Appendix 2A

Construction Environmental Management Plan (CEMP)

MWP

Construction Environmental Management Plan (CEMP)

Ballycar Wind Farm

Ballycar Green Energy

January 2024

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Appendix 1 – Environmental Management Plans

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1. Introduction

This Construction Environmental Management Plan (CEMP) outlines the scope of construction works, construction methodologies and environmental management measures which will be implemented and followed for the proposed development in order to ensure that the project is constructed in accordance with best practice and with the minimum impact on the surrounding environment. For the purposes of the CEMP, the proposed development includes the wind farm, turbine delivery works area and the grid connection.

1.1 Report Purpose and Objectives

All construction projects require the preparation of a Site-Specific CEMP in order to ensure that the project is constructed in accordance with Best Practice, with the minimum impact on the surrounding environment.

The purpose of a CEMP is to outline how the Contractor(s) will implement a Site Construction Management System to meet the specified requirements which include Contractual, Regulatory and Statutory Requirements, Environmental Mitigation Measures and Planning Conditions.

In essence this CEMP is to provide the Client and the Main Project Contractor with a practical guide to ensure compliance by all parties with Planning and Environmental requirements.

The CEMP achieves this by providing the environmental management framework to be adhered to during the pre-commencement and construction phases of the proposed development. It outlines the work practices, construction management procedures, management responsibilities, mitigation measures and monitoring proposals that are required to be adhered to in order to construct the works in an appropriate manner.

All site personnel will be required to be familiar with the plan's requirements as related to their role on site. There will be a requirement on the Appointed Contractor that details are updated with progress, including the roles and responsibilities of those appointed on the site for the construction of the project.

This CEMP is intended to be a live document whereby different stages will be completed and submitted as the development progresses.

1.2 Scope

The CEMP defines the approach to environmental management at the site during the construction phase relating to all construction activities. Compliance with the CEMP, the procedures, work practices and controls will be mandatory and will be adhered to by all personnel and contractors employed on the construction phase of the project. This CEMP seeks to:

- Promote best environmental on-site practices for the duration of the construction phase; and
- Comply with any planning conditions that may apply.

The CEMP is considered a 'live' document, and as such, will be reviewed on a regular basis. Updates to the CEMP may be necessary due to any changes in environmental management practices and/or contractors. As explained

in more detail in the later sections, the procedures agreed in this CEMP will be audited regularly throughout the construction phase to ensure compliance.

2. Overview of Project

2.1 Wind Farm

The development for which planning permission is sought in the planning application (the proposed development) includes the following:

Core Wind Farm Elements:	• 12 No. Wind Turbines (blade tip height up to 158m, refer to Table 2-1 for turbine dimensions). • 12 No. Wind Turbine foundations and Hardstand areas. • 1 No. Permanent Meteorological Mast (90m height) and foundation and associated hardstand areas. • 1 No. Electrical Substation (110kV) including associated ancillary buildings security fencing and all associated works. • 2 No. Developed Site Entrances, one temporary entrance to facilitate construction traffic and one permanent entrance. • New and upgraded internal site service tracks. • Provision of an on-site Visitor cabin and parking.
Associated Development Components:	• All associated underground electrical and communications cabling connecting the proposed turbines to the proposed onsite substation. • Laying of approximately 1.5km of underground electricity cabling to facilitate the connection to the national grid from the proposed onsite substation to connect to an existing 110kV overhead line. • Temporary works on sections of the public road network along the turbine delivery route (including hedge or tree cutting, relocation of powerlines/poles, lampposts, signage, and local road widening). • 1 No. Temporary construction site compound and additional mobile welfare unit. • 1 No. Borrow pit to be used as a source of stone material during construction. • 3 No. spoil deposition areas (one at borrow pit location). • Associated surface water management systems. • Tree felling for wind farm infrastructure.

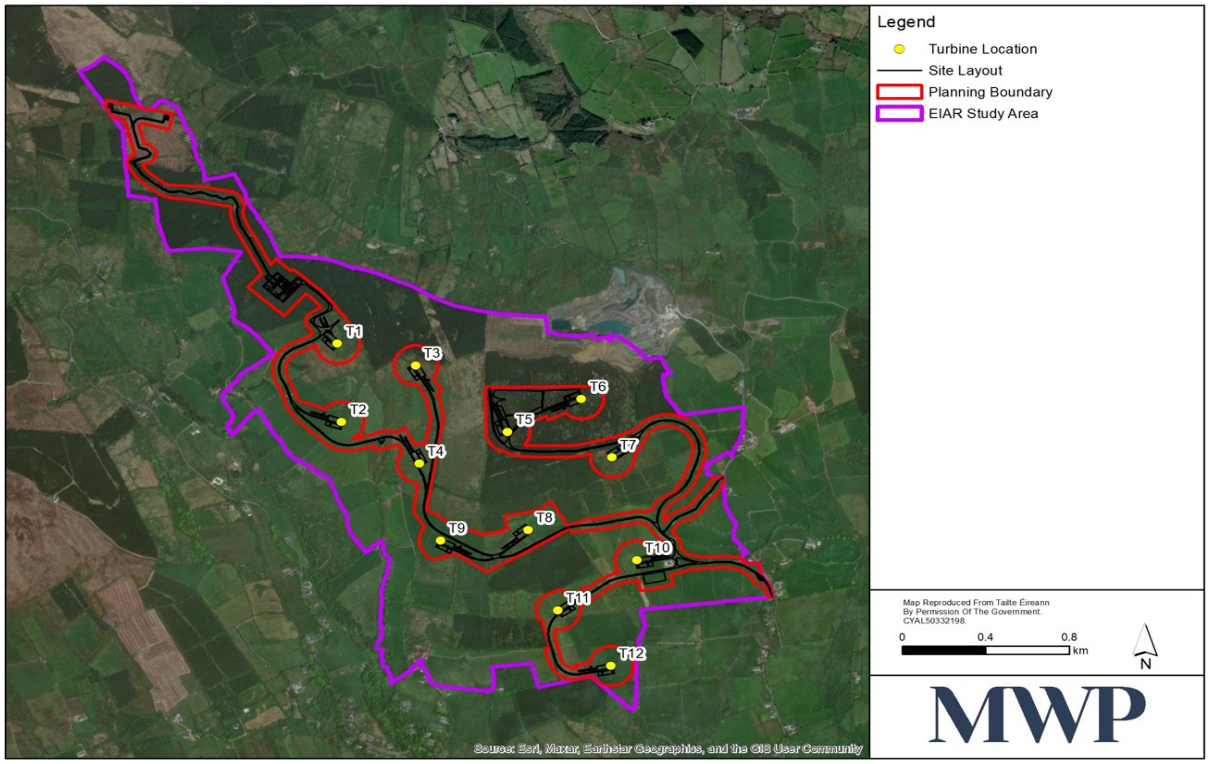


Figure 2-1: Proposed Wind Farm Layout

Table 2-1: Proposed Turbine Dimensions and Co-ordinates

Turbine Ref. No.	Hub Height	Blade Length	Maximum turbine tip height (m)	Grid Co-ordinates (ITM)	
T1	90	68	158	554589	664237
T2	90	68	158	554609	663823
T3	90	68	158	554964	664122
T4	90	68	158	554981	663600
T5	90	68	158	555405	663769
T6	90	68	158	555757	663943
T7	90	68	158	555904	663633
T8	90	68	158	555503	663247
T9	90	68	158	555084	663192

Turbine Ref. No.	Hub Height	Blade Length	Maximum turbine tip height (m)	Grid Co-ordinates (ITM)	
T10	82	68	150	556023	663087
T11	90	68	158	555645	662822
T12	90	68	158	555899	662525

2.2 Substation and Grid Connection

In addition to the proposed development as described, there is a proposed underground connection between T1 and the proposed 110kV substation which will be located northwest of T1. The underground connection from T1 is routed along existing forestry tracks and through conifer forestry to the north west of the wind farm site and connects to the proposed 110kV substation. From the proposed 110kv substation, an underground cable is routed in a north west direction where it connects to the existing 110kV overhead line. The proposed 110kV grid route is approximately 1.5km in length. 1.0km of the 110kV grid route is proposed within existing forestry tracks. The remaining 0.5km is routed through conifer forestry. It also crosses a 3m wide local public road. A new unbound stone access track will be constructed over the 110kV grid route on private lands to allow access for future maintenance.

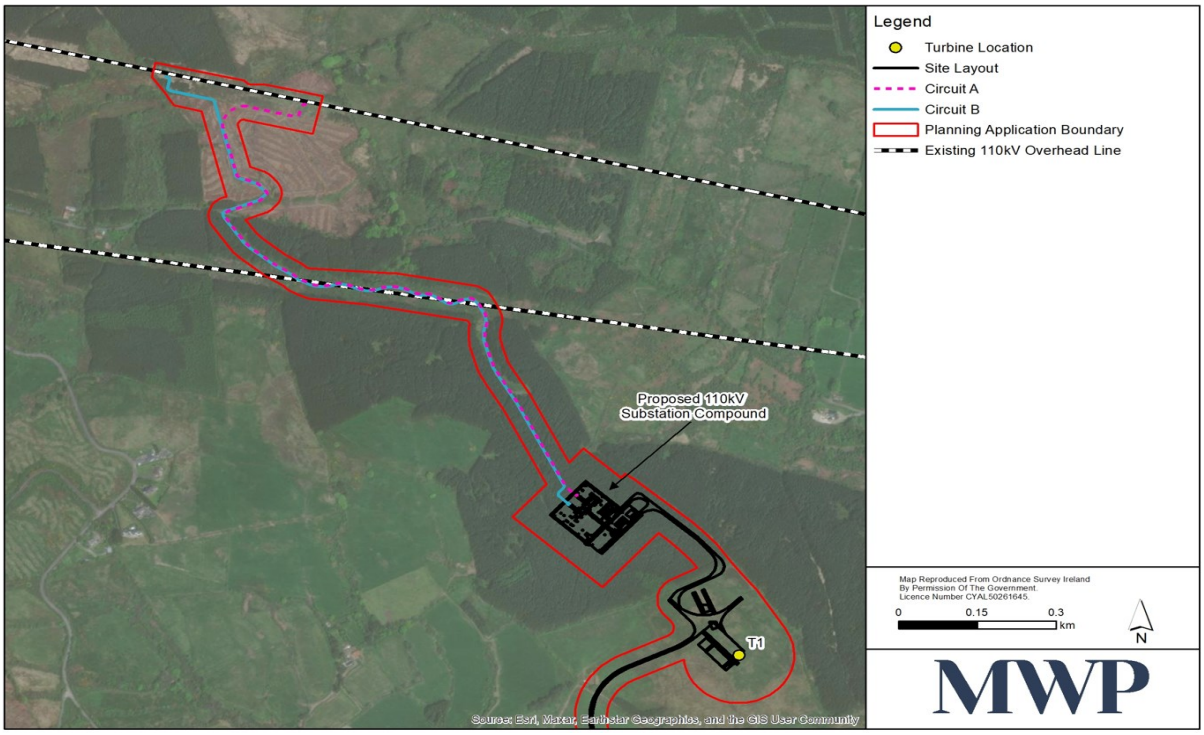


Figure 2-2: Proposed Substation and Grid Connection Route

3. Construction Works

3.1 Wind Farm Construction Schedule

The proposed overall project duration will be of the order of 18 months. The wind farm construction works will be phased as outlined in Table 3-1. A number of these phases will however run concurrently as follows:

- As the internal site access tracks are constructed up to each turbine, hardstand areas for the crane, turbine foundations will be prepared.
- Once the tracks are completed, the trenching and laying of underground cables adjacent to the tracks will begin.
- Construction of the site substation compound and substation buildings will commence so that they will be ready to export power as turbines are commissioned.

Table 3-1: Wind Farm Construction Schedule

Phase	Activity	Duration
Phase 1	Clearfelling (to be complete ahead of construction site mobilisation)	2 months (prior to construction)
Phase 2	Prepare site, pre-construction activities, site entrance, temporary compound	1 month
Phase 3	Access track construction + Drainage plan implementation	3 months
Phase 4	Hard standing construction for turbines	2 months
Phase 5	Turbine Foundation construction	4 months
Phase 6	Trenching and ducting (underground electrical collection system)	2 months
Phase 7	Substation construction	4 months
Phase 8	Permanent meteorological mast erection	1 month
Phase 9	Turbine delivery	3 months
Phase 10	Turbine erection	4 months
Phase 11	Wind Farm Commissioning	4 months (approx.)

3.2 Working Hours and Construction Personnel

Typically, construction will occur within the hours 7.00am – 7.00pm, Monday to Friday and 7.00am to 2.00pm on Saturdays. Due to the requirement for the concrete pours to be continuous, the working day may extend outside normal working hours in order to limit the traffic impact on other road users, particularly peak period school and work commuter traffic. Such activities are limited to the day of turbine foundation concrete pours, which are normally complete in a single day per turbine. Turbine and crane erections may also occasionally occur outside of these times in order to take advantage of low wind periods. Working hours will be confirmed at the outset of the project and any changes in hours will be agreed with the Local Authority.

During the construction phase, the number of on-site construction personnel will vary for each phase of the development. Overall, it is envisaged that the wind farm and substation works of the proposed development would generate employment for up 60 persons during the construction phase to include site contractors, on-site vehicle and plant operators, engineers, materials delivery personnel, environmental personnel, health and safety personnel.

It is expected that the civil works for the grid connection route will require at least 10 personnel to complete the works. The electrical works will require less heavy machinery but more labour personnel, with typically 25 personnel to complete the works.

4. Construction Methodology

Key elements of the civil works and activities associated with the construction phase of the wind farm development are as follows:

4.1 Pre-Construction Surveys

Any detailed ground investigations, environmental surveys and archaeological testing required to support the construction process will be carried out and finalised. These may include:

- Pre-construction ornithology surveys;
- Pre-construction monitoring of bats and terrestrial mammals conducted to determine whether their use of the site has altered;
- Pre-construction invasive species survey;
- Baseline water quality assessment; and
- If required, pre-development archaeological testing at the site.

4.2 Enabling Works

Prior to construction commencing, on site demarcation of the construction site boundary will be undertaken to prevent equipment tracking outside of the planning boundary.

To prepare the site for the construction of the internal tracks, turbines and hardstand areas, clearance of small areas of scrub and hedgerows is required. The temporary compound will also be set-up at this stage.

4.3 Temporary Site Construction Compound

One (1) No. temporary construction compound will be set up upon commencement of the construction phase. The location of the temporary compound is shown in Figure 4-1.

The construction compound will be located on the eastern section of the wind farm site near T10. See planning application Drawing No. 22156-MWP-00-00-DR-C-5408 for details. All excavated material will be taken to the on-site deposition areas.

The exposed surface will be levelled out by cutting and filling and will be overlain with a layer of crushed stone from the proposed on-site borrow pit. The finished surface will be formed with a layer of Clause 804 or similar aggregate imported from local quarries. The compound will be graded and compacted out before the welfare container facilities are installed.

The compound will be used as a secure storage area for construction materials and will also contain temporary site cabins to provide welfare facilities for site personnel. Facilities will include office space, meeting rooms, canteen area and mobile sanitary facilities. Any surface water management, bunding, waste management measures etc. will also be put in place at the outset. Site security will be put in place adjacent to the entrance and will be maintained throughout all phases of the work. The proposed development will include an enclosed wastewater management system at the temporary compound capable of handling the demand during the

construction phase. A holding tank is proposed at the compound for wastewater management. The holding tank will be emptied by a licensed permitted contractor only. Upon completion of the development the compound will be decommissioned by backfilling the area with the material arising during excavation and landscaping with topsoil.

The compound will be in place for the duration of the construction phase and will be removed once commissioning is complete.

Areas within the compound will be constructed as access tracks and used as vehicle hardstanding during deliveries and for parking;

1. A bunded containment area will be provided within the compound for the storage of lubricants, oils, and site generators etc.;
2. The compound will be fenced and secured with locked gates;
3. During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used on site for toilet facilities. This will be maintained by the service contractor on a regular basis and will be removed from the site on completion of the construction phase.

