be required by the planning authority.

#### 4.1.4 Project Hydrologist

The Project Hydrologist will report to the ECoW and is responsible for inspection and review of drainage and water quality aspects associated with construction of the proposed renewable energy development. The Project Hydrologist will not be full time on site but will visit the site at least once a month during construction and on a weekly basis during site preparation/groundworks.

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

- Assist in compiling a detailed drainage design before construction commences and attend the site to set out and assist with micro siting of drainage controls. This will be completed over several site visits at the start of the construction phase;
- Review and input to the final construction phase CEMP in respect of drainage and water quality management;
- Following the initial stage of drainage construction regular site visits will be required, at least once a month, to complete hydrological and water quality audits and reviews and report any issues noted to the Site Supervisor/Construction Manager; and,
- Complete ongoing inspection and monitoring of the development, particularly in areas of drainage control, through all phases of construction (including pre, during and post construction) and ensure construction is carried out as specified in the EIAR, and in relevant planning conditions.

#### 4.1.5 **Project Geotechnical Engineer/Geologist**

The Geotechnical Engineer or Project Geologist will report to the ECoW 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 and on a weekly basis during site preparation/groundworks.

The responsibilities and duties of the Geotechnical Engineer or Geologist 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 Site Supervisor/Construction Manager;
- Ensuring that identified hazards are listed in the Construction 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**

The methodology for water quality monitoring before, during and after the construction phase of the proposed development is outlined in detail in Section 4 of the Surface Water Management Plan which is included as Appendix 4-4 of the EIAR.

This document includes details in relation to baseline monitoring, daily visual inspections, continuous monitoring, monthly laboratory analysis, field monitoring and reporting.

## 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 Overview

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 Site Supervisor/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 Site Supervisor/ 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.

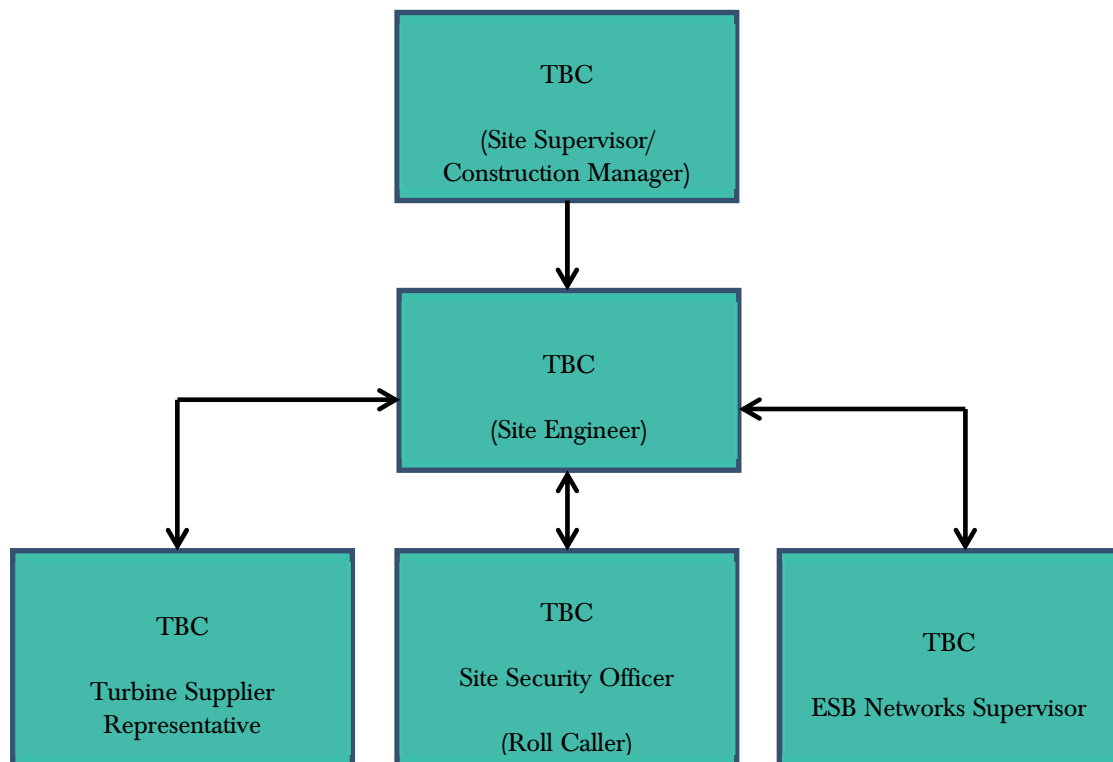


Figure 5-1 Emergency Response Procedure Chain of Command

## 5.1.2 Hazard Identification

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
Construction Vehicles: Dump trucks, tractors, excavators, cranes etc.	Collision or overturn which has resulted in operator or third-party injury.
Abrasive wheels/Portable Tools	Entanglement, amputation or electrical shock associated with portable tools
Contact with services	Electrical shock or gas leak associated with an accidental breach of underground services
Fire	Injury to operative through exposure to fire
Falls from heights including falls from scaffold towers, scissor lifts, ladders, roofs and turbines	Injury to operative after a fall from a height
Sickness	Illness unrelated to site activities of an operative e.g. heart attack, loss of consciousness, seizure
Turbine Specific Incident	This will be included when the upon agreement and section of the final turbine type

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

- Establish the scale of the emergency situation and identify the number of personnel, if any, have been injured or are at risk of injury.
- Where necessary, sound the emergency siren/fog-horn that activates an emergency evacuation on the site. The Site Supervisor/Construction Manager must proceed to the assembly point if the emergency poses any significant threat to their welfare **and if there are no injured personnel at the scene that require assistance.** The Site Supervisor/Construction Manager will be required to use their own discretion at that point. In the case of fire, the emergency evacuation of the site should proceed, without exception. The site evacuation procedure is outlined in Section 5.1.3.
- 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 delegating the task, ensure that the procedures for contacting the emergency services as set out in Section 5.3 is followed.
- 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 5.4.
- Contact the next of kin of any injured personnel where appropriate.