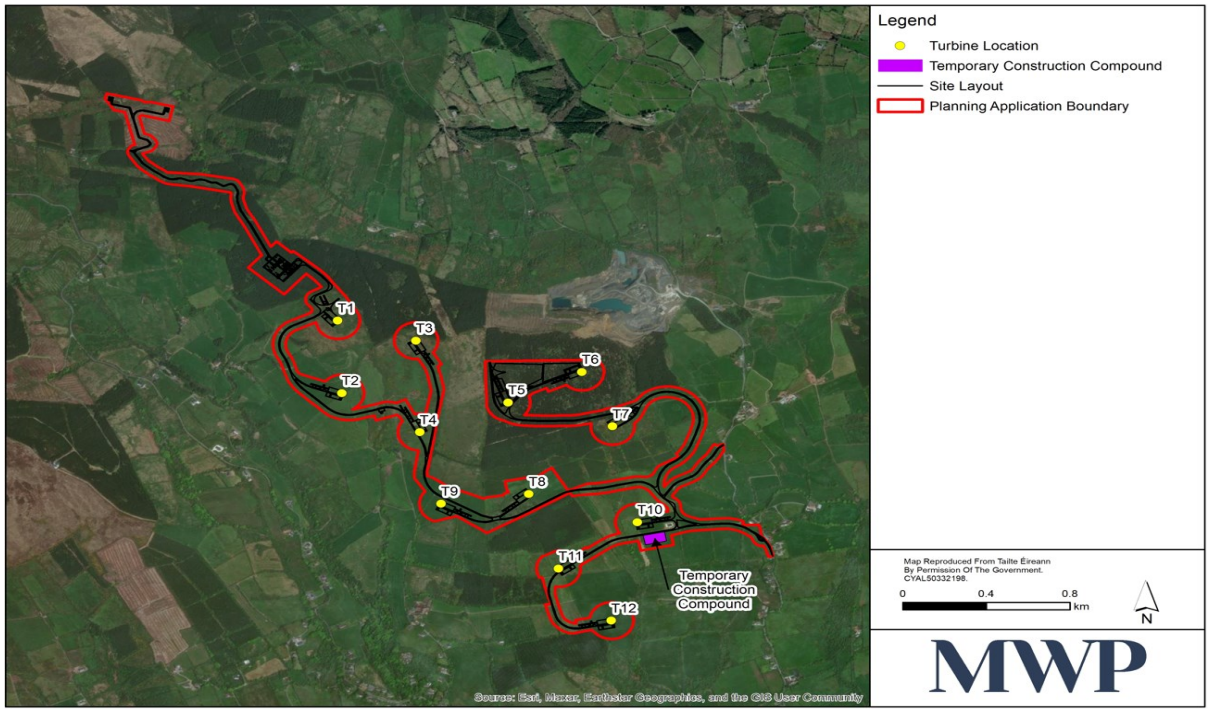


Figure 4-1: Location of Temporary Construction Compound

Figure 4-2: Typical temporary site construction compound on a wind farm

4.4 Borrow Pit

The borrow pit proposed within the site will be used to obtain approximately 165,000m^3 of site won stone aggregate for use in the construction of the wind farm. The borrow pit will also act as a material deposition area. This borrow pit will be located within the northern area of the site where it will be used as a source of hardcore for the construction of access tracks, crane hardstands, met mast, substation and construction compound. The proposed location of the borrow pit is shown on Figure 4-3 and Planning Drawings 22156-MWP-00-00-DR-C-5411.

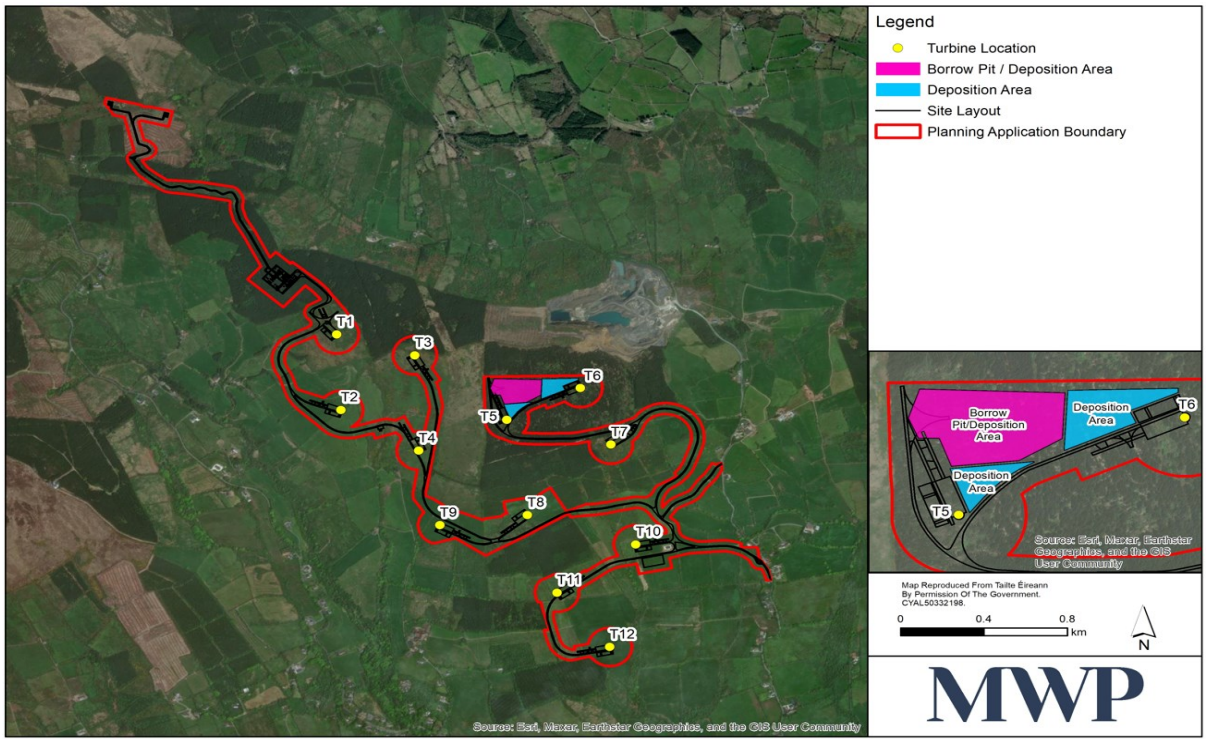


Figure 4-3: Borrow Pit/Material Storage Locations

4.5 Site Access

Primary access to the proposed development site will be provided from the local public road the L-7062 (refer to **Figure 4-4).** There will be two site entrances, one temporary entrance to facilitate construction traffic delivering material from a local quarry and one to facilitate turbine deliveries, materials sourced from alternative quarries and operations and maintenance vehicles.

Entrance Point A to the north-east of the site is proposed as a temporary access to be used during the construction phase only. Any materials sourced from a local quarry will utilise this entrance point, thereby minimising the impact of additional construction traffic on the L-7062 and the residents on this road. This entrance will be reinstated to its original condition once the construction phase is completed.

Entrance Point B will be from the south-east of the site and from the L-7062. This site access point will be for turbine deliveries, materials other than those sourced from the local quarry, and operations and maintenance vehicles. This will be a permanent access point but will be scaled back, landscaped, fenced and gated as the wind farm becomes operational.

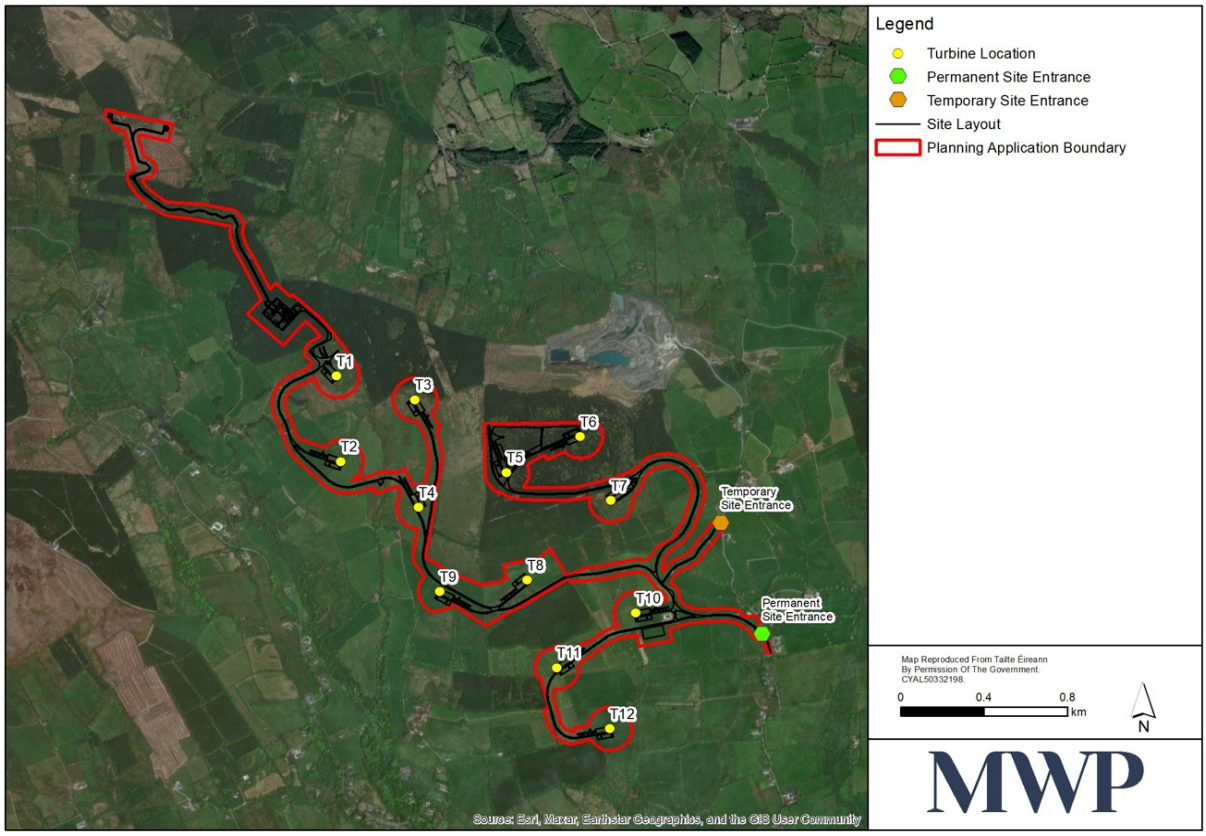


Figure 4-4: Site Access Points and Internal Tracks Layout

4.6 Internal Site Tracks

Internal access tracks are required in order to interconnect elements of the site and provide access to wind turbines and wind farm infrastructure. The existing tracks within the site, will be upgraded where possible and new tracks will be constructed as required.

It is anticipated that both upgraded and new tracks will be excavated to suitable bearing level, as dictated by local ground conditions. Where depth to bearing level is excessively deep or where the water table is close to the surface level, new tracks will be constructed as floating tracks. Tracks and drainage layout and construction details are illustrated in Drawing No. 22156-MWP-00-00-DR-C-5006 to 22156-MWP-11-00-DR-C-5006, Drawing No. 22156-MWP-00-00-DR-C-5405 and Drawing No. 22156-MWP-00-00-DR-C-5406. The finished surface of the internal access tracks will be raised above the surrounding ground level and cambered to allow surface water to runoff the track surface.

4.7 Site Drainage System and Water Quality Management

During the construction phase of the project, there is potential for sedimented surface water run-off from the construction works areas to contaminate downstream watercourses, without implementation of appropriate mitigation measures. Fundamental to any construction project, is the need to keep clean water (i.e. runoff from adjacent ground upslope of the permitted development footprint) clean and manage all other run-off and water from construction in an appropriate manner.

A site-specific drainage system has been designed taking account of the following:

- Knowledge of the ground and hydrological conditions at the site;
- Previous construction experience of wind farm developments in similar environments;
- Previous experience of environmental constraints and issues from construction of wind farms in similar environmental conditions; and
- Technical guidance and best management practice manuals.

The system is designed to ensure that it will largely mimic the existing drainage regime across the site, will not deteriorate water quality and will safeguard catchment water quality status from wind farm-related sediment run-off. The following are the key elements of the proposed drainage system:

- Clean water from uphill catchments, which would otherwise flow into the site infrastructure areas, will be collected in cut-off drains and diverted away from or piped unimpeded through site infrastructure. This reduces the risk of clean water mixing with dirty water runoff from the development and also reduces the volume of dirty water to be treated;
- Access tracks will be cambered to ensure dirty water flows towards the dirty water drain;
- Runoff collected in dirty water drains will be routed through settlement ponds prior to travelling through overland flow/percolation to existing agricultural field drains or to existing watercourses;
- Stone filter beds will be installed at the outfall of the settlement ponds;
- Two (2) rows of Terrastop silt fencing will be installed along the top banks of watercourses and existing agricultural field drains where infrastructure will cross or run adjacent to a watercourses or existing agricultural field drains. The silt fencing will slow overland flows and provide additional filtration of suspended solids prior to discharge entering watercourses;
- Clean stone check dams will be placed at maximum 50m c/c intervals within trackside drains to limit erosion and provide attenuation volumes during times of high rainfall;
- Areas between structures within the onsite substation compound will be constructed of permeable crushed stone. A footpath will be installed around the substation building. This footpath will be graded to direct surface water away from the building towards a land drain installed within the compound stone and discharging to a bioretention basin and overflowing overland to existing land drainage;
- All stormwater runoff from electrical infrastructure bunds within the substation compound where the risk of an oil leak or spill may be present, will be treated using Class 1 full retention interceptor manufactured in accordance with IS EN 858 parts 1 and 2 and a BundGuard pump and sump system (or similar);

- All bunds will be fitted with alarmed sensors to detect oil. High water levels in the sump will activate the pump and the water level will begin to drop as the sump is emptied. When the oil layer is detected by the units sensors, the pump will stop and no water will discharge. When the next rainfall event occurs, this process is repeated with the oil layer always remaining in the bund; and
- To ensure effective drainage from the permanent internal access track network and substation compound, the drainage measures installed for the construction phase will remain in place for the operational life of the wind farm.

The site drainage layout is presented in 22156-MWP-01-00-DR-C-5006 to 22156-MWP-11-00-DR-C-5006 with drainage details presented in Planning Drawing 22156-MWP-00-00-DR-C-5406.The drainage layout is overlaid on background OSI mapping in the A1 drawings that accompany the planning application.

Figure 4-5 shows a well-constructed and maintained tiered settlement pond. The design was developed in conjunction with Inland Fisheries Ireland (IFI) personnel and local authority engineers. This example is located in an upland environment with significant ground surface slope and operates efficiently provided that it is well maintained.

Figure 4-5: Typical Three-tiered Settlement Pond with Stone Filter

4.7.1 Watercourse Crossings

There will be some minor works associated with the proposed development within 50m of watercourses identified in Planning Drawing No. 22156-MWP-DR-C-5006 at the following locations:

- Temporary Construction Site Entrance;
- Grid connection to OHL; and

- Met Mast Works.

Works will be undertaken in accordance with the mitigation measures set out in this CEMP and Surface Water Management Plan contained in Appendix 2B. Working near watercourses during or after intense or prolonged rainfall events will be avoided and work will cease entirely near watercourses when it is evident that there is a risk that pollution could occur. All construction method statements will be developed in consultation with Inland Fisheries Ireland and in accordance with the details in this CEMP. The selection criteria and other details of the proposed crossings can be found in Chapter 03 Civil Engineering. These crossings will be subject to a Section 50 application to ensure flood risk upstream and downstream of the crossing is not increased.

The selection criteria for crossing natural / artificial drains and streams within the site were:

- Avoid crossing drains or streams at acute angles where possible;
- Avoid meanders at the crossing location;
- Cross where foundations could be constructed without excess excavation;
- Consider vertical alignment requirements.

Where crossings are cut into relatively deep channels these channels would require significant upfill to maintain vertical alignment criteria for turbine deliveries along access tracks. Clear span pre-cast concrete culverts are advantageous in several manners for this type of installation. As spans increase, the height can increase accordingly allowing significant light penetration under the culvert. The increase in height is complimentary to the vertical alignment requirements for access track design.

The design of a clear span pre-cast concrete culvert crossings will ensure that:

- The existing channel profile within the watercourse is maintained;
- Gradients within the watercourse are not altered;
- There is unrestricted passage for all size classes of fish by retaining the natural watercourse stream / riverbed;
- There are no blockages within the watercourse. The large size of a clear span culvert allows for the passage of debris in the event of flood flow conditions;
- The watercourse velocity is not changed;
- The clear span of a culvert will ensure that the existing stream / riverbank is maintained during construction which will in turn avoid the occurrence of in-stream works.

Construction of any clear span crossings will be supervised by the Construction Manager, a suitably qualified engineer, the project manager, and the Environmental Manager in accordance with Inland Fisheries Ireland *"Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters, 2016"* and Office of Public Works *"Construction, Replacement or Alteration of Bridges and Culverts, 2013"*.