### 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 Site Supervisor/Construction Manager when all personnel have been accounted for. The Site Supervisor/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

## 5.2 Environmental Emergency Response Procedure

### 5.2.1 Excessive Peat Movement

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.

### 5.2.2 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.

### 5.2.3 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 ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- The ECoW will notify the appropriate regulatory body such as Donegal County Council, and the Environmental Protection Agency (EPA), 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 ECoW 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 Main Contractor. These records will be made available to the relevant authorities such as Donegal County Council, EPA 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.

5.3

## Contact the Emergency Services

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.

**Wait for the call-taker to ask questions, then answer clearly and calmly.** If you are in danger of assault, the dispatcher or call-taker will still need you to answer quietly, mostly "yes" and "no" questions.

**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.

5.4

## 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 – Buncrana Medical Centre	074 93 6311
Hospital – Letterkenny University Hospital	074 912 5888
ESB Emergency Services	1850 372 999



Contact	Telephone no.
Gas Networks Ireland Emergency	1850 20 50 50
Gardaí – Buncrana Garda Station.	074 932 0540
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
FuturEnergy Glenard Designated Activity Company (DAC)	081 8776301

### 5.4.1 Procedure for Personal 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.

## 5.5 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 MEASURES**

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 An Bord Pleanála.

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
<b>Pre-Commencement Phase</b>					
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 Donegal County Council.</p> <p>Baseline laboratory analysis of a range of parameters with relevant regulatory limits and Environmental Quality Standards (EQSs) will also be undertaken as per water</p>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			monitoring programme for the Proposed Development and each primary watercourse along the route.		
MM5	Birds	EIAR Section 7 CEMP Section 4	<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"> <li>➤ Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided.</li> <li>➤ Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Development area.</li> <li>➤ Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise.</li> <li>➤ Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.</li> <li>➤ Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.</li> </ul>		
MM6	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 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.		
MM7	Concrete Deliveries	EIAR Section 4	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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM8	Site Drainage Plan	EIAR Section 4 CEMP Section 4	The Project Hydrologist will prepare detailed drainage design before construction commences.		
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 8	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	<p>Construction will not commence during the Breeding Bird season from March to August inclusive.</p> <p>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 &amp; Whitfield 2007). No works shall be permitted within the buffer until it can be demonstrated that the nest is no longer occupied.</p>		
MM16	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.		
MM17	Archaeology	EIAR Section 13	Two structures of 19 <sup>th</sup> century date were recorded in Glenard townland along the existing road which is due to be upgraded. The structures are not listed in the		



Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			NIAH or RPS and are not subject to statutory protection. The structures will be fenced off prior to road upgrade works in the vicinity and an archaeologist will monitor excavation works associated with the road upgrade.		
MM18	Human Health	EIAR Section 5	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 identified in line with the engagement plan. Local access to properties will also be maintained throughout any 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.		
<b>Construction Phase</b>					
<b><i>Construction Management</i></b>					
MM19	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 <i>'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2006'</i> . 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.		
MM20	Health and Safety	EIAR Section 4 CEMP Section 2	<ul style="list-style-type: none"> <li>➤ Stock-proof fencing will be erected around the borrow pits 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.</li> <li>➤ Fencing will be erected in areas of the site where uncontrolled access is not permitted.</li> </ul>		
MM21	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 wind farm. These signs include:</p> <ul style="list-style-type: none"> <li>➤ Buried cable route markers at 50m (maximum) intervals and change of cable route direction;</li> <li>➤ Directions to relevant turbines at junctions;</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>➤ “No access to Unauthorised Personnel” at appropriate locations;</li> <li>➤ Speed limits signs at site entrance and junctions;</li> <li>➤ “Warning these Premises are alarmed” at appropriate locations;</li> <li>➤ “Danger HV” at appropriate locations;</li> <li>➤ “Warning – Keep clear of structures during electrical storms, high winds or ice conditions” at site entrance;</li> <li>➤ “No unauthorised vehicles beyond this point” at specific site entrances; and</li> <li>➤ Other operational signage required as per site-specific hazards.</li> </ul>		
MM22	Wastewater Management	EIAR Section 4, 9  CEMP Section 2	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).		
MM23	Wastewater Management	CEMP Section 9	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.		
MM24	Refuelling	EIAR Section 4, 8, 9  CEMP Section 3, 5	<ul style="list-style-type: none"> <li>➤ 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.</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>➤ Fuels stored on site will be minimised. Storage areas where required will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;</li> <li>➤ The plant used during construction will be regularly inspected for leaks and fitness for purpose;</li> <li>➤ 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.</li> </ul>		
MM25	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.		
MM26	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.		
MM27	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"> <li>➤ General Forecasts, Meteo Alarm, 3-hour Rainfall Maps, Rainfall Radar Images, Consultancy Service</li> <li>➤ Works will be suspended if forecasting suggests either of the following is likely to occur:               <ul style="list-style-type: none"> <li>○ &gt;10 mm/hr (i.e. high intensity local rainfall events);</li> <li>○ &gt;25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day);</li> <li>or,</li> <li>○ &gt;half monthly average rainfall in any 7 days.</li> </ul> </li> </ul>		