Typically, the proposed installation works for a clear span pre-cast concrete culvert will comprise the following:

1. Prior to the commencement of works the design of the culvert will be submitted for approval to the Office of Public Works (OPW) under Section 50 of the Arterial Drainage Act, 1945 and to Inland Fisheries Ireland (IFI);
2. Upon design approval the extent of the excavations required for the culvert foundations at either side of the watercourse will be marked out. The foundations will be set to an agreed minimum distance by IFI from the existing watercourse so as not to impact on the riparian habitat. Health and safety measures

such as lifebuoys on stakes will be installed and where appropriate life jackets will be provided to persons working near the watercourse;

3. Appropriate environmental control measures such as silt curtains, silt traps, mats etc. will be erected on both sides of the watercourse. These environmental control measures will reduce the potential for sedimentation of the watercourse;
4. Excavators will begin to excavate the foundations to formation level where all excavations will be battered back to a safe angle of repose (minimum slope angle of 45°) and comply with the final Construction and Environmental Management Plan (CEMP) to be produced by the appointed contractor for the proposed development. All excavation works will stop in the event of heavy rainfall;
5. All excavated material will be transported to the on-site deposition areas located outside of the 50m hydrology buffer zone. Some of the excavated material will subsequently be reused as backfill around the culvert abutments and structure upon installation. Bare ground will be minimised;
6. Once formation is reached at suitable ground conditions; steel reinforcement and shuttering will be installed. The culvert abutments will be prepared for the pouring of concrete by dewatering standing water within the excavations, which is likely to contain suspended solids, via a pump to an adequately sized settlement pond located outside of the 50m hydrology buffer zone. The standing water will be treated through the settlement pond and clean filtration stone prior to outfall over vegetation away from the watercourse;
7. Ready-mix concrete will be delivered to the culvert abutments by ready-mix concrete trucks and placed into each abutment by means of excavators. During the concreting works the watercourse will be temporary covered over with a tarpaulin to protect the watercourse from concrete spills. Upon completion the abutments will be covered and allowed to cure;
8. Following curing, the shuttering around the abutments will be struck and removed. A small temporary hardstand will be constructed so that a lifting crane, which will install the pre-cast concrete culvert components onto the abutments, can be set up;
9. Deliveries of the pre-cast concrete culvert components will arrive to site. These components will be individually fitted and manoeuvred into position by the lifting crane onto the concrete abutments. The components will be inspected to ensure that each unit is level and secure;
10. Backfilling on either side of the culvert will commence using excavated material, in particular larger rock of a uniform size will be placed along the edge;
11. The access track surface will be laid over the culvert structure using stone aggregate and compacted in maximum 250mm layers with the use of 10-20 Ton rollers. An internal cable trench will be installed within the carriageway of the culvert so that it can cross over the watercourse;
12. Vegetated soil bunds will be installed to divert dirty water generated on the section of track over the culvert crossing into the dirty water system outside of the 50m hydrology buffer zone. This will ensure that dirty water will not enter the clean watercourse;
13. Steel parapet railings and timber post and rail fencing will be installed at the sides and on the approaches to the culvert. This will prevent persons or vehicles falling into the watercourse while travelling across the culvert.

4.7.2 Water Quality Management Systems

Sediment such as clay or silt can cause pollution during the construction phase of a civil engineering project due to the erosion of exposed soil by surface water runoff. The water quality management system has been prepared in order to control erosion and prevent sediment runoff during the construction phase of the proposed development. The implementation of sediment and erosion control measures is essential in preventing sediment pollution. The system was designed having regard to:

- Knowledge of the site's environmental conditions;
- Previous experience of environmental constraints and issues from construction of wind farms in similar environmental conditions; and
- Technical guidance and best management practice manuals.

The following site-specific information was used in the design of the drainage and treatment system:

- High resolution aerial photography;
- LiDAR ground surface information;
- Wind farm infrastructure layout (turbines, access tracks and ancillary development);
- Hydrology maps (watercourses and buffer zones);
- Soil and land use maps;
- Baseline water quality assessments; and
- Met Éireann extreme rainfall data.

The settlement ponds and check dams described in the following subsections provide the essential mechanism for the removal of silt from construction related runoff and the controlled return of the treated runoff to the downstream watercourses.

The drainage and treatment system will ensure that the construction and early post-construction phases of the proposed development will not create adverse effects on the aquatic environment.

A site-specific Surface Water Management Plan (SWMP) has been designed for the proposed development to avoid/minimize impacts to water quality within and downstream of the site. Refer to Chapter 03 Civil Engineering for full details. The SWMP will be implemented by the appointed contractor in combination with this CEMP.

4.7.3 Water Quality Monitoring

4.7.3.1 Pre-Construction Baseline Monitoring

Pre-baseline construction monitoring will be carried out at the following proposed locations which drain the proposed development (see Table 4-1 and Figure 4-6).

Table 4-1: Baseline Monitoring Locations

Hydrometric Area	Subbasin	River Catchment	Watercourse	River Segment Code	Stream order	Site	Coordinate	
							x	y
Shannon Estuary North	Crompaun (East)_010	Crompaun (East)	Crompaun	27_755	2	SW1	553790	663975
			Glennagross	27_431	2	SW2	554084	663753
			Cappateemore east	27_277	1	SW3	554792	663405
			Crompaun East	27_1129	3	SW4	555000	662040
Lower Shannon	North Ballycannan_ 010	North Ballycannan	North Ballycannan	25_866	1	SW5	556531	663068
			North Ballycannan	25_185	2	SW6	556445	661639
			West Ballycannan	25_1699	2	SW7	556084	661408
			South Ballycar	25_1694	1	SW8	556538	664031
			South Ballycar	25_181	3	SW9	557344	661790
			West Roo	25_1150	2	SW10	558026	662034
	Blackwater (Clare_010)	Blackwater (Clare)	Blackwater (Clare)	25_3209	3	SW11	559355	665585
			Kilnacreagh	25_3206	1	SW12	553630	665468

Baseline water quality monitoring will be required for each proposed monitoring location prior to commencement of the proposed development. Water quality field testing and laboratory analysis will be undertaken prior to commencement of felling and construction at the site. The monitoring programme will be subject to agreement with Clare County Council but will be based on the planning stage programme already outlined in the EIAR and presented herein.

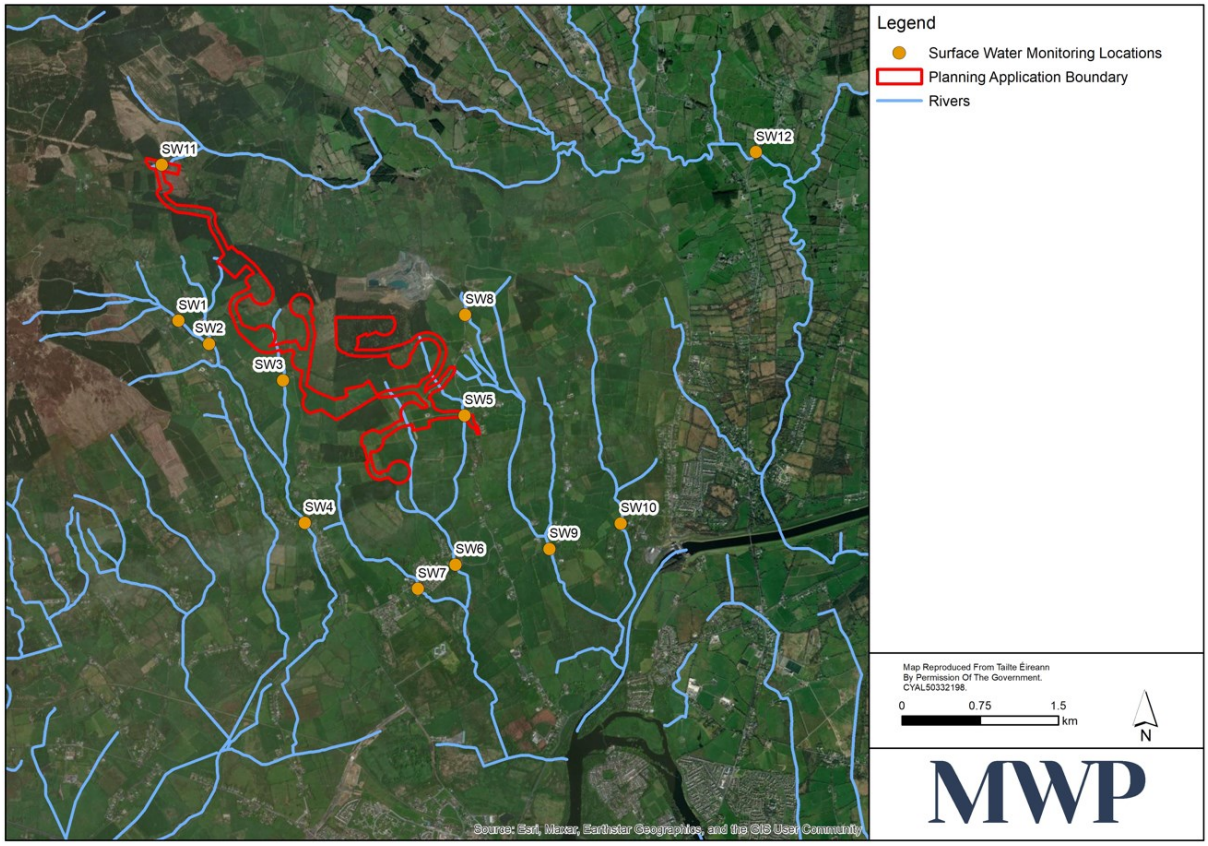


Figure 4-6: Water Quality Monitoring Locations

4.7.3.2 Construction Phase Monitoring

Continuous Field Monitoring

During the construction phase of the project, a surface water monitoring schedule, finalised prior to construction, will be followed. In summary, it is recommended that weekly field monitoring of surface water quality chemistry will be carried out at identified 12 surface water quality monitoring locations in Figure 4-6, or others as required. The following parameters will be measured:

- pH (field measured);
- Electrical Conductivity (field measured);
- Temperature (field measured);
- Dissolved Oxygen (field measured);
- Total Dissolved Solids (TDS) (field measured);
- Turbidity (field measured).

Continuous, In-Situ Monitoring

Continuous, in-situ, monitoring equipment will be installed at selected locations. The monitoring equipment will provide continuous readings for turbidity levels, flow rate and water depth in the watercourses.

Monthly Laboratory Analysis

Each month, the ECoW will take samples from each location and bring to a laboratory for analysis on a range of parameters with relevant regulatory limits and EQSs. This will be compared with the baseline data obtained prior to construction from the EPA and from sampling. If the measured value exceeds the baseline values, the cause will be determined, and remedial measures put in place as necessary.

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

- pH;
- Total Petroleum Hydrocarbons (TPH);
- Temperature;
- Total Phosphorus;
- Chloride;
- Nitrate;
- Nitrite;
- Total Nitrogen;
- Orthophosphate;
- Ammonia N;
- Biochemical Oxygen Demand;
- Total Suspended Solids.

Visual Monitoring

Periodic visual observations at each of the monitoring points will be recorded with specific reference to flow, stream substrate and water colour. Photos will be taken to support visual observation, and inspection sheets including visual observation results and photographic records will be kept on site.

Visual observations will also be completed after major rainfall events along with photographs which will be collected and assessed by the EcoW.

The elements which will be included in the visual checklist are as follows:

- Appropriate periodic visual inspection of all watercourses which drain the proposed development by the ECoW or a suitably qualified and competent person delegated by the ECoW.
- All elements of drainage system will be monitored including settlement ponds, check dams, interceptor drains etc. Corrective action will be carried out if there is a visual indication of discolouration, oily sheen, odour or litter.
- Event based visual inspections by the ECoW as follows:
    - Following a high intensity localised rainfall event (10mm/hr);
    - Heavy rainfall within a day (25mm in a 24 hour period);
    - Higher than monthly rainfall within a week period.

- A record of all visual inspections will be included in the Construction Environmental Management Plan (CEMP) and maintained on site.

4.8 Traffic Management

A detailed Traffic Management Plan (TMP) has been prepared and is included in **Appendix 2D**. This plan will be further updated and adopted by the appointed contractor prior to construction commencing. It will be necessary to engage with the Roads and Transportation section of Clare County Council and with An Garda Siochána and to establish traffic volumes and local road usage at the time.

The purpose of developing and implementing an agreed TMP for the construction phase works is to minimise the impact of the works on local residences and users of the public road networks. The TMP will be updated at the construction stage (or the update commenced during planning compliance stage) to ensure controls are in place for all users of the site.

4.9 Spoil Management and Material Volumes

Excavated spoil will be reused for the backfilling, landscaping, and restoration around wind farm infrastructure such as turbines and hardstands.

The calculated volume of excavated material is summarised in **Table 4-2**.

Dedicated spoil storage areas and a borrow pit are proposed within the site. These will be used for generating material for the construction of access tracks and hardstands and for spoil storage. The proposed locations for the borrow pit and spoil storage are shown on **Planning Drawings 22156-MWP-00-00-DR-C-5411**.

Spoil will also be stored around the turbines to a maximum height of 1m. The felled areas around the turbines have been identified as a potential additional area that will be used to store material; however, priority will be given to restoration of the borrow pit and the dedicated spoil storage areas.

Berms will be formed along sections of access tracks and hardstands that will act as a physical edge protection measure to prevent vehicles falling off where a drop off greater than 1m exists from the track / hardstand edge. Spoil generated onsite will be used to create these berms.

A summary of the construction material and spoil storage volumes are shown in **Table 4-2**.

Drainage and siltation control measures will be put in place in all spoil storage areas. This will include a dedicated drainage network, temporary silt fences and settlement ponds designed to cater for the size of each storage area.

Table 4-2: Spoil Excavation and Construction Material Volumes

Item	Unit	Quantity
Excavations		
Total Excavation Volumes	m^3	418,300
Excavated Material Stored or Reused Onsite	m^3	402,000

Item	Unit	Quantity
Excavated Material Removed from Site	m^3	16,300*
Imported Material		
Total Volume of Stone Required	m^3	265,150
Imported Stone	m^3	100,150
Site Won Stone	m^3	165,000
Concrete and Steel		
Concrete for bases (12 @ 900 m^3 each)	m^3	10,800
Concrete for substation and met mast foundations	m^3	250
Concrete for cable route	m^3	281,450
Reinforced steel for turbine bases (12 @ 100 tonnes each)	tonnes	1,200

* This material will be reused on site as preference in trackside berms etc. It is however included in the table above as material to be removed from site as a precautionary measure.

4.10 Wind Turbines

4.10.1 Wind Turbine Locations

The final step in positioning turbines was to minimise the volume of excavated spoil and to achieve as close as possible to a balance of cut and fill of the underlying strata at each turbine location. This was achieved by orientating the turbine base and crane hardstanding area with its long axis parallel to the ground contours as much as possible while taking account of access criteria for delivery of turbine components. This generally required some adjustment to the position of the access track on the approach to the turbine site. Table 4-3 gives information of the site, ground slope and spoil depth at and in the vicinity of each of the proposed turbines.

Table 4-3: Ground Parameters at Turbine Sites

Turbine	Land Use Category	Slope	Peat Depth
T1	Agricultural Grassland	4.9°	0.0m
T2	Agricultural Grassland	7.4°	0.0m
T3	Agricultural Grassland	5.1°	0.0m
T4	Agricultural Grassland	7.6°	0.0m

Turbine	Land Use Category	Slope	Peat Depth
T5	Coniferous Forestry	0.7°	0.0m
T6	Coniferous Forestry	10.6°	0.0m
T7	Agricultural Grassland	9.6°	0.0m
T8	Agricultural Grassland	12.4°	0.0m
T9	Agricultural Grassland	6.0°	0.0m
T10	Agricultural Grassland	4.5°	0.0m
T11	Agricultural Grassland	4.0°	0.0m
T12	Agricultural Grassland	4.4°	0.0m

4.10.2 Turbine Crane Hardstands

The layout of the crane hardstand is designed to accommodate the delivery of the turbine components prior to their erection and to support the cranes during erection. Hardstands are also used for maintenance during the operation of the turbine. The hardstands will be rectangular in shape with additional hardstand set down area to lay the turbine blades across once delivered. The area of a single hardstand is approximately 68m long by 25m wide. Refer to Planning Drawing 22156-MWP-00-00-DR-C-5403 for further details. Due to the significant loads that will be imposed by the outriggers of the main lifting crane during the turbine erection process; it is intended that the hardstands will be constructed using excavation methods over the footprint of the hardstand area / turbine base.

The proposed works will be restricted to the turbine locations and will comprise the following:

1. Each crane hardstand will be formed on competent subgrade of the underlying subsoil / rock which will comprise of stone aggregate (obtained from either the on-site borrow pit, excavated works, or imported from the nearby quarry) laid on a geotextile filter membrane.
2. Any existing unsuitable soil found within the footprint of the turbine hardstand will be excavated out during formation works. The excavation works will be carried out using hydraulic excavators where surplus subsoil material will be transported to the on-site deposition areas via articulated dumper trucks or tractor and trailer for subsequent reuse in the permanent reinstatement of the borrow pit.
3. The stone aggregate for the turbine hardstands will be compacted in 250mm layers and will vary from approximately 300mm to 900mm deep depending on the gradient of the underlying subgrade.
4. Temporary set down areas will be formed to facilitate the storage of the turbine components at each crane hardstand (e.g., the turbine blades, the turbine towers, and nacelle). Each temporary set down area will be constructed using compacted stone aggregate which will be fully removed and reinstated after all turbines have been erected.
5. Plate bearing test results will be undertaken on the finished hardstand surface to check if ground bearing strengths are to the wind supplier's specifications. Once complete the assembly cranes will be set up on the hardstand and erect the wind turbine into place.
6. Where drop offs greater than 1.0m in height occur alongside hardstand edges; physical edge protection will be constructed to reduce the risk of vehicles overturning or persons falling.

4.10.3 Turbine Bases

It is proposed the 12 no. wind turbines will have a reinforced concrete base pad foundation with a central pedestal above the base, that will in turn support the wind turbine tower. Each turbine base will bear onto rock or other such suitable bearing stratum and will be constructed utilising a spread foundation, which is wide and shallow. A typical foundation will be approximately 28m in diameter and will generally be installed to a depth of approximately 3.0m below ground level. Approximately 900m^3 of concrete and 100 tonnes of steel will be used in the construction of each turbine base. The final dimensions of the turbine bases will be confirmed as part of detailed engineering. Refer to Planning Drawing No. 22156-MWP-00-00-DR-C-5402 for further details.

The proposed works will be restricted to the turbine locations and will comprise the following:

1. 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;
2. Any existing subsoil found within the footprint of the turbine base will be excavated out during formation works at the adjacent crane hardstand area. The excavation works will be carried out using hydraulic excavators where surplus subsoil material will be transported to the on-site deposition areas via articulated dumper trucks or tractor and trailer for subsequent reuse in the permanent reinstatement of the borrow pit;
3. Blasting at turbine locations and hardstands may be necessary to enable excavation of the rock if encountered at less than 3m depth. Any blasting will be carried out by a suitably qualified specialist under licence with a suite of mitigation measures in place. Blasting, and mitigation measures associated with the process, is discussed in further detail in the Chapter 09 Land and Soils of this EIAR.
4. Standing water in turbine base excavations is likely to contain an increased concentration of suspended solids. Dewatering of turbine base excavations can result in significant flow rates to the drainage and settlement system if high-capacity pumps are used. To avoid the need for pumping it is proposed to provide drainage channels from the excavations to prevent a build-up of water. Where this is not feasible, temporary storage will be provided within the excavations and dewatering carried out at a flow rate that is within the capacity of the settlement ponds;
5. The excavated surface will be levelled and adequate drainage measures will be put in place along with suitable set back areas to facilitate placing of stone and ultimately the erection of shuttering for the turbine base;
6. If poor ground conditions are encountered during excavation and a significant depth to sub-formation is required, a piled foundation may be considered. A piled foundation requires the use of a piling machine equipped with an auger drill to rotary bore a number of holes around the area of the turbine base to the sub-formation depth determined at construction stage. Once all the holes have been bored, reinforcement steel is inserted into each with concrete poured afterwards;
7. Suitable stone aggregate will be used to form a solid level working foundation surface. The stone will be rolled and compacted to a suitable formation level;
8. Shutters and steel reinforcement will then be put in place and the foundation of the turbine will be prepared for pouring of concrete;
9. A layer of concrete blinding approximately 75mm thick will be laid 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 will be prevented from entering surface water drainage directly;

10. High tensile steel reinforcement will be fixed in accordance with the design drawings and schedules. The foundation anchorage system will be installed, levelled and secured to the blinding using steel box section stools;
11. Ductwork will be installed as required, and formwork erected around the steel cage and propped from the backside as required;
12. 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 the turbine supplier for their approval;
13. Ready-mix concrete will be delivered to each turbine base by a fleet of ready-mix concrete trucks via the internal access tracks. Concrete will placed into each base by means of a concrete pump where vibrating pokers will be used to ensure that full and proper compaction of the concrete around the reinforcement in the turbine base has been made. Upon completion of the concreting works the foundation base will be covered and allowed to cure;
14. Steel shutters will be used to pour the circular chimney section;
15. Following curing, the shuttering around the turbine base will be struck and removed;
16. Earth wires will be placed around the base; and,
17. The foundation will be backfilled with a cohesive material, where possible using the material arising during the excavation and landscaped using the vegetated soil set aside during the excavation. A gravel footpath will be formed from the access track to the turbine door and around the turbine for maintenance.

4.11 Tree Felling

Felling of commercial conifer forestry is required within and around wind farm infrastructure to accommodate the construction of two turbine foundations, and associated hardstands, access tracks, turbine assembly and borrow pit and deposition areas. There will also be felling required for the substation and grid connection. It is proposed to fell up to a distance of 95m (in line with the required clearance for bats around turbines and circa 5m on either side of tracks). Overall felling of approximately 15.97ha of forestry will be required.

All tree felling will be undertaken in accordance with a tree felling licence, using good working practices as outlined by the Department of Agriculture, Food, and the Marine (DAFM) Standards for Felling and Reforestation (2019). These standards deal with sensitive areas, buffer zone guidelines for aquatic zones, ground preparation and drainage, chemicals, fuel, and machine oils. All conditions associated with the felling licence will be complied with.

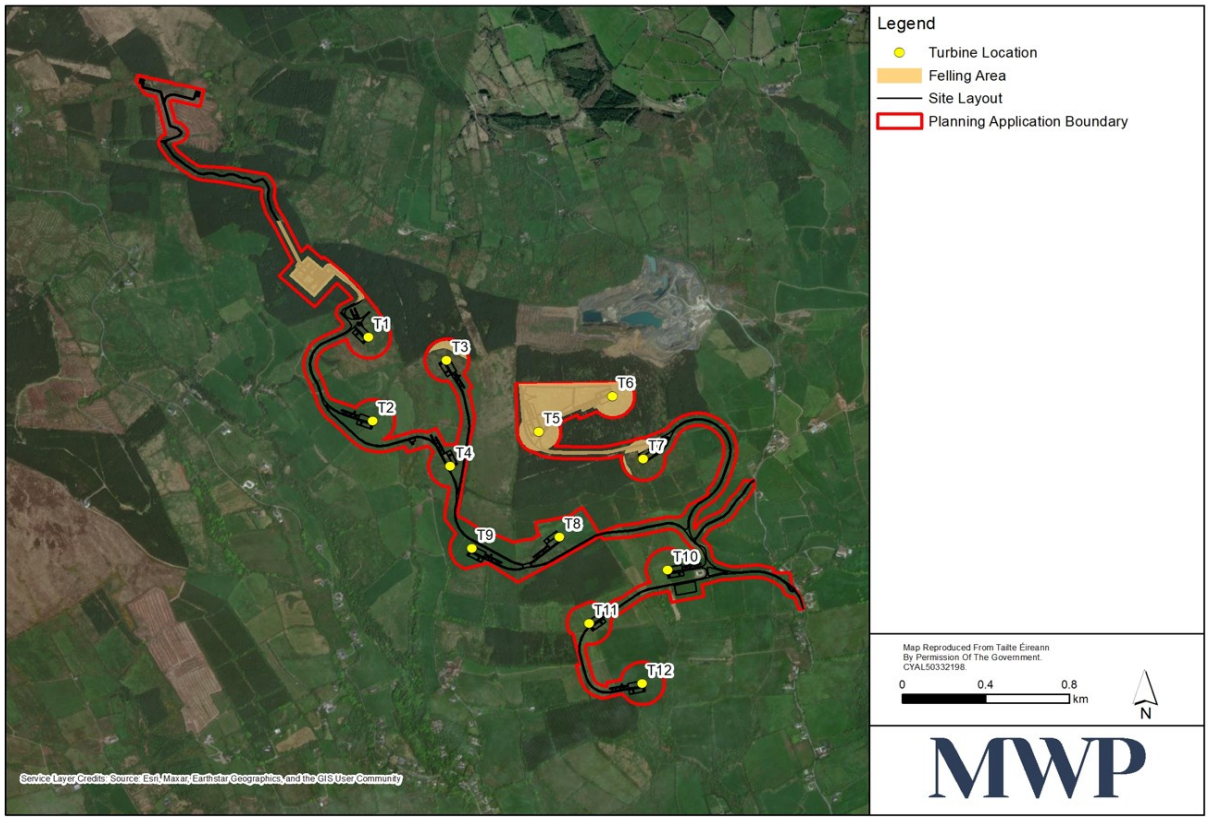


Figure 4-7: Areas to be felled

4.12 Electrical Transmission/Distribution

4.12.1 Distribution Network

Each individual turbine will generate electricity at a nominal voltage and will have its own internal transformer to step-up to an on-site distribution network voltage. The transformer and associated switchgear will be located within the turbine tower. A network of underground cabling servicing each turbine with electrical power and signal transmission will be installed along internal tracks to collect the electricity from each turbine and connect them to the on-site substation. Cabling will be installed in PVC ducting laid in trenches adjacent to the tracks edge (as illustrated on Drawing No. 22156-MWP-00-00-DR-C-5407). Access to the cable ducting is provided by intermittent chambers and pull pits at defined locations adjacent to the access track infrastructure.

An example of a typical substation compound similar in scale and design to the proposed is shown in Figure 4-8.

Figure 4-8: Example of Substation Compound

4.12.2 Wind Farm 110kV Substation

The proposed 110kV wind farm substation will occupy an area of approximately 13,500m^2 and will comprise an outdoor electrical yard and two single storey buildings (one for Eirgrid and one for the wind farm operator).

The substation will connect via underground cable circuits to accommodate a grid connection via the Ennis – Ardnacrusha 110kV overhead line (OHL). The proposed 110kV substation will be made up of 1 No. Control Building, 1 No. IPP MV Switch room, Transformer compound and Busbar compound.

The control building works will consist of foundation works, block work, roofing, low voltage electrical fit out, cladding and building finishing works. The transformer, gantry and structural steelwork will be installed in the transformer compound. Two cable sealing ends will be installed to incorporate the radial underground circuits in and out of the station. The busbar compound structural steelwork will be erected, with lightning masts also installed. Substation electrical equipment will be installed once the control building and compound is complete. Fencing will be erected around the compound for security/protection. Permanent access tracks will also be installed to allow traffic in and out of the proposed substation compound, access track to loop in interface mast structures and internal access track for compound use.

The substation will be unmanned. Maintenance personnel will visit the substation occasionally to undertake operations and maintenance. Maintenance vehicles accessing the site will park within the compound area.

The substation buildings and associated compound will be contained within a 2.6m high powder coated steel palisade fence.

4.12.3 External Grid Connection

The underground grid connection route, refer to **Figure 2-2**, is approximately 1.5km in length between two radial UGC circuits, from the proposed 110kV substation location, carrying towards the interface points where the

circuits split between Circuit A and Circuit B. It is proposed to transition from an overhead line (OHL) to UGC at two tower locations. These locations have been identified along the Ennis – Ardnacrusha 110kV overhead line from a technical perspective. The identified locations will be mid span between Polesets 34 and 37 within the Northern periphery of the development site.

The exact location of the underground HV ducting may be subject to minor modification following confirmatory site investigations, to be undertaken prior to construction and following consultation with Clare County Council and all other relevant stakeholders, having regard to all environmental protection measures outlined in the planning application and accompanying technical reports. Any such minor modification will be within the planning boundary.

4.13 Permanent Meteorological Mast

A permanent meteorological mast is proposed for the site to monitor the wind regime while the wind farm is in operation. The mast will be located adjacent to the turbine access track at the western side of the site. The meteorological mast will be installed to a height of 90m which will be representative of the hub height of the turbines. The meteorological mast will be surrounded by a galvanised steel palisade fence, 2.4m in height. Details of the meteorological mast are shown in Planning Drawing 22156-MWP-00-00-DR-C-5404. Excavated material will be reused for backfill/adjacent landscaping or will be relocated to the on-site deposition areas.

4.14 Turbine Delivery Route

The Turbine Delivery Route is outlined below but described in detail in the accompanying Turbine Delivery Assessment Report in Appendix 2C of the proposed development EIAR.

The proposed route to deliver wind turbine components from the port at Foynes Co. Limerick to the proposed development's site entrance in Co. Clare are shown on Drawing 22156-MWP-00-00-DR-C-5009 of the proposed development EIAR.

Blade deliveries will use the Limerick tunnel to avoid entering the centre of Limerick city. Oversized loads such as tower components which have a loaded height greater than 4.65m will travel along the Dock Road crossing the River Shannon at Shannon Bridge. These components will then travel along Condell Road to Clonmacken Roundabout where they will rejoin the blade delivery route to the Ballycar site.

Proposed Wind Turbine Component Delivery Route:

- Depart Foynes Port and travel along the N69 as far as the N18 interchange.
- From here, the WTG blades and components with loaded heights of less than 4.65m will travel North along the N18 via Limerick Tunnel and exit at Junction 3 through the toll arriving at Clonmacken Roundabout from the west.
- Where the component loaded height is greater than 4.65m the components will continue on the N69 through the Dock Road Roundabouts and along the Dock Road R510 to Shannon Bridge Roundabout. Here the components will turn northwards over Shannon Bridge and travel along the R527 Condell road arriving at Clonmacken Roundabout from the south.
- Upon reaching the Clonmacken Roundabout, two route options to reach the R464 Kileely Road are considered.

- Option 1 – Northwest on Condell Road towards the Coonagh Roundabout and then via the Coonagh to Knockalisheen Distributor Road. Through the Coonagh Cross, Cratloe Road and Moyross Road roundabouts to the Knockalisheen Distributor Road Roundabout. Then turning southeast on Knockalisheen distributor road to the existing junction with the R464 Kileely Road.
- Option 2 – Northeast on the L8570 Clonmacken Road passing the Jetland Shopping Centre and through the Ennis Road junction and Moylish Roundabout towards Thomond Park. Turning left at the Cratloe Road/R464 Kileely Road junction (Hassett's Cross).

- Taking the R464 Kileely Road to Parteen before turning left onto the L-3056 Local Road to the proposed wind farm site entrance.

The route from Foynes Port to the Limerick Tunnel and through the Dock Road in Limerick to Clonmacken Roundabout is already proven for this type of turbine as it was successfully used to deliver Vestas V136 turbine blades to Cloncreen Wind Farm in County Offaly.

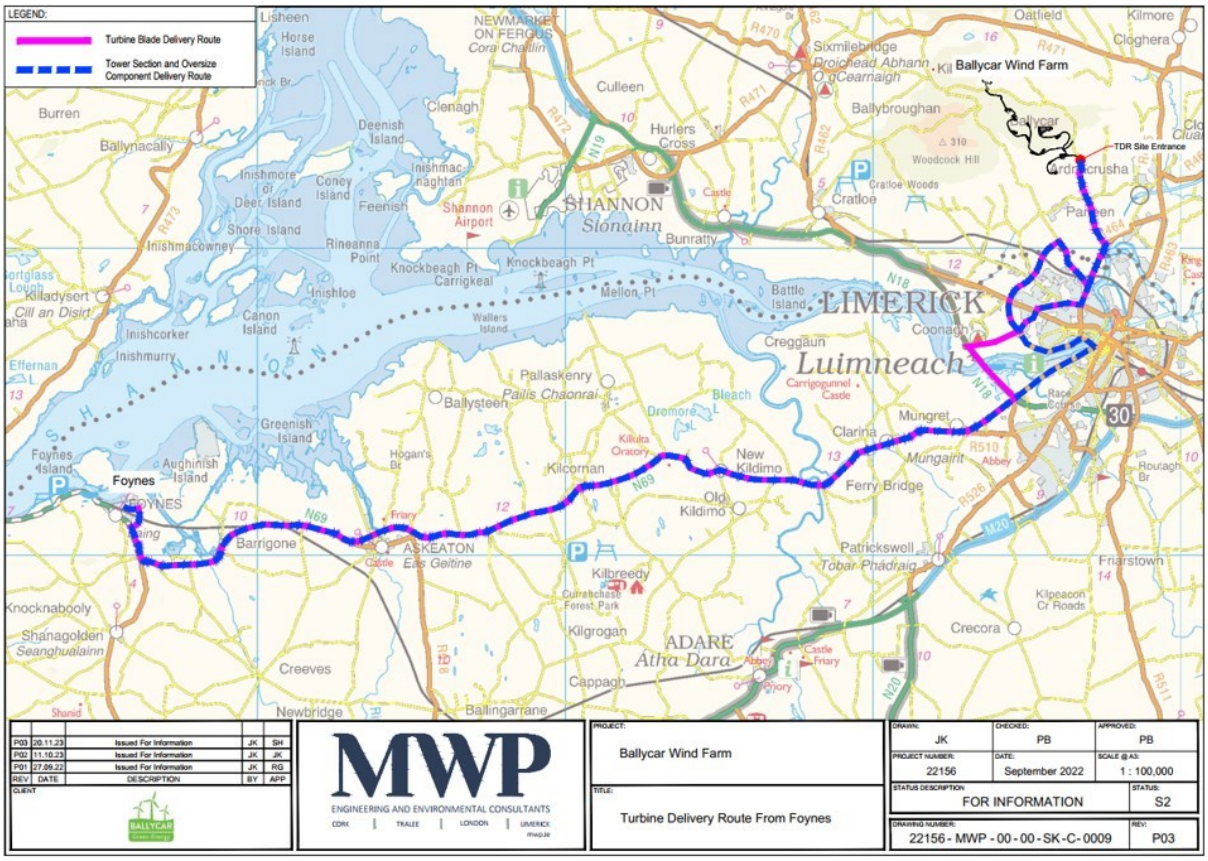


Figure 4-9: Proposed TDR from Foynes Port to Ballycar Wind Farm

The delivery of turbine components to the proposed development will require temporary works on sections of the public road network along the delivery route including hedge or tree cutting, relocation of powerlines/poles, lampposts, signage and temporary local road widening. Such works are temporary for the delivery of turbine components and are not included in the planning application boundary. Construction methods for temporary public road widening will follow those outlined in **Chapter 03 Civil Engineering.** New Floating Tracks where

applicable. The exposed surface will be levelled out and will be overlain with a layer of crushed stone. The finished surface will be formed with a layer of Clause 804 or similar aggregate imported from local quarries.