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"> <li>➤ Secure all open excavations;</li> <li>➤ Provide temporary or emergency drainage to prevent back-up of surface runoff; and,</li> <li>➤ Avoid working during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded.</li> </ul>		
MM28	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.		
MM29	Surface Water Quality	CEMP Section 4	<p>Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken as per water monitoring programme for the overall windfarm development and each primary watercourse along the route. This will not be restricted to just these locations around the immediate wind farm site with further sampling points added as deemed necessary by the ECoW, in consultation with the Project Hydrologist and Site Manager, as the construction phase progresses.</p> <p>In-situ field monitoring will be completed on a weekly basis. In-situ field monitoring will also be completed after major rainfall events, i.e. after events of &gt;25mm rainfall in any 24-hour period. The Project Hydrologist will monitor and advise on the readings collected by in-situ field monitoring.</p>		
MM30	Concrete Deliveries and Management	EIAR Section 4, 9 NIS Section 5	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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM31	Concrete Deliveries and Management	EIAR Section 4 NIS Section 5	<ul style="list-style-type: none"> <li>➤ 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.</li> <li>➤ Concrete trucks will be directed back to their batching plant for washout.</li> <li>➤ 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.</li> </ul>		
MM32	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.		
MM33	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		
MM34	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.		
MM35	Concrete Deliveries and Management	EIAR Section 4	Concrete pumps and machine buckets will be restricted from slewing over watercourses while placing concrete.		
MM36	Concrete Deliveries and Management	EIAR Section 4	Excavations will be sufficiently dewatered before concreting begins. Dewatering will continue while concrete sets.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM37	Concrete Deliveries and Management	EIAR Section 4	Covers will be available for freshly placed concrete to avoid the surface washing away in heavy rain.		
MM38	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.		
MM39	Road Cleanliness	EIAR Section 4. CEMP Section 3	A road sweeper will be available if any section of the public roads were to be dirtied by trucks associated with the Proposed Development.		
<b>Drainage Design and Maintenance</b>					
MM40	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.		
MM41	Watercourse Buffers	EIAR Section 4. CEMP Section 3	All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses.		
MM42	Water Discharge	EIAR Section 4	There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows.		
MM43	Wastewater Management	EIAR Section 4.	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		



Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 3	service contractor as required and will be removed from the site on completion of the construction phase.		
MM44	Borrow Pit Drainage	EIAR 9 SWMP Section 3	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.		
MM45	Drainage Swales,	EIAR Section 4, 9 CEMP Section 3	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.		
MM46	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.		
MM47	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.		
MM48	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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM49	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.		
MM50	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.		
MM51	Settlement Ponds	EIAR Section 4, 9 CEMP Section 3	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 retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to water courses as per the drainage design.		
MM52	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.		
MM53	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.		
MM54	Culvert Upgrades	EIAR Section 4, 9	The following mitigation is proposed for completion of wind farm culvert upgrades: ➤ Where possible pre-cast elements for culverts and concrete works will be used;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>➤ All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse;</li> <li>➤ In all cases, culverts will be oversized to allow mammals to pass through the culvert.</li> <li>➤ 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.</li> <li>➤ All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance</li> <li>➤ 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;</li> <li>➤ 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;</li> <li>➤ All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland is incorporated into the design of the proposed crossings;</li> <li>➤ 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);</li> <li>➤ During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and,</p> <ul style="list-style-type: none"> <li>➤ 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.</li> </ul>		
MM55	Silt Fences,	EIAR Section 4, 9.	<ul style="list-style-type: none"> <li>➤ Silt fences will be emplaced within drains down-gradient of all construction areas.</li> <li>➤ They will remain in place throughout the entire construction phase.</li> <li>➤ 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.</li> <li>➤ 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.</li> <li>➤ All silt fencing will be formed using Terrastop Premium or equivalent silt fence product.</li> <li>➤ 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</li> </ul>		
MM56	Sediment disposal	EIAR Section 4 SWMP Section 3	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 in the proposed borrow pit or peat and spoil repository		
MM57	Excavation seepages and treatment	EIAR Section 4, 9	<ul style="list-style-type: none"> <li>➤ Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place;</li> <li>➤ If required, pumping of excavation inflows will prevent build-up of water in the excavation;</li> <li>➤ The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters;</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>➤ 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;</li> <li>➤ There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur;</li> <li>➤ 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;</li> <li>➤ 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;</li> <li>➤ Buffered outfalls which will be numerous over the site will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site; and,</li> <li>➤ 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</li> </ul>		
<b><i>Felling</i></b>					
MM58	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.		
MM59	Keyhole felling of Coniferous Plantation	EIAR Section 9	Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods which are set out as follows:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li data-bbox="913 327 1673 416">➤ Machine combinations (i.e., handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance;</li> <li data-bbox="913 424 1673 587">➤ 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;</li> <li data-bbox="913 595 1673 917">➤ 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 there are steep gradients, and avoid being placed at right angles to the contour;</li> <li data-bbox="913 925 1673 1088">➤ Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the peat disposal areas. All new silt traps will be constructed on even ground and not on sloping ground;</li> <li data-bbox="913 1096 1673 1185">➤ 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;</li> <li data-bbox="913 1193 1673 1313">➤ All drainage channels will taper out before entering the 50m buffer zone. This ensures that discharged water gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within</li> </ul>		



Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>the zone. On erodible soils, silt traps will be installed at the end of the drainage channels, to the outside of the buffer zone;</p> <ul style="list-style-type: none"> <li>➤ 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;</li> <li>➤ Brush 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. Brush mat renewal will take place before they become heavily used and worn. Provision will be made for brush 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;</li> <li>➤ Timber will be stacked in dry areas, and outside a local 50 metre watercourse buffer. Straw bales and check dams will be emplaced on the down gradient side of timber storage/processing sites;</li> <li>➤ 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;</li> <li>➤ Checking and maintenance of roads and culverts will be on-going through the felling operation;</li> <li>➤ 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;</li> <li>➤ A permit to refuel system will be adopted;</li> <li>➤ 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;</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>➤ Crossing of streams will not be permitted;</li> <li>➤ Trees will be cut manually from along streams and using machinery to extract whole trees; and</li> <li>➤ Travel only perpendicular to and away from stream.</li> </ul>		
MM60	Keyhole 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. The following items shall be carried out during pre-felling inspections and after:</p> <ul style="list-style-type: none"> <li>➤ 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;</li> <li>➤ Inspection of all areas reported as having unusual ground conditions;</li> <li>➤ Inspection of main drainage ditches and outfalls. During pre-felling inspections the main drainage ditches will be identified. Ideally the pre-felling inspection will be carried out during rainfall;</li> <li>➤ Following tree felling all main drains will be inspected to ensure that they are functioning;</li> <li>➤ Extraction tracks nears drains will be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground;</li> <li>➤ Culverts on drains exiting the site, if impeded by silt or debris, will be unblocked; and,</li> <li>➤ 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.</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM61	Clear Felling of Coniferous Plantation	EIAR Section 9 SWMP Section 4	<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 samples 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"> <li>➤ Avoid man-made ditches and drains, or watercourses that do not have year round flows, i.e. avoid ephemeral ditches, drains or watercourses;</li> <li>➤ Select sampling points upstream and downstream of the forestry activities;</li> <li>➤ It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry;</li> <li>➤ 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,</li> <li>➤ The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed.</li> <li>➤ Also, daily surface water monitoring forms (for visual inspections and field chemistry measurements) will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection.</li> </ul>		
<b><i>Peat, Subsoils and Bedrock</i></b>					
MM62	Erosion of Exposed Subsoils and Peat	EIAR Section 8, 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM63	Peat Management	EIAR Section 9	<p>It is proposed that excavated peat/subsoil (spoil) will be used to reinstate that proposed borrow pit, for landscaping throughout the site and any excess spoil will be placed in 1 no. peat and spoil repository. The repository is located outside the 50m stream buffer zone (refer to Figure 9-9 of the EIAR).</p> <ul style="list-style-type: none"> <li>➤ During the initial emplacement of peat and subsoil at the repository area, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the enclosure.</li> <li>➤ The peat repository is an enclosed area. Its drainage can be easily managed.</li> <li>➤ Drainage from the peat repository will be pumped to settlement ponds as required or will overflow through controlled overflow pipes.</li> <li>➤ Discharge or pumping will be intermittent and will depend on preceding rainfall amounts.</li> </ul> <p>Once the peat repository has been seeded and vegetation is established the risk to downstream surface water is significantly reduced.</p>		
MM64	Peat Management	EIAR Section 4 CEMP Section 4	<ul style="list-style-type: none"> <li>➤ Prior to commencing the construction of the excavated roads movement monitoring posts will be installed in areas where the peat depth is greater than 1.5m.</li> <li>➤ Interceptor drains will be installed upslope of the access road alignment to divert any surface water away from the construction area.</li> <li>➤ Excavation will take place to a competent stratum beneath the peat.</li> <li>➤ 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.</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>➤ Once excavated, peat will be placed within the borrow pit or the peat and spoil repository.</li> <li>➤ Excavation of materials with respect to control of peat stability.               <ul style="list-style-type: none"> <li>○ Acrotelm (top about 0.3 to 0.4m of peat) is generally required for landscaping and will be stripped and temporarily stockpiled for re-use as required. Acrotelm stripping will be undertaken prior to main excavations.</li> <li>○ Where possible, the acrotelm will be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation.</li> <li>○ All catotelm peat (peat below about 0.3 to 0.4m depth) will be transported immediately on excavation to the borrow pit or to the designated peat repository.</li> </ul> </li> <li>➤ Side slopes in peat will be not greater than 1 (v): 3 (h). This slope inclination will be reviewed during construction, as appropriate. Where areas of weaker peat are encountered then slacker slopes will be required. Battering of the side slopes of the excavations will be carried out as the excavation progresses.</li> <li>➤ The excavated access road will be constructed of up to 1000mm of selected granular fill. Granular fill to be placed and compacted in layers in accordance with the TII Specification for Road Works.</li> <li>➤ A layer of geogrid/geotextile may be required at the surface of the competent stratum should excessive rutting be noted in the track.</li> <li>➤ At transitions between floating and excavated roads a length of road of about 10 to 20m will have all peat excavated and replaced with suitable fill. The surface of this fill will be graded so that the road surface transitions smoothly from floating to excavated road.</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>➤ Where slopes of greater than 5 degrees are encountered along with relatively deep peat (i.e., greater than 1.5m) and where it is proposed to construct the access road perpendicular to the slope contour sit is best practice to start construction at the bottom of the slope and work towards the top, where possible. This method avoids any unnecessary loading to the adjacent peat and greatly reduces any risk of peat instability.</li> <li>➤ A final surface layer will be placed over the excavated road and will be graded to accommodate wind turbine construction and delivery traffic.</li> </ul>		
MM65	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 by Fehily Timoney (January 2022) 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.		
MM66	Peat Management	EIAR Section 9	<ul style="list-style-type: none"> <li>➤ During the initial emplacement of peat and subsoil at the repository area, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the enclosure.</li> <li>➤ The peat repository is an enclosed area. Its drainage can be easily managed.</li> <li>➤ Drainage from the peat repository will be pumped to settlement ponds as required or will overflow through controlled overflow pipes.</li> <li>➤ Discharge or pumping will be intermittent and will depend on preceding rainfall amounts.</li> <li>➤ Once the peat repository has been seeded and vegetation is established the risk to downstream surface water is significantly reduced.</li> </ul>		
<b><i>Flora and Fauna</i></b>					
MM67	Bats	EIAR Appendix 6-2	<u>Noise Disturbance</u>		



Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001).</p> <p><u>Lighting Disturbance</u>            Where lighting is required, directional lighting will be used to prevent overspill on to woodland/forestry edges. Exterior lighting, during construction and post construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Development, and consequently on bats i.e., Lighting will be directed away from mature trees/treelines around the periphery of the study area to minimize disturbance to bats. Directional accessories can be used to direct light away from these features, e.g., through the use of light shields. The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands.</p>		
MM68	Bats	EIAR Appendix 6-2	<p><u>Bat Buffers</u>            In accordance with NatureScot Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.) will be applied to the siting of all wind turbines.</p>		
MM69	Birds	EIAR Section 7	<ul style="list-style-type: none"> <li>➤ A Construction and Environmental Management Plan (CEMP) has been prepared. The CEMP will be in place prior to the start of the construction phase. Best practice measures which form part of the design of the project are included in Chapter 4 of the EIAR. The CEMP is included as an Appendix to Chapter 4.</li> <li>➤ Construction works will begin outside the bird nesting season as defined by the Wildlife Act 1976 as amended (1st of March to the 31st of August).</li> <li>➤ Construction works required to facilitate the connection of the wind farm to the national grid within 750m of the identified hen harrier roost (Confidential Appendix Figure 7.6.2.1) located to</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>the south of the proposed development will be undertaken outside of the winter roosting period. As per Gilbert et al., (1998) winter roosts are occupied from October to March inclusive.</p> <ul style="list-style-type: none"> <li>➤ All construction works along the turbine delivery route within 800m (McGuinness 2015) of the curlew territory (Confidential Appendix Figure 7.12.1) identified to the north of the proposed development will be undertaken outside the breeding season. The period when breeding curlew are sensitive to disturbance runs from the 1st of March to the 31st of August.</li> <li>➤ All removal of woody vegetation will be undertaken in accordance with Section 40 of the Wildlife Act 1976 as amended.</li> <li>➤ 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.</li> <li>➤ Plant machinery will be turned off when not in use.</li> <li>➤ All plant and equipment for use will comply with the European Communities (Noise Emission by Equipment For Use Outdoors) Regulations, 2001 (S.I. No. 632/2001) and other relevant legislation.</li> <li>➤ An Ecological Clerk of Works (ECoW) will be appointed. Duties will include:             <ul style="list-style-type: none"> <li>○ Ensure a pre-construction confirmatory transect/walkover bird survey is undertaken, to ensure significant effects on breeding birds will be avoided. Further details are provided in Section 7.10 below.</li> <li>○ Inform and educate on-site personnel of the ornithological and ecological sensitivities within the proposed development site.</li> </ul> </li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>○ Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise.</li> <li>○ Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.</li> <li>○ Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.</li> </ul>		
MM70	Flora and Fauna – Upland Blanket Bog	EIAR Section 6	<p>The Proposed Development has been deliberately designed to minimise loss of Upland blanket bog and Cutover bog. Where the development footprint does occur on this habitat, (i.e., at Turbines T12 and T10 and associated access roads, a section of the new site access track between T10 and T14, Access track between T13 and T14, and a small area of degraded bog at the site of the new access road between T1 and T9), the proposed development provides for the replacement of peatland habitat through the restoration of forestry (WD4) back to peatland, located to the north of Turbine no. T10. This is fully described in the site-specific Biodiversity Management and Enhancement Plan (BMEP), provided in Appendix 6-4 of the EIAR.</p> <ul style="list-style-type: none"> <li>➤ The BMEP will ensure that there will be no net loss of peatland habitat associated with the Proposed Development as well as providing an overall long-term net gain in terms of area.</li> <li>➤ Opportunities for other peatland restoration/improvements have also been incorporated into the BMEP through the inclusion of an additional peatland enhancement area comprising of degraded Upland blanket bog (PB2).</li> <li>➤ On completion of successful peatland restoration to peatland habitats, this will result in an additional area of 4.2ha of restored peatland habitat as a result of the proposed development.</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>➤ The mitigation/restoration measures will be monitored by a suitably qualified ecologist appointed by the wind farm operator over the lifetime of the proposed development as part of the BMEP to confirm their effectiveness and to allow for alteration in approaches where necessary.</li> </ul>		
MM71	Invasive Species	EIAR Section 6 CEMP Section 3	<p>The following measures are proposed to establish good site hygiene to ensure the control of any potential spread of invasive species during construction works, if they are identified prior to the commencement of the construction phase:</p> <ul style="list-style-type: none"> <li>➤ A risk assessment and method statement must be provided by the Contractor prior to commencing works.</li> <li>➤ Fences will be erected around areas of infestation, as confirmed by test pits, and warning signs shall be erected.</li> <li>➤ 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.</li> <li>➤ Stockpile areas will be chosen to minimise movement of contaminated soil.</li> <li>➤ Stockpiles will be marked and isolated.</li> <li>➤ 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.</li> <li>➤ The use of vehicles with caterpillar tracks within contaminated areas will be avoided to minimise the risk of spreading contaminated material.</li> <li>➤ An ECoW/suitably qualified ecologist will be on site to monitor and oversee the implementation of invasive species management plans.</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>➤ 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:</li> <li>➤ Personnel may only clean down if they are familiar with the plant and rhizome material and can readily identify it.</li> <li>➤ Decontamination will only occur within designated wash-down areas.</li> <li>➤ 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.</li> <li>➤ All run-off will be isolated and treated as contaminated material. This will be disposed of in already contaminated areas.</li> </ul>		
<b>Noise and Vibration</b>					
MM72	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"> <li>➤ Managing the hours according to the CEMP during which site activities likely to create high levels of noise or vibration are permitted;</li> <li>➤ Establishing channels of communication between the contractor/developer, Local Authority and residents;</li> <li>➤ Appointing a site representative responsible for matters relating to noise and vibration;</li> <li>➤ Monitoring typical levels of noise and vibration during critical periods and at sensitive locations;</li> <li>➤ Keeping site access roads even to mitigate the potential for vibration from lorries.</li> </ul> <p>Furthermore, a variety of practicable noise control measures will be employed. These include:</p>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>➤ Selection of plant with low inherent potential for generation of noise and/ or vibration;</li> <li>➤ Placing of noisy / vibratory plant as far away from sensitive properties as permitted by site constraints, and;</li> <li>➤ Regular maintenance and servicing of plant items.</li> </ul>		
MM73	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> .		
MM74	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"> <li>➤ No plant used on site will be permitted to cause an on-going public nuisance due to noise.</li> <li>➤ The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.</li> <li>➤ All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.</li> <li>➤ 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.</li> <li>➤ Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.</li> <li>➤ Any plant, such as generators or pumps, which is required to operate outside of general construction hours will be surrounded by an acoustic enclosure or portable screen.</li> <li>➤ During the course of the construction programme, supervision of the works will include ensuring compliance and using methods outlined in British</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise.</p> <ul style="list-style-type: none"> <li>➤ The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 07:00hrs and 19:00hrs weekdays and between 07:00hrs and 14:00hrs on Saturdays. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e., concrete pours, rotor/tower deliveries) it could occasionally be necessary to work out of these hours.</li> <li>➤ Where rock breaking is employed in relation to the proposed borrow pit location, the following are examples of measures that will be considered, where necessary, to mitigate noise emissions from these activities:             <ul style="list-style-type: none"> <li>○ Fit suitably designed muffler or sound reduction equipment to the rock breaking tool to reduce noise without impairing machine efficiency.</li> <li>○ Ensure all leaks in air lines are sealed.</li> <li>○ Use a dampened bit to eliminate ringing.</li> <li>○ 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.</li> <li>○ Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation.</li> </ul> </li> </ul>		
<b><i>Air Quality/Dust</i></b>					
MM75	Construction Phase Dust Control	EIAR Section 10  CEMP Section 3	<ul style="list-style-type: none"> <li>➤ In periods of extended dry weather, dust suppression may be necessary along haul roads, site roads, substation and construction compounds and around the borrow pit area to ensure dust does not cause a nuisance. If necessary, de-silted 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. Water bowser movements will be</li> </ul>		



Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>carefully monitored to avoid, insofar as reasonably possible, increased runoff.</p> <ul style="list-style-type: none"> <li>➤ All plant and materials vehicles shall be stored in dedicated areas (on site).</li> <li>➤ Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction.</li> <li>➤ Turbines and construction materials will be transported to the site on specified haul routes only.</li> <li>➤ The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary.</li> <li>➤ The transport of construction materials which may have the potential to generate dust will be undertaken with tarpaulin cover or similar, where necessary.</li> <li>➤ The transport of dry excavated material from the on-site borrow pit which may have potential to generate dust will be avoided. If necessary, excavated material will be dampened prior to transport from the borrow pits.</li> </ul>		
MM76	Construction Phase Air Quality	EIAR Section 10	<ul style="list-style-type: none"> <li>➤ All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.</li> <li>➤ All machinery will be switched off when not in use.</li> <li>➤ The majority of aggregate materials for the construction of the proposed development will be obtained from the borrow pit on site. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the emissions associated with vehicle movements.</li> </ul>		
<b>Cultural Heritage</b>					
MM77	Impact of excavation works on unrecorded	EIAR Section 13	<ul style="list-style-type: none"> <li>➤ Licensed archaeological monitoring of any geotechnical / engineering trial pits or investigations and a report detailing the results of same.</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
	potential sub-surface sites		<ul style="list-style-type: none"> <li>➤ Licensed archaeological monitoring of all ground works during construction. A report on the results of the monitoring will be compiled and submitted to the relevant authorities on completion of the project.</li> </ul>		
<b>Traffic</b>					
MM78	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. These will take place after peak evening traffic:</p> <ul style="list-style-type: none"> <li>➤ 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.</li> <li>➤ The deliveries will be made in consultation with the Local Authority and An Garda Síochána / The Police Service of Northern Ireland.</li> <li>➤ It is estimated that 144 abnormal sized loads will be delivered to the site, comprising 29 convoys of 5, undertaken over 29 separate nights.</li> <li>➤ These nights will be spread out over an approximate period of 15 weeks and will be agreed in advance with the relevant authorities</li> <li>➤ 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 5 vehicles.</li> <li>➤ There will also be two escort vehicles provided by the haulage company for each convoy.</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM79	Construction Phase Traffic and Transport	EIAR Section 5, 14	<p>A detailed <b>Traffic Management Plan (TMP)</b> is provided specifying details relating to traffic management and included in the CEMP. Prior to the commencement of the construction phase of the proposed development a detailed TMP will be prepared by the Contractor for agreement with the relevant local authorities and An Garda Síochána / The Police Service of Northern Ireland prior to construction works commencing on site. The detailed TMP will include the following:</p> <ul style="list-style-type: none"> <li>➤ <b>Traffic Management Coordinator</b> – a competent Traffic Management Co-ordinator will be appointed for the duration of the project and this person will be the main point of contact for all matters relating to traffic management.</li> <li>➤ <b>Delivery Programme</b> – 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.</li> <li>➤ <b>Information to the local community</b> – Local residents 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.</li> <li>➤ <b>A Pre and Post Construction Condition Survey</b> – 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</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>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.</p> <ul style="list-style-type: none"> <li>➤ <b>Liaison with the relevant local authority</b> - Liaison with the County Councils and An Garda Síochána / The Police Service of Northern Ireland, 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 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 Site Environmental Manager.</li> <li>➤ <b>Implementation of temporary alterations to road network at critical locations</b> – 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.</li> <li>➤ <b>Identification of delivery routes</b> – These routes will be agreed with the County Councils and adhered to by all contractors.</li> <li>➤ <b>Delivery times of large turbine components</b> - 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.</li> <li>➤ <b>Travel plan for construction workers</b> – 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.</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<ul style="list-style-type: none"> <li>➤ <b>Additional measures</b> - Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including wheel washing facilities on site and sweeping / cleaning of local roads as required. These are set out in the CEMP which is contained in Appendix 4.3.</li> <li>➤ <b>Re-instatement works</b> - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.</li> </ul>		
MM80	Construction Phase Traffic and Transport	EIAR Section 14	Truck wheel washing facilities will be available on site where deemed necessary and will be effective.		
<b>Operational Phase</b>					
MM81	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.		
MM82	Electrical Substation	EIAR Section 4, 8, 9 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.		
MM83	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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM84	Site Drainage	EIAR Section 9	<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> <ul style="list-style-type: none"> <li>➤ Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader;</li> <li>➤ 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;</li> <li>➤ 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;</li> <li>➤ 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;</li> <li>➤ 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,</li> <li>➤ Settlement ponds have been designed in consideration of the greenfield runoff rate.</li> </ul>		
MM85	Site Drainage	EIAR Section 4	<p>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.</p>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM86	Surface Water Quality	CEMP Section 4	Monthly sampling for laboratory analysis for the range of parameters adopted during pre-commencement and construction phases will continue after construction is complete. The project hydrologist will monitor and advise on the readings received from the testing laboratory and monitoring will only cease once the hydrologist is satisfied that the chemical and biological monitoring results show that there is no adverse impact on the quality of surface water within the natural watercourses draining the site.		
MM87	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.		
MM88	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.		
MM89	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.		
MM90	Telecoms and other service interference	EIAR Section 14	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.		
MM91	Flora and Fauna	EIAR Section 7	A detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Development, please refer to Appendix 7-8 of the EIAR for further details. The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation and these surveys will be scheduled to coincide with Years 1, 2, 3, 5, 10 & 15 of the lifetime of the wind farm. Monitoring measures are broadly based on guidelines issued by the		



Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>Scottish Natural Heritage (SNH, 2009). The following individual components are proposed for monitoring years:</p> <ul style="list-style-type: none"> <li>➤ Monthly flight activity surveys: vantage point surveys</li> <li>➤ Distribution and abundance surveys: breeding wader to a 500m radius of the development area, breeding hen harrier surveys and winter hen harrier roost surveys to a 2km radius of the development area.</li> <li>➤ Targeted bird collision surveys (corpse searches) will be undertaken with training dogs. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust.</li> </ul>		
MM92	Flora and Fauna	EIAR Section 6	<p><u>Blade Feathering</u></p> <p>On a precautionary basis, and in addition to buffers applied to habitat features, it is proposed that all wind turbines are subject to ‘feathering’ of turbine blades when wind speeds are below the cut-in speed of the proposed turbine. <u>Bat Buffers</u></p> <p>In accordance with NatureScot Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.) will be maintained from the turbines.</p> <p><u>Lighting</u></p> <p>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>		
MM93	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 and Enhancement Management Plan) that will be implemented during the construction phase of the Proposed Development and maintained during the</p>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			operational phase. Details of the management that will be undertaken are provided in the Biodiversity and Enhancement Management Plan in Appendix 6-4 of the EIAR. These include: <ul style="list-style-type: none"> <li>➤ Drain blocking within degraded peatlands,</li> <li>➤ Surface Peat Assessments,</li> <li>➤ Vegetation Sampling,</li> <li>➤ Hydrological Monitoring.</li> </ul>		
MM94	Noise and Vibration	EIAR Section 11	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.		
MM95	Air and Climate	EIAR Section 10	Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise.		
MM96	Shadow Flicker	EIAR Section 5	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, 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: <ul style="list-style-type: none"> <li>➤ Installation of appropriate window blinds in the affected rooms of the residence;</li> <li>➤ Planting of screening vegetation;</li> <li>➤ 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</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			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.		
MM97	Human Health	EIAR Section 5	<ul style="list-style-type: none"> <li>➤ Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits.</li> <li>➤ 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.</li> <li>➤ 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"> <li>○ Buried cable route markers at 50m (maximum) intervals and change of cable route direction;</li> <li>○ Directions to relevant turbines at junctions;</li> <li>○ “No access to Unauthorised Personnel” at appropriate locations;</li> <li>○ Speed limits signs at site entrance and junctions;</li> <li>○ “Warning these Premises are alarmed” at appropriate locations;</li> <li>○ “Danger HV” at appropriate locations;</li> <li>○ “Warning – Keep clear of structures during electrical storms, high winds or ice conditions” at site entrance;</li> <li>○ “No unauthorised vehicles beyond this point” at specific site entrances; and</li> <li>○ Other operational signage required as per site-specific hazards.</li> </ul> </li> <li>➤ 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.</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
<b>Decommissioning Phase</b>					
MM98	Decommissioning	EIAR Chapter 4	Prior to the end of the operational period the Decommissioning Plan (Appendix 4-6 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.		
MM99	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.		
MM100	Decommissioning	EIAR Chapter 4 DP Section 2	On removal of turbines, the covering of the foundation will be completed using locally sourced 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.		
MM101	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"> <li>➤ Road-going vehicles will be refuelled off site wherever possible;</li> <li>➤ 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</li> <li>➤ Only designated trained and competent operatives will be authorised to refuel plant on site.</li> <li>➤ Fuel volumes stored on site should be minimised. Any fuel storage areas will be bunded appropriately;</li> <li>➤ The plant used will be regularly inspected for leaks and fitness for purpose; and,</li> </ul>		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			<p>➤ An emergency plan for the decommissioning phase to deal with accidental spillages will be developed (refer to EIAR Section 4). Spill kits will be available to deal with and accidental spillage in and outside the refuelling area.</p> <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>		
MM102	Decommissioning	EIAR Section 7	<p>The following measures are proposed for the decommissioning phase:</p> <ul style="list-style-type: none"> <li>➤ During the decommissioning phase, disturbance limitation measures will be as per the construction phase (see Chapter 7 of the EIAR).</li> <li>➤ Plant machinery will be turned off when not in use.</li> <li>➤ 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).</li> </ul> <p>A project ecologist will be appointed to oversee the decommissioning phase, with similar duties to those outlined above during the construction phase.</p>		
MM103	Decommissioning	EIAR Chapter 14 DP Section 3	<p>A Traffic Management Plan will be prepared in advance of any decommissioning works. The removal of turbines from site will be undertaken by a specialist haulier. The traffic management arrangements although similar to those that will be implemented for turbine delivery as outlined in the EIAR will be agreed in advance of decommissioning with the competent authority Donegal County Council.</p> <p>The Traffic Management Plan for the decommissioning phase will also include provision for the removal of underground cables from the underground ducts. This will be done by opening the joint bays in along the public road .</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 An Bord Pleanála.