4.15 Turbine Erection

The erection of turbines will occur in the last months of the construction phase. The erection of turbines is typically phased at an average of one turbine erected per week. The erection of turbines is a specialist process with specially designed large scale cranes required to erect the turbine components. The cranes themselves have to be built up on site at the turbine hardstand location and will have to be dismantled substantially before progressing to the next turbine base location for erection of the next turbine.

Components can be placed on hardstands prior to assembly. Large cranes will be required for erecting the turbines, supported by smaller assist cranes. The tower of the turbine is erected first followed by the nacelle and blades. The turbine erection process is a carefully managed and precision operation and is heavily dependent on specialist plant and good weather windows. Once the turbine is in place, electrical commissioning and final energisation follows.

The Project Manager for the site will notify Clare County Council and AirNav Ireland at least 30 days prior to erection of the wind turbines.

After the turbines have been put in place, the project manager will provide confirmation of the coordinates of the as constructed positions of the turbines and the highest point of the turbines to the top of blade spin to the AirNav Ireland.

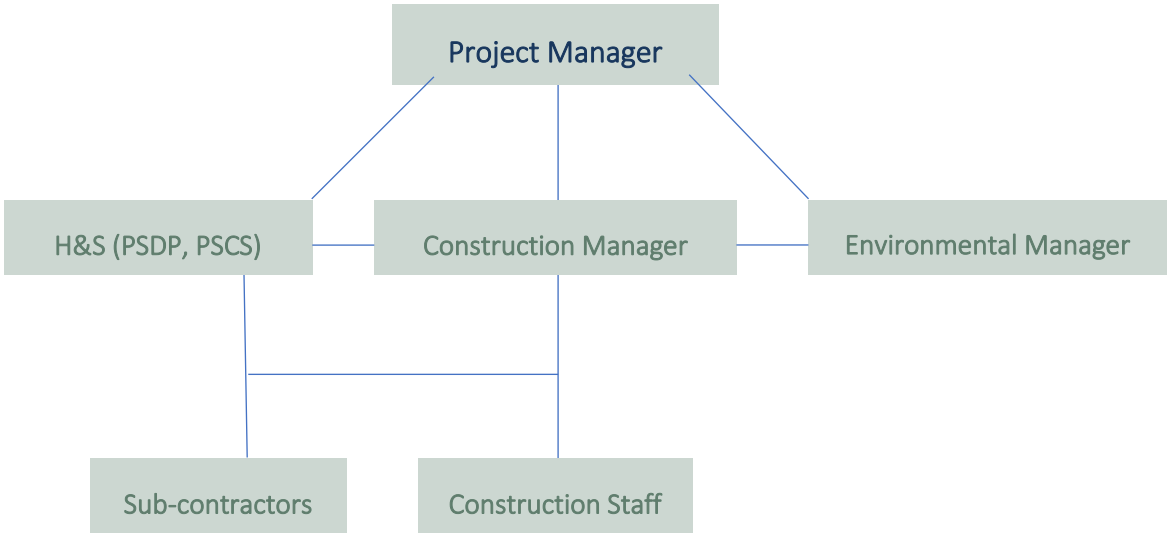
4.16 Wind Farm Commissioning

The final stage of the project construction includes commissioning of the wind farm. It will include testing of the turbines for compliance with standards and for compliance with the National Electricity Grid Code. Once the tests results are satisfactory, the wind farm will be authorised by ESB Networks / EirGrid to export electricity onto the national grid.

5. Construction & Environmental Management – Organisational Structure, Duties and Responsibilities

5.1 On Site Organisational Structure and Responsibility

The Organisational Structure for the Contractor's Project Team is included below. This structure is defined by the Contractor and will include the names of the assigned personnel with the appropriate responsibility and reporting structure reflected.



The Contractor will select the Project Team for the construction of the Project. The Contractor's Project Team will include an overall Project Manager, whose duties will stretch beyond the day-to-day works to budgetary, procurement and scheduling matters. The selected Construction Manager will have overall responsibility for the construction site personnel carrying out the works and the Construction Manager will report to the Project Manager.

A competent Environmental Manager will be appointed for the duration of the works and will report to the Project Manager. The Construction Manager will communicate regularly with the Environmental Manager to ensure mitigation measures are applied to specific works. The Environmental Manager will carry out tasks as required, including installation and maintenance of sediment control measures and implementing and maintaining approved waste management control measures. The use of dedicated staff, under the direction of the Environmental Manager, will ensure the environmental controls are in situ ahead of the works on site.

5.2 Duties and Responsibilities

The general role of key people on site implementing the CEMP will be:

- The Project Manager - liaises with the Project Team in assigning duties and responsibilities in relation to the CEMP to individual members of the main contractor(s)'s project team.
- The Construction Manager - liaises with the Environmental Manager when preparing site works where there is a risk to the environment and manages the construction personnel and general works.
- The Design Engineer - undertakes and certifies the Design and supervises the standard of works, including geotechnical aspects (Geotechnical engineer may need to be consulted).
- The Environmental Manager - ensures that the CEMP is developed, implemented and maintained. The Environmental Manager's tasks at the construction site are described in Section 5.2.4. To ensure adequate cover of environmental tasks, waste management tasks and responsibilities, dedicated construction staff will be assigned to the Environmental Manager to implement and maintain the Sediment and Erosion Plan and any other measures required.

Other roles include:

- Project ecologist/Ecological Clerk of Works (EcoW);
- Health and Safety (PSDP and PSCS);
- Project Archaeologist;
- Project Ornithologist;
- Waste Management Coordinator (report to the Environmental Manager);
- Geotechnical Engineer (as required by Design Engineer).

5.2.1 Project Manager

Name: TBC

A Project Manager is to be appointed on behalf of the main Contractor(s) to manage and oversee the entire project. The Project Manager is responsible for:

- Implementing of the Construction and Environmental Management Plan (CEMP);
- Implementing the Health and Safety Plan;
- Management of the construction project;
- Liaison with the client/developer;
- Liaison with the Project Team ;
- Assigning duties and responsibilities in relation to the CEMP;
- Production of construction schedule;
- Materials procurement;
- Maintaining a site project diary.

5.2.2 Construction Manager

Name: TBC

The Construction Manager manages all the works to construct the project, on behalf of the Contractor. The Construction Manager reports to the Project Manager. In relation to the CEMP, the Construction Manager is responsible for:

5.2.2.1 Site-Specific Method Statements

- Liaising with the Environmental Manager in preparing site-specific Method Statements for all works activities where there is a risk to the environment, by incorporating relevant Environmental Control Measures and referring to relevant Environmental Control Measure Sheets;
- Liaising with the Environmental Manager in reviewing and updating site-specific Method Statements for all Works activities where Environmental and Waste Management Control Measures and Environmental Control Sheets have been altered, and
- Liaising with the Environmental Manager where third party agreement is required in relation to site-specific Method Statements, Environmental & Waste Management Control Measures and/or Environmental Control Measure Sheets.

5.2.2.2 General

- Being aware of all project Environmental Commitments and Requirements;
- Ensuring that all relevant information on project programming, timing, construction methodology, etc., is communicated from the Project Manager, to the Environmental Manager in a timely and efficient manner in order to allow pre-emptive actions relating to the environment to be taken where required;
- Programming and planning of excavation works and communicating this schedule to the Environmental Manager;
- Ensuring that adequate resources are provided to design and install any environmental interventions;
- Liaising with the Design Engineer and providing information on environmental management to the Design Engineer during the course of the construction phase;
- Liaising with the Project Team in assigning duties and responsibilities in relation to the CEMP to individual members of the Contractor's project staff;
- Ensuring that the Environmental Manager performs regular and frequent environmental site inspections; and
- Reviewing and approving all waste management control measures ensuring compliance with National and International Waste legislation and best practice.

5.2.3 Design Engineer

Name: TBC

The Design Engineer is responsible for:

- Design of the Works;
- Review and approval of relevant elements of the method statements – assist the Construction Manager with the overall review;
- Participating in Third Party Consultations; and
- Liaising with Third Parties through the Environmental Manager.

5.2.4 Environmental Manager

Name: TBC

The Environmental Manager is responsible for:

- General
  - Being familiar with the project environmental commitments and requirements;
  - Being familiar with baseline data gathered for the various environmental assessments and during pre-construction surveys;
  - Assisting the Construction Manager in liaising with the Design Engineer and the provision of the information on environmental management to the Design Engineer during the course of the construction phase;
  - Liaising with the Project Team in assigning duties and responsibilities in relation to the CEMP to individual members of the Contractor's project staff;
  - Implementing the environmental procedures of the CEMP;
  - Liaising with the Construction Manager to ensure that the control measures set out in the Schedule of Environmental Mitigation are implemented;
  - Liaising with the client/developer in relation to environmental issues;
  - Auditing the construction works from an environmental viewpoint.
- Site-Specific Method Statements
  - Liaising with the Construction Manager in preparing site-specific Method Statements for all Works activities where there is a risk to the environment. These site-specific Method statements will incorporate relevant Environmental Control Measures and take account of relevant Environmental Control Measure Sheets;
  - Liaising with the Construction Manager in reviewing and updating site-specific Method Statements for all Works activities where Environmental Control Measure and Environmental Control Sheets have been altered; and
  - Liaising with the Construction Manager where third party agreement is required in relation to site-specific Method Statements, Environmental Control Measures and/or Environmental Control Measure Sheets.

- Third Party Consultations
  - Overseeing, ensuring coordination and playing a lead role in third party consultations required statutorily, contractually and in order to fulfil best practice requirements;
  - Ensuring that the minutes of meetings, action lists, formal communications, etc., are well documented and that the consultation certificates are issued to the Design Engineer as required;
  - Liaising with all prescribed bodies during site visits, inspections and consultations;
  - Where new Environmental Control Measures are agreed as a result of third party consultation, ensuring that the CEMP is amended accordingly;
  - Where new Environmental Control Measures are agreed as a result of third party consultation, the Environmental Manager will liaise with the Construction Manager in updating relevant site-specific Method Statements; and
  - Where required, liaising with the Construction Manager in agreeing site-specific Method Statements with third parties.
- Licensing
  - Ensuring that all relevant works have (and are being carried out in accordance with) the required permits, licences, certificates, planning permissions, etc,;
  - Liaising with the designated licence holders with respect to licences granted pursuant to the Wildlife Act, 1976, as amended (if required);
  - Bringing to the attention of the Project, Design and Construction Team any timing and legal constraints that may be imposed on the carrying out of certain tasks.
- Waste Management Documentation
  - Holding copies of all permits and licences provided by waste contractors;
  - Ensuring that any operations or activities that require certificates of registration, waste collection permits, waste permits, waste licences, etc., have appropriate authorisation; and
  - Gathering and holding documentation with the respect to waste disposal.
- Legislation
  - Keeping up to date with changes in environmental legislation that may affect environmental management during the construction phase;
  - Advising the Construction Manager of these changes; and
  - Reviewing and amending the CEMP in light of these changes and bringing the changes to the attention of the Contractor's senior management and subcontractors.
- Specialist Environmental Contractors
  - Identifying requirements for specialist environmental contractors (including ecologists, waste contractors and spill clean-up specialists) before commencement of the project;
  - Procuring the services of specialist environmental contractors and liaising with them with respect to site access and report production;
  - Ensuring that the specialist environmental contractors are competent and have sufficient expertise to co-ordinate and manage environmental issues; and

- Co-ordinating the activities of all specialist environmental contractors on environmental matters arising out of the contract.

- Environmental Induction Training and Environmental Toolbox Talks
  - Ensuring that Environmental Induction Training is carried out for all the Contractor's site personnel. The induction training may be carried out in conjunction with Safety Induction Training;
  - Providing toolbox talks on Environmental Control Measures associated with Site-specific Method Statements to those who will undertake the work.

- Environmental Incidents/Spillages
  - Prepare and be in readiness to implement at all times an Emergency Response Plan;
  - Notifying the relevant statutory authority of environmental incidents;
  - Carrying out an investigation and producing a report regarding environmental incidents. The report of the incident and details of remedial actions taken will be made available to the relevant authority, the Design Engineer and the Construction Manager;
  - The Site Environmental Manager shall notify the Client of any complaints or environmental incidents within 24 hours of occurrence. Where significant incidents occur requiring the involvement of statutory authorities or emergency services or where any pollution events occur, the Client shall be notified within 1 hour;
  - Project Specific Note: In the event of encountering a spillage or contaminated land/buried waste being encountered, the Environmental Manager will contact MWP - Engineering and Environmental Consultants who have at their disposal Environmental Engineers and Scientists with experience in addressing spillage or contaminated land/buried waste. MWP - Engineering and Environmental Consultants have personnel based in three offices in Ireland and will be available to dispatch suitably qualified and experienced personnel at short notice in the event of an Environmental Incident.

- Site Environmental Inspections and Auditing
  - Carrying out regular documented inspections of the site to ensure that work is being carried out in accordance with the Environmental Control Measures and relevant site-specific Method Statements, etc.;
  - Carrying out inspections of the site drainage system;
  - Appending copies of the inspection reports to the CEMP;
  - Liaising with the Construction Manager to organise any repairs or maintenance required following the daily inspection of the site;
  - Accommodate audits by the Employer and/or independent auditing consultants during the project;
  - Accommodate third party environmental auditing when required;
  - During audits, the Environmental Site Manager shall make the necessary staff available during each audit and provide access to all documentation and site areas (and provide necessary induction and training to allow access where required);
  - If there are any adverse findings arising from the environmental audits, the Environmental Site Manager shall be required to take prompt mitigation actions and provide written reports to the Employer detailing such mitigation;

- The Environmental Site Manager shall notify the Employer of any complaints or environmental incidents within 24 hours of occurrence. Where significant incidents occur requiring the involvement of statutory authorities or emergency services or where any pollution events occur, the Employer shall be notified within 1 hour.

Note: Communication in respect of the project to regulatory or statutory bodies shall be undertaken by the Employer, unless otherwise agreed, except in the case of incident notification.

- Environmental Records
  - The Construction Environmental Manager shall provide all CEMP documentation to the Client on completion of the site works. Reports arising during the site works, such as verification reports or waste disposal records shall be provided to the Client within one month of completion of the activity and may be subject to review.

5.2.5 Other Roles

5.2.5.1 Project Ecologist / Ecological Clerk of Works (ECoW)

A suitable qualified and experienced Project Ecologist/ECoW will be employed during the construction phase of the project. Duties will include the review of all method statements, delivery of toolbox talks, undertaking of all required pre-construction surveys for protected species and monitoring of works throughout the construction phase to ensure all environmental controls and EIAR mitigation is implemented in full. As part of toolbox talks, contractor staff and other site personnel, as relevant, will be made aware of the procedure to follow if a protected species or their resting or breeding site, is encountered. The Project Ecologist/ECoW will closely work with the Environmental Manager.

The Project Ecologist/ECoW will be awarded a level of authority and will be allowed to stop construction activity if there is potential for adverse environmental effects other than those predicted and mitigated for in the EIAR. The project ecologist/ECoW will be responsible for pointing out boundaries of exclusion zones as outlined further below.

The appointed Project Ecologist/ECoW will have demonstrated professional experience in managing large-scale construction works affecting ecological receptors identified within the EIAR.

5.2.5.2 Health and Safety Personnel – To be updated upon appointment of Contractor(s)/finalisation of CEMP

The Health and Safety personnel for the construction project is appointed by the Contractor in line with the Construction Regulations:

- Carrying out duty of Project Supervisor Construction Stage (PSCS);
- Responsible for safety induction of all staff and personnel on site;
- Implementing the Health and Safety Plan;
- Auditing and updating the Health & Safety Plan;
- All other required legal duties.

5.2.5.3 Project Archaeologist – To be updated upon appointment of Contractor(s)/finalisation of CEMP

The Archaeologist may be appointed by the Developer or the Contractor(s) and is responsible for:

- Ensuring implementation of archaeological mitigation measures;
- Monitoring of groundworks associated with the development;
- Liaison with the Environmental Manager/Construction Manager;
- Liaison with the Project Manager/client/developer.

5.2.5.4 Project Ornithologist – To be updated upon appointment of Contractor(s)/finalisation of CEMP

The Ornithologist may be appointed by the Developer or the Contractor(s) and is responsible for:

- Ensuring all pre-construction (completed) and construction phase avian monitoring is conducted at the site;
- Advice on any mitigation required;
- Consultations with National Parks and Wildlife Service (NPWS).

5.2.5.5 Geotechnical Engineer– To be updated upon appointment of Contractor(s)/finalisation of CEMP

The Geotechnical Engineer may be appointed by the Developer or the Contractor(s) and is responsible for:

- Assisting the Design Engineer as required;
- Providing advice on geotechnical aspects of the works.

5.2.5.6 All Site Personnel – To be updated upon appointment of Contractor(s)/finalisation of CEMP

The site personnel appointed by the Contractor are responsible for:

- Adhering to the relevant Environmental Control Measures and relevant site-specific Method Statements;
- Adhering to the Health and Safety Plan;
- Reporting immediately to the Environmental Manager and Construction Manager any incidents where there has been a breach of agreed procedures including:
    - a spillage of a potentially environmentally harmful substance;
    - an unauthorised discharge to ground, water or air, damage to a protected habitat, etc.

5.3 Contacts

5.3.1 Main Contractor Contacts

Table 5-1: Main Contractor Contacts

Position Title	Name	Phone	Email
Main Contractor	TBC		
Project Manager	TBC		
Construction Manager	TBC		
Design Engineer	TBC		
Environmental Manager*	TBC		
Safety (PSCS)*	TBC		
Safety Officer*	TBC		
Site Emergency Number*	TBC		
Project Ecologist/Ornithologist	TBC		
Project Archaeologist	TBC		
Overall Project PSDP	TBC		

**24 hour contact details required*

5.3.2 Employer Contacts

Table 5-2: Employer Contacts

Position Title	Organisation	Name	Phone	Email
Project Ecologist/ECoW	Employers Ecologist			
Project Archaeologist	Employers Archaeologist			

Overall Project PSDP	Safety (PSDP)
Project Liaison Officer	Employers Public Liaison Officer

5.3.3 Third Party Contacts

Table 5-3: Third Party Contacts

Organisation	Location	Name/Address	Phone	Email Address
Inland Fisheries Ireland	Limerick	Ashbourne Business Park, Dock Road, Limerick, Ireland.	(061) 300238	limerick@fisheriesireland.ie
National Parks and Wildlife Service	Mid Western Region	District Conservation Officer	(01) 539 3164	nature.conservation@chg.gov.ie
Environmental Protection Agency (EPA)	EPA	EPA Headquarters	(053) 9160600	info@epa.ie
Local Authority	Clare County Council	Clare County Council New Rd, Cappahard, Ennis, Co. Clare, V95 DXP2	(065) 682 1616	Inquiryofficer@clarecoco.ie
Health and Safety Authority	Health and Safety Authority		(01) 6147000	wcu@hsa.ie
An Garda Síochána	Sixmilebridge Garda Station	Sixmilebridge Garda Station, Shannon Road, Sixmilebridge, Co. Clare V95 YD63	(061) 369133	
Emergency Services	Ambulance and Fire Service	Ambulance and Fire Service	999 or 112	

6. Environmental Commitments

6.1 Environmental Management Plans

A number of environmental management plans (EMP) have been prepared for managing the impacts of Construction Activities associated with the proposed development. See Table 6-1 and refer to Appendix 1 of this CEMP. These plans will be implemented by the Appointed Project Manager and/or Project Contractor(s) as relevant.

Once appointed, it is the Contractor's responsibility, to update and add (where required) project specific control measures relevant to the environmental management plans and procedures. The Contractor will ensure that plans/procedures are communicated to all site staff, including sub-contractors, through induction, training and at relevant meetings.

Table 6-1: Environmental Management Plans

Ref:	Procedure:
EMP-1	Management of Excavations
EMP-2	Surface Water Management and Run-off Control
EMP-3	Fuels and Oils Management
EMP-4	Management of Concrete
EMP-5	Construction Noise Management
EMP-6	Construction Waste Management Plan
EMP-7	Construction Traffic Management Plan
EMP-8	Construction Dust Management
EMP-9	Archaeological and Heritage Protection
EMP-10	Ecological Management Plan Protection of Habitats and Fauna
EMP-11	Landscape and Visual Management
EMP-12	Emergency Response Plan
EMP-13	Site Environmental Training and Awareness

EMP-14	Monitoring and Auditing
EMP-15	Environmental Accidents, Incidents and Corrective Actions
EMP-16	Environmental Complaints
EMP-17	Management of Material Assets
EMP-18	Management of Rock Blasting

7. Auditing, Monitoring and Response

The environmental Monitoring Schedule (Table 7-1) will take cognisance of all mitigation measures outlined in the Environmental Report. The Monitoring Schedule for construction will also provide for the checking of equipment, materials storage and transfer areas and specific environmental controls.

The Contractor will assign a full-time Environmental Manager who will be on site to monitor the construction activities on a day to day basis. The duties will include completing the required checklists (sample checklist included below) and coordinating with the relevant personnel (e.g. Design Engineer as required) ensuring all environmental monitoring is carried out.

Table 7-1: Environmental Monitoring Schedule

Aspect	Area of Inspection	Monitoring Required	Note/Checks	Frequency	Responsibility
Surface Water Run-off Controls	Settlement ponds	Visual inspection	• Leaks • Cracks/broken plastic piling • Build up of sediment & soil	Regular/daily/weekly during the construction phase as well as during and after significant rainfall events	Environmental Manager
	Weather Forecast	Met Éireann download	Pre-determined rainfall trigger levels (e.g. 1 in 5 year storm event or heavy rainfall at >25mm/hr)		Environmental Manager
	Discharges from on-site sediment and erosion controls	Visual inspection	Colour, presence of silts	Regular/daily/weekly during the construction phase as well as during and after significant rainfall events	Environmental Manager
		Visual inspection	• Unacceptable level of sediment/silt on the access track surface • Presence of waste • Surface Condition	Daily	Environmental Manager
	Water quality sampling at watercourses draining site	Water Samples	• Minimum parameters: pH, Suspended Solids, metals , nitrates, phosphates	Monthly	Environmental Manager
	Areas of concrete pours	Visual inspection	• Monitoring of concrete pours to ensure no discharge of concrete to watercourses	To be scheduled with pours	Environmental Manager

Aspect	Area of Inspection	Monitoring Required	Note/Checks	Frequency	Responsibility
Archaeology	Area of ground works & excavations	Visual Inspection	• Archaeological monitoring during ground works & excavations	To be scheduled with ground works & excavations	Archaeologist
Waste Management	Material and Waste Storage	Daily	• Monitoring of waste storage areas to ensure correct waste management practices are being applied	Daily	Project Manager/Environmental Manager
Access Tracks	Fuel & Oil Storage areas	Visual inspection	• Damage to containers or ancillary equipment • Leakages • Unlocked storage container • Fuels stored within bunded area	Daily	Project Manager
	Construction Materials Storage Areas	Visual inspection	• Damage • Untidiness	Daily	Environmental Manager
Operation Control	Concrete pours	Visual inspection	• Run-off / spills	Weekly	Project Manager
	Dust generation	Visual Inspection	• Cleanliness of tracks and compound area • Dust at stockpiles • Dust from delivery vehicles	To be scheduled with pours	Project Manager

8. Environmental Performance Indicators

The Contractor will outline the key performance indicators for the site in gauging successful site management in the prevention of pollution and the protection of the environment.

Environmental performance indicators will include:

- Number of environmental accidents/incidents logged;
- Breach of procedure and corrective actions;
- Number of environmental complaints received;
- Results of monthly water quality monitoring;
- Results of noise and vibration monitoring, and
- Results of site audits.

The performance indicators will be communicated to all relevant personnel and sub-contractors. The review periods for analysing site performance indicators will also be specified.

8.1 Response Procedure/ Corrective Action

In the event of an environmental incident, or breach of procedure, or where a complaint is received, or in the event of encountering buried waste or contaminated soils/groundwater, the contributing factors are to be investigated and remedial action taken as necessary. The Contractor will ensure that the following respond actions will take place:

1) The Project Manager will be informed of any incident, breach of procedure and/or complaint received and details will be recorded in the incident/complaint register;
2) The Project Manager will conduct/co-ordinate an investigation to determine the potential influence that could have led to the non-compliance;
3) The Project Manager will notify and liaise with the appropriate site personnel where required, e.g. Site Environmental Manager, Project Ecologist, Project Archaeologist;
4) The Project Manager will notify the Client of any complaints or environmental incidents within 24 hours of occurrence. Where significant incidents occur requiring the involvement of statutory authorities or emergency services or where any pollution events occur, the Client will be notified within 1 hour;
5) If necessary, the Project Manager will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident;
6) The details of the incident will be recorded on an Incident / Complaints Form which is to record information such as the cause, extent, actions and remedial measures used following the incident/complaint. The form will also include any recommendations made to avoid reoccurrence of the incident;

7) The Project Manager 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 Designer and Client as appropriate;

8) The Site Project Manager will ensure that the relevant environmental management plans/procedures are revised and updated as necessary.

Appendix 1

Environmental Management Plans

Appendix 1

Environmental Management Plans

EMP-1 Management of Excavations

EMP-2 Surface Water Management and Run-off Control

EMP-3 Fuels and Oils Management

EMP-4 Management of Concrete

EMP-5 Construction Noise Management

EMP-6 Construction Waste Management Plan

EMP-7 Construction Traffic Management Plan

EMP-8 Construction Dust Management

EMP-9 Archaeological and Heritage Protection

EMP-10 Ecological Management Plan Protection of Habitats and Fauna

EMP-11 Landscape and Visual Management

EMP-12 Emergency Response Plan

EMP-13 Site Environmental Training and Awareness

EMP-14 Monitoring and Auditing

EMP-15 Environmental Accidents, Incidents and Corrective Actions

EMP-16 Environmental Complaints

EMP-17 Management of Material Assets

EMP-18 Management of Rock Blasting

EMP 1: Management of Excavations

Purpose

To describe measures for the management of all excavations and excavated soil and rock on the site.

Procedure

General

Bulk excavations will be done during dry weather periods so as to avoid run off from exposed excavation areas. Weather will be monitored during the project and no excavation works will be allowed during severe or heavy rainfall events.

All temporary cuts/excavations will be carried out such that they are stable or adequately supported. Where appropriate and necessary, cuts and excavations will be protected against ingress of water or erosion by the use of cut off drains around the excavation works. Temporary works will be such that they do not adversely interfere with existing drainage channels/regimes.

Plant and materials will be stored in approved locations only (such as the proposed site compound) and will not be positioned or trafficked in a manner that would surcharge existing or newly-formed slopes.

Vehicular movements will be restricted to the footprint of the permitted development, particularly with respect to the newly constructed access tracks. This implies that machinery will be kept on existing/newly formed tracks/hardstands/yard areas and aside from advancing excavations, do not move onto areas that are not permitted for the development.

Management for Slope Failure/Ground Instability

All site excavations and construction will be supervised by a suitably qualified and experienced engineer. The Contractor's method statements for each element of work will be reviewed and approved by the engineer prior to site operations. Specific method statements will be developed for each turbine and hardstanding location within the site.

Prior to excavation, drains will be established to effectively intercept overland flow prior to earthworks.

The existing network of drainage within the site will be utilised whenever possible.

Management and Storage of Excavated Materials and Soil Management

Site management will include the checking of equipment, materials storage and transfer areas, drainage structures and their attenuation ability on a regular basis during the construction phase of the project. The purpose of this management control is to ensure that the measures in place are operating effectively, prevent accidental leakages, and identify potential breaches in the protective retention and attenuation network during earthworks operations.

Excavated Spoil Storage

Excavated spoil will be reused for the backfilling, landscaping, and restoration around wind farm infrastructure such as turbines and hardstands.

Dedicated spoil storage areas and a borrow pit are proposed within the site. These will be used for generating material for the construction of access tracks and hardstands and for spoil storage.

Spoil will also be stored around the turbines to a maximum height of 1m. The felled areas around the turbines have been identified as a potential additional area that will be used to store material; however, priority will be given to restoration of the borrow pit and the dedicated spoil storage areas.

Berms will be formed along sections of access tracks and hardstands that will act as a physical edge protection measure to prevent vehicles falling off where a drop off greater than 1m exists from the track / hardstand edge. Spoil generated onsite will be used to create these berms.

A summary of the construction material and spoil storage volumes are shown in Table 4-1 of CEMP.

Drainage and siltation control measures will be put in place in all spoil storage areas. This will include a dedicated drainage network, temporary silt fences and settlement ponds designed to cater for the size of each storage area.

Temporary Storage of Excavated Material

No permanent stockpiles will be left on site after the completion of the construction phase works. After completion of the turbine base reinstatement works all remaining stockpiles are to be removed for permanent disposal at the proposed deposition areas within the site.

Any materials excavated during the construction phase which are to be used in the site reinstatement and landscaping process shall, in the first instance, be stored on site in an environmentally safe manner that will not result in the pollution of waters or the smothering of ecologically sensitive habitats.

The following principles will be adhered to when considering the temporary storage of excavated materials;

- Spoil disposal will take place within a 30m radius of each structure.
- Preparation of the spoil disposal site will involve the removal of the “top mat” which will be transplanted to suitable area and maintained for re-use during restoration operations.
- Spoil will be deposited, in layers of 0.5m and will not exceed a total thickness of 1m.
- Spoil will only be deposited on slopes of less than 5 degrees to the horizontal and greater than 10m from the top of a cutting. The exact location of such areas will be confirmed on consultation with the geotechnical engineer.
- Once reinstatement is complete the disposal sites will be re-vegetated with the “top mat” removed at the commencement of disposal operations.
- Upon commencement of the restoration phase, guidance from a suitably qualified environmental professional will be sought to confirm the methodology and programme.

Any temporary onsite stockpiles of soil, rock and other excavated material will be removed and utilised in the site reinstatement programme to infill any excavated areas which will then be mounded and capped with sod prior to the completion of works.

Permanent Deposition Areas

On completion of extraction activities in any cell at the borrow pit; the pit will be used for the permanent storage of the excavated spoil material from the turbine bases, crane hardstands and internal access track construction. The proposed deposition areas will be subdivided into a series of cells. Each cell will be bunded by an embankment of engineered fill material capable of allowing a tracked excavator to move between the cells during deposition activities. The size of each cell will be dictated by the maximum working length of the excavators working the

borrow pit. Each cell will be bunded on all downslope sides. The bund will be of adequate strength to retain the spoil stored within each cell.

Water build up within the disposal area will not be permitted. Water will free drain to the sump of the pit from where it will be discharged utilising a 6" pump discharging to a settlement pond constructed for this purpose. Permanent design features are proposed to allow drainage function correctly over the deposition areas. Upon completion of each cell the surface of the deposited spoil will be profiled to a gradient not exceeding 5% and vegetated with either harvested turves where available or allowed to vegetate naturally as indicated by the project ecologist.

Monitoring

This is to be detailed in the Contractors Final Method Statement.

Responsibility

- The Environmental Manager will monitor the excavation areas and associated drainage.
- The Construction Manager will monitor vehicle movements throughout the construction phase.
- The Project Manager will oversee the phasing of the excavation and machinery movement across the site.
- Construction personnel will be informed of the measures to prevent pollution of water courses.
- The Design Engineer, Geotechnical Engineer and Sub-contractors will have responsibilities as appropriate.
- All responsibilities will be finalised by the Appointed Contractor.

EMP 2: Surface Water Management and Run-off Control

Purpose

To describe measures for the management of all surface water and run-off on the site, for the protection of watercourses and in particular, sediment and erosion control.

The plan will:

- Implement erosion control to prevent runoff flowing across exposed ground and become polluted by sediments;
- Intercept and divert clean water runoff away from construction site runoff to avoid cross-contamination of clean water with soiled water;
- Implement sediment control to slow down runoff allowing suspended sediments to settle in situ particularly on access tracks;
- Implement the erosion and sediment controls before starting site clearance works;
- Minimise area of exposed ground by maintaining existing vegetation that would otherwise be subject to erosion in the vicinity of the wind farm infrastructure and keeping excavated areas to a minimum;
- Delay clearing of soil until before construction begins rather than stripping the entire site months in advance particularly during access track construction;
- Avoid working near drains during or after prolonged rainfall or an intense rainfall event and cease work entirely near drains when it is evident that pollution is occurring;
- Install a series of silt fences or other appropriate silt retention measure where there is a risk of erosion runoff to watercourses from construction related activity particularly if working during prolonged wet weather period or if working during intense rainfall event;
- Implement sediment control measures that includes for the prevention of runoff from adjacent intact ground that is for the separation of clean and 'dirty' water;
- Install appropriate silt control measures such as silt-traps, check dams and sedimentation ponds;
- Provide recommendations for public road cleaning where needed particularly in the vicinity of drains; and
- Controls will be regularly inspected and maintained otherwise a failure may result, such as a build up of silt or tear in a fence, which will lead to water pollution so controls must work well until the vegetation has re-established; inspection and maintenance is critical after prolonged or intense rainfall.