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
<b>Pre-Construction Phase</b>						
MX1	Drainage Maintenance	EIAR Section 4 SWMP 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 SWMP Section 3	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	SWMP 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	Invasive Species	EIAR Section 6	A pre-commencement invasive species survey shall be completed for the site.	Once	As required	Project Ecologist



Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
		CEMP Section 3				
MX5	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 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.	Once	As required	Project Ornithologist
<b>Construction Phase</b>						
MX6	Archaeological Monitoring	EIAR Section 13	An archaeologist will monitor excavation works associated with the grid connection cable route and a full photographic record of the bridges will be made by the archaeologist prior to the removal of any components. A report will be compiled on completion of the monitoring and sent to the Local Authority and National Monuments Service.	As Required	As Required	Project Archaeologist
MX7	Water Quality and Monitoring	CEMP Section 3 SWMP Section 4	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	Daily	As Necessary	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			effectiveness of the drainage design is maintained in so far as is possible.			
MX8	Water Quality and Monitoring	EIAR Section 9 SWMP Section 4	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
MX9	Surface Water Quality	CEMP Section 4 SWMP 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 weekly 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
MX10	Clear felling of Coniferous Plantation	EIAR Section 9 SWMP Section 3	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
MX11	Plant and Equipment Inspections	EIAR Section 9	The plant used should be regularly inspected for fuel leaks, unnecessary noise generation and general fitness for purpose.	As Required	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
		CEMP Section 4				
MX12	Plant and Equipment Inspections	CEMP Section 3	Local areas of the haul route will be condition monitored and maintained, if necessary.	Daily	Monthly	ECoW
MX13	Flora and Fauna	CEMP Section 4	<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"> <li>➤ Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided.</li> <li>➤ Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Development area.</li> <li>➤ Oversee management of ornithological and ecological issues during the construction period and advise on ornithological issues as they arise.</li> <li>➤ Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.</li> <li>➤ Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.</li> </ul>	As required	As required	Project Ecologist
MX14	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
<b>Operational Phase</b>						
MX15	Surface Water Quality	SWMP 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	Monthly	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			advise on the readings being received from the testing laboratory.			
MX16	Drainage Inspections	SWMP 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.	Monthly	Monthly	ECoW
MX17	Ornithology	EIAR Section 7	<p>A detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Development, please refer to Appendix 7-8 of the EIAR for further details. The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation and these surveys will be scheduled to coincide with Years 1, 2, 3, 5, 10 &amp; 15 of the lifetime of the wind farm. Monitoring measures are broadly based on guidelines issued by the Scottish Natural Heritage (SNH, 2009). The following individual components are proposed for monitoring years:</p> <ul style="list-style-type: none"> <li>➤ Monthly flight activity surveys: vantage point surveys</li> <li>➤ Distribution and abundance surveys: breeding wader to a 500m radius of the development area, breeding hen harrier surveys and winter hen harrier roost surveys to a 2km radius of the development area.</li> <li>➤ Targeted bird collision surveys (corpse searches) will be undertaken with training dogs. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust.</li> </ul>	Years 1, 2, 3, 5, 10 & 15	Annually	Project Ornithologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX18	Ornithology	Appendix 7-8	<p>The monitoring measures will include:</p> <ul style="list-style-type: none"> <li>➤ Monthly flight activity surveys: vantage point surveys.</li> <li>➤ Breeding Bird surveys: Adapted Brown &amp; Shepard</li> <li>➤ Hen Harrier Winter Roost Surveys</li> <li>➤ 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.</li> </ul>	1, 2, 3, 5, 10 and 15	As required	Project Ornithologist
MX19	Ornithology	Appendix 7-8	<p>Audits will be required to ensure the effectiveness of the enhancement plan. The audit will assess:</p> <ul style="list-style-type: none"> <li>➤ Objectives of the individual farm plan;</li> <li>➤ Implementation of the plan; and</li> <li>➤ Adherence to requirements of the farm plan.</li> </ul>	Every five years	As required	Project Ornithologist
MX20	Bats	EIAR Section 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 static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision. The results of post construction monitoring shall be utilised to assess 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>	Years 1, 2, 3	Annually	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX21	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 and Enhancement 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 and Enhancement Plan in Appendix 6-4 of the EIAR. These include:</p> <ul style="list-style-type: none"> <li>➤ Drain blocking within degraded peatlands</li> <li>➤ Surface Peat Assessments</li> <li>➤ Vegetation Sampling</li> <li>➤ Hydrological Monitoring</li> </ul>	As required	As required	Project Ecologist
<b>Decommissioning Phase</b>						
MX22	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
MX23	Decommissioning	DP Section 3	Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of any material proposed 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.	As required	As required	Project Ecologist

## 8. PROGRAM 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 the removal of conifers (forestry) by felling will take place between the 1st of September and 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.

Works during the construction phase of the development, including delivery of construction materials will generally take place between 7 a.m. and 7 p.m. daily Monday to Friday and 7 a.m. to 2 p.m. on Saturdays, with large concrete pours requiring an earlier start when deemed necessary. Delivery of abnormal loads such as turbine tower sections and blades will take place at night outside of peak traffic hours.

The phasing and scheduling of the main construction task items are outlined in Figure 8-1 below, where 1<sup>st</sup> 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 Monitoring

Routine inspections of construction activities will be carried out on a daily and weekly basis by the ECoW and the Site Supervisor/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

The Contractor will be responsible for implementing the mitigation and monitoring measures specified throughout the EIAR and compiled in Sections 6 and 7 of this CEMP. The Contractor will also be responsible for ensuring that all construction staff understand the importance of implementing the mitigation measures. The implementation of the mitigation measures will be overseen by the environmental clerk of works or supervising hydrogeologists, environmental scientists, ecologists or geotechnical engineers, depending on who is best placed to advise on the implementation.

Environmental audits will be carried out during the construction phase of the project. In contrast to monitoring and inspection activities, audits are designed to highlight 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 contractor staff or alternatively by external personnel acting on their behalf. It is important that an impartial and objective approach is adopted. 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 project management personnel.

### 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 Site Supervisor/Construction Manager, as advised by the Site Environmental Clerk of Works. 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 Site supervisor/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

This CEMP will be updated and reviewed prior to commencement of construction, and also every six months thereafter during the construction phase of the project.