Monitoring

- The Environmental Manager will monitor the general level of suspended solids at designated sampling points in the rivers/streams downslope of the active construction areas using a turbidity meter.
- The Environmental Manager will walk the site each day and check the cross-drain pipes, dirty water drains and outlets, settlement ponds, interceptor drains and silt fences for any damage or blockages. Any damage or blockages will be repaired or cleared promptly.
- As detailed above, weather forecasts will be monitored during the construction phase. The 24 hour advance meteorological forecasting service from Met Éireann will be used.
- Water quality monitoring will take place prior to and during the construction phase and for the first 6 months of the operational phase. The location of sampling points and the programme of monitoring of water quality will be agreed with the Planning Authority prior to the commencement of construction. This monitoring, together with visual monitoring, will help to ensure that the mitigation measures that are in place to protect water quality are effective.
- The Water Monitoring Programme will include monitoring of streams and end points of the Sediment and Erosion Control system and visual monitoring of Sediment and Erosion Control measures.

- Baseline water quality monitoring will be updated prior to commencement of the development at the locations identified in **Chapter 08 Water** of the **EIAR** as a minimum. Water quality field testing and laboratory analysis will be undertaken prior to commencement of felling and construction at the site. The monitoring programme will be subject to agreement with Clare County Council but will be based on the planning stage programme already outlined in the EIAR and CEMP and presented herein.

  In order to ensure a comprehensive understanding of baseline water quality conditions including during low and high flow water conditions, upstream and downstream of the proposed development site, baseline water quality measurements will be undertaken monthly for a period of 6 months prior to commencement of construction. Additional locations can be included at any time. Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standard's (EQSs).

  The analytical determinants of the monitoring programme (including limits of detection and frequency of analysis) will be as per S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations as amended and European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009 as amended. The likely suite of determinants will include:
  - pH (field measured);
  - Electrical Conductivity (field measured);
  - Temperature (field measured);
  - Dissolved Oxygen (field measured);
  - Total Phosphorus;
  - Chloride;
  - Nitrate;
  - Nitrite;
  - Total Nitrogen;
  - Orthophosphate;
  - Ammonia N;
  - Biochemical Oxygen Demand;
  - Total Suspended Solids.

Continuous, in-situ, monitoring equipment will be installed at selected locations. The monitoring equipment will provide continuous readings for turbidity levels, flow rate and water depth in the watercourses.

Responsibility

- The Environmental Manager is responsible for ensuring that appropriate water pollution prevention measures are put in place and that water sampling is carried out. Where standards are breached and remedial action is taken, an investigation will be carried out in conjunction with the Construction Manager, and further samples will be taken to verify that the situation has returned to normal.
- The Environmental Manager is responsible for ensuring spill kits are readily available in vulnerable locations and that booms for watercourses are long enough and have adequate anchorage.
- The Construction Manager (or a designate) is responsible for ensuring the spill kits are adequately stocked and will inform the Environmental Manager when items have been used.

Reference

Surface Water Management Plan **(Appendix 2B)**

Planning Drawings

Drainage layout plan presented in Planning Drawing **22156-MWP-01-00-DR-C-5006** to **22156-MWP-11-00-DR-C-5006** as well as drainage details presented in Planning Drawing **22156-MWP-00-00-DR-C-5406.**

EMP 3: Fuel and Oils Management

Purpose

To describe measures for the management of all fuel and oils on site for the protection of watercourses from any spills.

Procedure

Construction machinery and vehicles:

- All contractors will comply with the Machinery Directive as described in "Guide to application of the Machinery Directive 2006/42/EC Edition 2.2 – October 2019 (Update of 2nd Edition)."
- Only qualified persons shall operate machinery or equipment.
- Machinery and equipment shall be checked on a regular basis to ensure they are working properly (no oil/fuel leaks etc.).
- The potential for hydrocarbons getting into the existing drains and local watercourses will be mitigated by only refuelling construction machinery and vehicles in designated refuelling areas using a prescribed re-fuelling procedure.
- Fuel tanks, drums and mobile bowsers will have a secondary containment such as a double skinned tank. All tanks, drums and mobile bowsers will be located in a sealed impervious bund with sufficient capacity to contain at least 25% of the total volume of the containers or 110% of the largest container, whichever is the greatest.
- Refuelling will be carried out using 110% capacity double bunded mobile bowsers. The refuelling bowser will be operated by trained personnel. The bowser will have spill containment equipment which the operators will be fully trained in using.
- Refuelling of vehicles and plant will be carried out on hard standing, using drip trays to ensure that no fuel can contaminate the ground outside of the bunded areas.
- Storage areas will be covered, wherever possible, to prevent rainwater filling the bunded areas.
- Storage areas will be kept secure to prevent acts of vandalism that could result in leaks or spills.
- All containers of any size will be correctly labelled indicating their contents and any hazard warning signs.
- All oil and diesel storage facilities will be at least 30m from any watercourse including surface water drains.
- Fuel fill pipes will not extend beyond the bund wall and will have a lockable cap secured with a chain.
- Where fuel is delivered through a pipe permanently attached to a tank or a bowser:
    - The pipe will be fitted with a manually operated pump or valve at the delivery end which closes automatically when not in use;
    - The pump or valve will be fitted with a lock;
    - The pipe will be fitted with a lockable calve at the end where is leaves the tank or bowser;
    - The pipework will pass over and not through the bund walls;
    - Tanks and bunds will be protected from vehicle impact damage;
    - Tanks will be labelled with contents and capacity information; and
    - All valves, pumps and trigger guns will be turned off and locked when not in use. All caps on fill pipes will be locked when not in use.

- Suitable precautions will be taken to prevent spillages from equipment containing small quantities of hazardous substances (i.e. chainsaws and jerry cans) including:
    - Each container or piece of equipment will be stored in its own drip tray made of a material suitable for the substance being handled;
    - Containers and equipment will be stored in a firm level surface.
- Plant nappies or absorbent mats will be placed under refuelling points during all refuelling to absorb drips. Plant nappies will be provided beneath small mobile plant (e.g. small generators, pumps etc).
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage areas, away from drains and open water.
- No tanks or pipework containing liquids such as fuel, oils or chemicals will be stored below ground.
- Only emergency breakdown maintenance will be carried out on site.
- A suitable permanent fuel and oil interceptor shall be installed to deal with all substation surface water drainage.
- Temporary petrol and oil interceptors will be installed at the site compound for plant repairs/storage of fuel/temporary generator installation.
- To reduce the potential for oil leaks, only vehicles and machinery will be allowed onto the site that are mechanically sound. An up to date service record will be required from the main contractor.
- For deliveries and dispensing activities, it will be ensured that:
    - Site specific procedures are in place for bulk deliveries;
    - Delivery points and vehicle routes are clearly marked;
    - Emergency procedures are displayed and a suitably sized spill kit is available at all delivery points, and staff are trained in these procedures and the use of spill kits.
- Potential leaks from delivery vehicles will be reduced by visually inspecting all delivery vehicles for major leaks. Contractors supplying concrete and crushed stone to the site will be contractually required to supply their products using roadworthy vehicles.
- Vehicles and plant will not park near or over drains and will be washed in accordance with the commitments set out above.
- Should there be an oil leak or spill, the leak or spill will be contained immediately using oil spill kits; the nearby dirty water drain outlet will be blocked with an oil absorbent boom until the fuel/oil spill has been cleaned up and all oil and any contaminated material removed from the area. This contaminated material will be properly disposed of in a licensed facility.
- The Environmental Manager will be immediately informed of the oil leak/spill, and will assess the cause and the management of the clean-up of the leak or spill. They will inspect nearby drains for the presence of oil, and initiate the clean-up if necessary.
- Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound and also in site vehicles and machinery.
- Correct action in the event of a leak or spill will be facilitated by training all vehicle/machinery operators in the use of the spill kits and the correct containment and cleaning up of oil spills or leaks. This training will be provided by the Environmental Manager at site induction.

- In the event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill kits kept in site vehicles and machinery.

Oil storage during the construction phase

- The scale of potential impacts on downstream water quality will be reduced by only storing the required volume of oils for the works taking place at the time.
- Fuel containers will be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores.
- Access to oil stores will be controlled by the storage of oils within a locked steel container within the site compound. The site compound will be surrounded by a palisade fence and locked when there are no site personnel present.
- Collision with oil stores will be prevented by locating oils within a steel container in a designated area of the site compound away from vehicle movements.
- Leakages of oil from oil stores will be prevented by storing these oils in bunded tanks which have a capacity of 110% of the total volume of the stored oil. Ancillary equipment such as hoses and pipes will be contained within the bunded storage container. Taps, nozzles or valves will be fitted with a lock system.
- The volume of leakages will be prevented through monitoring oil storage tanks/drums for leaks and signs of damage. This will be carried out daily by the Environmental Manager.
- Long term storage of waste oils will not be allowed on site. These waste oils will be collected in leak-proof containers and removed from the site for disposal or re-cycling by an approved service provider.

Responsibilities

The Construction Manager and Environmental Manager are responsible for ensuring Fuel and Oils are managed in line with this procedure. The Contractor, in updating the CEMP, will designate personnel to the tasks relating to Fuels and Oil, as outlined above.

Reference

Best Practice Guidelines BPGCS005 – Oil Storage Guidelines (Enterprise Ireland).

EMP 4: Management of Concrete

Purpose

To describe measures for the management of concrete on site for the protection of watercourses from any spillages.

Procedure

Supervision of concrete pours

- To reduce the potential for cementitious material entering watercourses, concrete pours will be supervised by the Construction Manager, a suitably qualified Engineer and the Environmental Manager.
- The Construction Manager will ensure that the area of the pour is completely drained of water before a pour commences.
- Pours will not take place during forecasted heavy rainfall.
- Incidental rainfall from light showers during the period of a pour is typically absorbed into the concrete matrix but heavier showers can result in some run off from the top surface of the concrete pour. If run-off is encountered, the Environmental Manager will block the outflow from the drains to retain or treat the run-off until the pH is neutral before discharge to the drainage network.
- In the event of a spillage on site, the Environmental Manager will temporarily block the dirty water drains in the immediate area and monitor the pH levels of the water in the associated settlement ponds and if necessary will adjust the pH levels using CO2 entrainment. Any spillage will be cleared immediately and deposited in the chute wash down area.

Concrete Water

- Pours will not take place during heavy rainfall.
- There will be no on-site batching of concrete; concrete requirements will be met by ready-mix suppliers.
- To reduce the volume of cementitious water, washout of concrete trucks will not take place on site.
- Concrete trucks will be washed out off site at the source quarry.
- To reduce the volume of cementitious water, only concrete truck chutes will be washed down on site, reducing water volume to approximately 25 litres. The concrete trucks will wash down their chutes at a designated chute wash down area in the site compound. The wash down area will consist of a polythene lined bunded area with a capacity of about $20m^3$. This capacity will be sufficient to accommodate the chute washdown from the various anticipated concrete pours. The system is sealed with no overflow discharge to the drainage system.
- Any overflow of water will be collected in the site compound drainage system which will be connected to a settlement pond for treatment prior to discharge to the external drainage system.
- The concrete sediment in the construction compound washout area will be removed at regular intervals.

Responsibilities

- All concrete pours will be supervised by suitable personnel.
- The environmental manager will monitor the pH of the water in the chute wash out bund and can dose with CO_2 or acidic water from the drains until the wash out water achieves neutrality before discharge.

- The Environmental Manager is responsible for ensuring that appropriate water pollution prevention measures are put in place and that water sampling is carried out. Where standards are breached he/she will carry out an investigation and in conjunction with the Construction Manager, he/she will ensure remedial action is taken and further samples taken to verify that the situation has returned to normal.
- The Environmental Manager is responsible for ensuring spill kits are readily available in vulnerable locations and that booms for watercourses are long enough and have adequate anchorage.

EMP 5: Construction Noise and Vibration Management

Purpose

To describe measures for the management of impacts from construction noise.

Procedure

Control of Noise at Source

- Plant will be properly and regularly maintained.
- Compressors, if needed, will be 'sound related' models fitted with properly lined and sealed acoustic covers which will be kept closed whenever machines are in use.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers.

Construction Phase

Best practice in the form of BS5228 –1&2:2009 + A1 2014, *Code of Practice for the Control of Noise and Vibration on Construction and Open Sites* will be adopted during the construction phase in order to minimise the noise generated by construction activities and nuisance to neighbours.

Wherever possible the contractor will inform residents where appropriate of the proposed blasting times (if blasting is required) and any deviation from this programme in advance. Where blasting takes place, it will be restricted to regular times. Each blast will be carefully designed to maximise its efficiency and reduce transmission of noise. These details will be finalised by the appointed contractor in agreement with the local authority and design team prior to any blast taking place and documented in a Blast Management Plan. The Blast Management Plan will include full details of the locations of the bores for the blasts, the types of materials to be used, details of the necessary controls and responsibilities, and compliance with the relevant safety legislation.

All plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations 1996 (SI 359/1996) and other relevant legislation.

Vibration levels will not exceed those described in BS5228 –1&2:2009 + A1 2014, *Code of Practice for the Control of Noise and Vibration on Construction and Open Sites*.

Responsibility

The Construction Manager will be familiar with the noise sensitive receptors and alert the Environmental Manager in good time prior to work commencing in the areas closest to any noise sensitive receptors.

The Environmental Manager will review any relevant planning conditions in updating this plan.

References

BS5228 –1&2:2009, Code of Practice for the Control of Noise and Vibration on Construction and Open Sites

IOA GPG Supplementary Guidance Note 5: *Post Completion Measurements* (July 2014).

Details of management of noise on the site to be finalised by Appointed Contractor

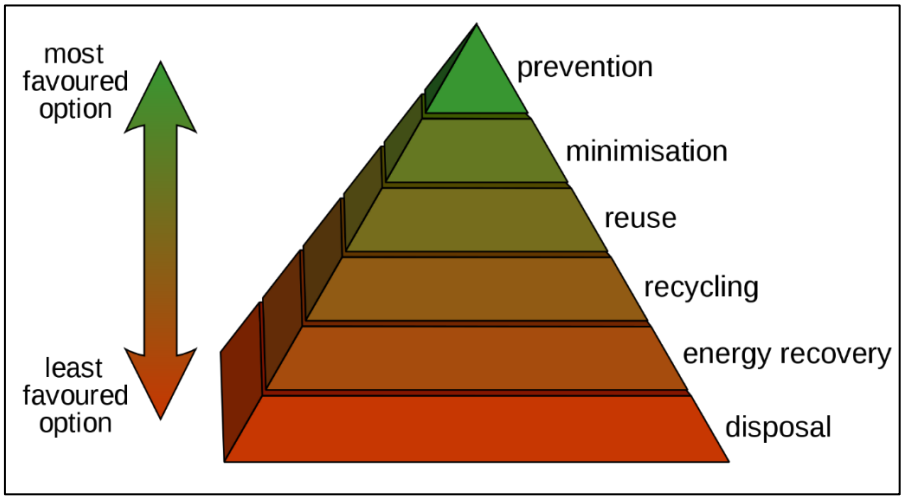
EMP 6: Construction Waste Management Plan

Purpose

To describe measures for the management of all wastes associated with the construction of the wind farm.

Procedure

- Waste Management Plan:
  - Waste will be managed in accordance with the waste hierarchy in Council Directive 98/2008/EC on waste and section 21A of the Waste Management Act 1996, as amended, as follows:
    - (a)Prevention;
    - (b)Re-use;
    - (c)Recycling;
    - (d)Other recovery (including energy recovery); and
    - (e) Disposal;



  - All waste for offsite treatment/disposal will be stored temporarily in appropriate dedicated storage areas. The areas in which wastes are stored on site will be segregated to prevent material and contaminated surface water runoff entering local surface water drains;
  - All chemical, hydrocarbon or other controlled wastes will be stored in designated areas in appropriate approved containers within bunds or on spill pallets, as required; and
  - All waste to be removed from site will be undertaken by authorised waste contractors and transported to an authorised facility in accordance with best practice and the site waste management plan.
- Construction and waste generated:
  - Contractors working on site during the works will be responsible for the collection, control and disposal of all waste generated by the works. Construction phase waste may consist of hardcore, stone, concrete, steel reinforcement, shuttering timber, food waste from the canteen and unused oil, diesel and building materials. This waste will be collected at the end of the construction phase and taken off site to be reused, recycled and disposed of in accordance with best practice

procedures at an approved facility. Domestic wastewater from the on-site holding tank will be collected on a regular basis by approved contractors and disposed of in an authorised facility in accordance with best practice. Plastic waste will be taken for recycling by an approved contractor(s) and disposed or recycled at an approved facility.

- Construction Compound:
  - Construction phase waste may consist of hardcore, concrete, spare steel reinforcement, shuttering timber and unused oil, diesel and building materials. This waste will be stored in the construction compound and collected at the end of the construction phase and taken off site to be reused, recycled and disposed of in accordance with best practice procedures at an approved facility. Plastic waste will be taken for recycling by an approved contractor and disposed or recycled at an approved facility. Domestic type waste generated by contractors will be collected on site, stored in an enclosed skip at the construction compound and disposed of at a licensed landfill facility.
- General Waste Generation and Management:
  - Best practice procedures in general will minimise waste generated on-site. Measures including good site management will be taken to limit the quantity of waste generated during the construction phase. Waste such as excavated material on-site will be recycled where possible;
  - Surplus materials will include materials generated by the excavation works during construction of tracks and construction compound mainly comprising excavated excess sub-soils; and
  - Waste streams will include wastes generated by plant, machinery and construction workers over the period of the works, for example waste oils, sewage, refuse (paper, carton, plastic etc), wooden pallets, waste batteries, fluorescent tubes etc.
  - Access to materials will be controlled. A dedicated storage area will be provided in the site construction compound for building materials such as cables, plastic piling for the settlement ponds, geotexile matting, blocks, tools and equipment, fence posts and wire, booms, pipes etc;
  - Access to stored materials will be restricted; the site compound will be securely fenced from the outset and will be locked when there are no site personnel present;
  - To contain and manage construction phase waste, multiple skips will be provided at the temporary site construction compound; one for recyclable waste and others for various construction waste. These skips will be emptied when required by a licensed waste management company. Waste oil and waste oil drums will be collected and stored in containers and on a bunded tray within the storage container;
  - At the end of each phase, the completed works areas will be tidied of any unused material or waste; this material will be brought to the site compound for storage and reuse or placed in the appropriate skip for disposal;
  - Construction waste (timber, steel, concrete etc) elements will be segregated and stored in dedicated bins on site for recycling;
  - Timber waste will be kept to a minimum through the re-use of shutters etc. throughout the works. At the end of the works, the majority of timber will be sent onto a new site for re-use. Any timber that cannot be re-used because of poor quality etc. will be recycled;
  - All waste steel reinforcing will be stockpiled and at the end of each work unit, it will be collected for recycling by a Licensed Facility;

- Plastics and packaging will be segregated and stored in dedicated bins on site for recycling;
- Waste oil stored on site will be stored in labelled containers and will be collected by licensed facility/licensed oil-recycling contractor as necessary. Records will be maintained on the volumes of waste oil generated;
- Paper / cardboard will be recycled; and
- Wastewater generated from the office and welfare facilities will be regularly emptied by licensed/suitable contractors.

- Waste-Water Treatment / Effluent disposal:
  - Wastewater from welfare facilities on site will drain to integrated wastewater holding tanks associated with the toilet units. The stored effluent will then be collected on a regular basis from site by a permitted waste contractor and removed to a licenced/permitted waste facility for treatment and disposal; and
  - During the construction time period, wastewater production is estimated to be 3,000 litres per day (based on an estimated workforce of 60 people generating on average 50L/person.
- Sustainable Resource and Waste Management:

The principle objective of sustainable resource and waste management is to use material resources more efficiently, to re-use, recycle and recover material and to reduce the amount of waste requiring waste disposal. The value of products, material and resources is maintained in the economy for as long as possible such that the generation of waste is minimised. To achieve resource efficiency there is a need to move from a traditional linear economy to a circular economy. Resource efficiency techniques will include the following:

- Excavated spoil will be resourced efficiently on site and will be reused for the backfilling, landscaping, and restoration around wind farm infrastructure such as turbines and hardstands. Dedicated spoil storage areas and a borrow pit are proposed within the site. These will be used for generating material for the construction of access tracks and hardstands and for spoil storage.
- When possible, soil to be removed from site will be treated as Article 27 by-product (a non-waste) or treated to comply with Article 28 if practicable and recycled if possible.
- Spoil will also be stored around the turbines to a maximum height of 1m. The felled areas around the turbines have been identified as a potential additional area that will be used to store material; however, priority will be given to restoration of the borrow pit and the dedicated spoil storage areas.
- Berms will be formed along sections of access tracks and hardstands that will act as a physical edge protection measure to prevent vehicles falling off where a drop off greater than 1m exists from the road / hardstand edge. Spoil generated onsite will be used to create these berms.
- Approximately 165,000m^3 of stone won from the borrow pit will be reused on site.

Responsibility

The Environmental Manager will be responsible for adherence to correct waste management procedures. They will also identify a waste contractor to remove waste that can be recycled or re-used.

The Environmental Manager will keep records provided by waste contractors of all waste being removed from site. The Environmental Manager will record waste removed from site regularly. This information will be recorded in a standard format. It will be the construction manager's responsibility to organise the removal of skips from their area when they are full.

The Environmental Manager will inspect waste segregation and temporary soil/rock storage stockpiles during his regular site visits.

Training

Copies of the Waste Management Plan will be available to all site personnel. All site personnel and sub-contractors will be instructed about the objectives of the Waste Management Plan for the site, and informed of the responsibilities which fall upon them as a consequence of its provisions. This will be carried out during the site induction process for all site personnel. Where source segregation and materials reuse techniques apply, each member of the construction team will be given instructions on how to comply with the Waste Management Plan for the site. Site notices will be designed to reinforce the key messages of the waste management plan, and will be displayed prominently for the benefit for all on site personnel.

Waste Records

All details of wastes (arising/generated/movement, etc.) will be recorded during the project. Each consignment of waste removed from the site will be documented in the form of a waste management movement record form which will ensure full traceability of the material to its final destination. All records will be retained at a designated location at the site office/construction compound and made available for auditing of the waste management plan.

References

Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (DoEHLG, July 2006).

Design Out Waste: A design team guide to waste reduction in construction and demolition projects (EPA, 2015).

EMP 7: Construction Traffic Management

Purpose:

To describe measures for the management of all traffic, including construction traffic and oversized loads, for the minimization of disturbance and nuisance to the local community.

Scope:

All Site Construction Areas, approach roads to the site and internal access track traffic.

Procedure:

General

An **Outline TMP** is included as **Appendix 2D** of this **EIAR**. A construction stage TMP will be finalised in agreement with Clare County Council.

The plan will include provision for:

- Communicating with the community, An Garda Síochána and Clare County Council.
- Details of site access and any site traffic rules, including security, parking, loading and unloading, required speed or other relevant details.
- Programme of maintenance and upkeep of public roads.
- Site operating hours (including delivery) to be outlined.

Public Roads

- In order to mitigate from a significant impact during peak traffic hours, the majority of staff will either arrive on-site before or after the peak morning traffic and finish work before or after the evening peak traffic hours.
- The condition of the public roads will be monitored on an on-going basis and a road sweeper provided to clean the public roads if required.

Site Entrance

- There will be no parking of any vehicles on the public road near the site entrance.
- Adequate parking will be provided on site for both employees and visitors.
- The condition of the site entrance will be monitored on an on-going basis and a road sweeper provided to clean the public road if required.

Responsibility

Project Manager

Construction Manager

Construction personnel

Sub-contractors as appropriate

Delivery personnel

EMP 8: Construction Dust Management

Purpose

To describe the measures for the management of nuisance impacts on air quality from construction generated dust.

Procedure

A dust minimisation plan has been formulated for the construction phase of the project, as construction activities are likely to generate some dust emissions. The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of any dust produced will be deposited close to the potential source and any impacts from dust deposition will typically be within several hundred metres of the construction area.

It is not envisaged that a dust monitoring nor a sampling programme is required for this site. Ongoing good practice measure for the management of dust on site is to be implemented as set out below. Ongoing visual monitoring of dust will be carried out by Site Management.

In order to ensure that no dust nuisance occurs, a series of measures will be implemented:

- The use of water as a dust suppressant, e.g. a water bowser to spray access tracks and crane hardstanding areas during any extended dry periods when fugitive dust emissions could potentially arise;
- Site tracks and compound will be regularly cleaned and maintained as appropriate;
- Public roads will be swept to remove mud and aggregate materials from their surface;
- Furthermore, any track that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- Speeds will be restricted on access tracks as site management dictates;
- Public roads in the vicinity of the site will be regularly inspected for cleanliness, and cleaned as necessary;
- Site stockpiling of materials will be designed and laid out to minimise exposure to wind;
- Daily site inspections will take place to examine dust measures and their effectiveness;
- A temporary vehicle wheel wash facility will be installed in proximity to the site entrance;
- Any materials leaving the site will be evaluated and covered if considered necessary to minimise potential dust impacts during transportation.
- The transportation contractor shall take all reasonable measures while transporting waste or any other materials likely to cause fugitive loses from a vehicle during transportation to and from site, including but not limited to:
    - Covering of all waste or material with suitably secured tarpaulin / covers to prevent loss;
    - Utilisation of enclosed units to prevent loss.

The dust minimisation plan will be reviewed at regular intervals during the construction phase to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures.

Responsibility

- The Environmental Manager is responsible for reviewing the site Dust Minimisation Plan.
- The Construction Manager is responsible for:
    - Organising dust suppression through use of bowsers and cleaners;
    - Plan site layout so that machinery and dust causing activities are located away from receptors as far as possible;
    - Keep site fencing, barriers and scaffolding clean using wet methods;
    - Remove materials that have the potential to produce dust from sit as soon as possible;
    - Cover seed of fence stockpiles to prevent wind whipping;
    - Ensure all vehicles switch off their engines when stationary – no idling vehicles;
    - Use enclosed chutes and covered skips.
- The Project Manager is responsible for:
    - Recording all dust and air quality complaints, identify causes and take appropriate measures to reduce emissions in a timely manner;
    - Make a compliant log available to Clare County Council when requested;
    - Record any exceptional incidents that cause dust or air emissions.

References

Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (Consultation Draft, National Roads Authority, October 2006).

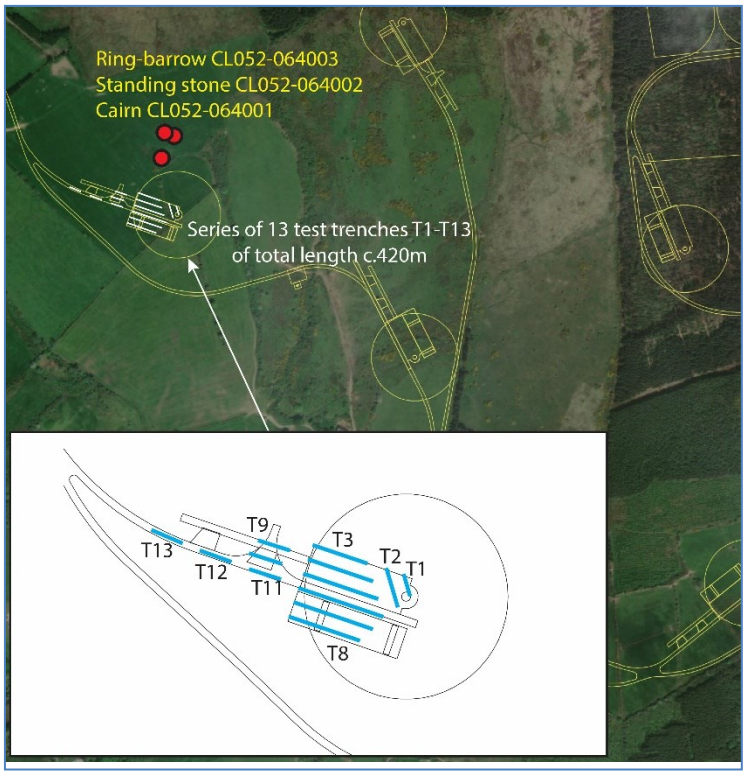
Control of Dust from Construction and Demolition Activities (BRE, 2003).

EMP 9: Archaeological and Heritage Protection

The purpose of this plan is to describe measures for the management and protection of the archaeological and cultural heritage sites that have been found on the development site. There is one monument located within the development boundary.

Archaeological management measures during construction

- Pre-construction targeted archaeological testing under licence from NMS (22E0744) was proposed and undertaken in October 2022 on the footprint of the proposed groundworks in proximity to the prehistoric complex comprising of the three recorded monuments (see **Figure** below). The objective was to proactively determine the presence / absence of potential archaeological remains near these recorded sites to develop an informed mitigation strategy. Nothing of archaeological interest was recorded during the testing (see **Appendix 13A of EIAR**) and consequently the possibility of discovering previously unrecorded features on the footprint of T2 has decreased;



- Exclusion zones (reflecting RMP's zones) will be physically established on the ground by archaeologists before the construction phase, around all five monuments: CL052-064001, CL052-064002, CL052-064003, CL053-040, CL053-049. No ground disturbance will be undertaken within the zones. The ground works in the vicinity of all monuments will be archaeologically monitored during construction;
- Groundworks associated with cuttings through townland / barony/ county boundaries will be kept to a minimum. Cutting locations will be archaeologically recorded and all boundary cuttings will be monitored with photographs and written descriptions; and
- All ground disturbance associated with the construction of the proposed development will be monitored by a suitably qualified archaeologist working under licence issued by the Minister under Section 26 of the National Monuments Act (Amended) 1930 to 2014. Should archaeological material be found during the course of monitoring, the archaeologist may have work on site stopped, pending a decision as to how best to deal with the find (e.g. preservation in situ or excavation). Advice will also be sought from

the National Monument Service (NMS). Having completed the work, the archaeologist will submit the report to the NMS.

- If during archaeological monitoring and testing, previously unrecorded sites/features are discovered, then preservation 'in situ' or preservation by record will be carried out. In that context preservation 'in situ' reduces the effect to 'not significant'. When preservation 'in situ' is not an option, then preservation by archaeological excavation and record will reduce the effect on unrecorded sites to 'slight'. Proposed archaeological monitoring and the full recording of potential remains of vernacular structures, will reduce the effect to 'not significant'. Proposed mitigations to the townland boundaries consisting of archaeological monitoring and reverting the boundaries to pre-construction phase status will reduce the effect to 'slight'.

Responsibility

Project Archaeologist

Environmental Manager

Construction Manager

References

Council of Europe Convention on the Protection of the Architectural Heritage of Europe (the '*Granada Convention'*) ratified by Ireland in 1997.

Framework and Principles for the Protection of the Archaeological Heritage, 1999, Department of Arts, Heritage, Gaeltacht and the Islands.

The Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous) Provisions Act, 1999, as amended.

The conservation principles as set out by International Council on Monuments and Sites (ICOMOS) in the Venice and Burra Charters.

Planning and Development Act, 2000, as amended.

Architectural Heritage Protection-Guidelines for Planners by the Department of the Environment Heritage and Local Government 2011 (DoEHLG).

EMP 10: Ecological Management Plan for the Protection of Habitats and Fauna

Purpose

To describe measures for the management and protection of habitats and fauna on the site.

Project Ecologist/Ecological Clerk of Works (ECoW)

A suitable qualified and experienced Project Ecologist/ECoW will be employed during the construction phase of the project. Duties will include the review of all method statements, delivery of toolbox talks, undertaking of all required pre-construction surveys for protected species and monitoring of works throughout the construction phase to ensure all environmental controls and EIAR mitigation is implemented in full. As part of toolbox talks, contractor staff and other site personnel, as relevant, will be made aware of the procedure to follow if a protected species or their resting or breeding site, is encountered. The Project Ecologist/ECoW will closely work with the Environmental Manager.

The Project Ecologist/ECoW will be awarded a level of authority and will be allowed to stop construction activity if there is potential for adverse environmental effects other than those predicted and mitigated for in the EIAR. The project ecologist/ECoW will be responsible for pointing out boundaries of exclusion zones as outlined further below.

The appointed Project Ecologist/ECoW will have demonstrated professional experience in managing large-scale construction works affecting ecological receptors identified within the EIAR.

Construction and Environmental Management Plan (CEMP)

A CEMP has been prepared for the proposed project. The CEMP will be finalised and implemented by the appointed contractor. The implementation of the proposed mitigation measures and environmental commitments of the project, as well as the monitoring and supervision of these measures, and follow-up arrangements and management of any potential impacts, will be managed through the CEMP. Mitigation measures to prevent significant negative impacts to the ecological receptors identified in the EIAR chapters will also be incorporated into the project through the CEMP and will be overseen by the Project Ecologist/ECoW. Mitigation measures will be monitored for compliance in-line with the requirements of the Planning Consent.

As recommended in Nature Scot (2019), drainage through or under floating tracks will be maintained to prevent the structure acting as a dam, impounding water on the uphill side and causing drought on the downhill side. Regular maintenance inspections will be carried out to monitor the operation of such drainage. Construction of the tracks will allow for continued drainage across the line of the track even under compaction and settlement. This will be achieved through the sub-base (by using coarse granular material) or by constructing drains at regular points along the length of the track (SNH, 2015).

The finalised CEMP will take cognisance of Construction Industry Research and Information Association (CIRIA) technical guidance on water pollution control (Masters-Williams et al., 2001; Murnane et al, 2006; Audus et al., 2010) and will include, but is not limited to, the following construction phase elements:

- Management of Excavations;
- Surface Water Management Plan (Sediment and Erosion Control);
- Fuels and Oils Management;
- Management of Concrete;
- Construction Waste and By-product Management Plan;
- Wheel Wash Management Procedure;

- Construction Dust Management;
- Construction Noise Management;
- Ecological Management Plan for the Protection of Habitats and Fauna;
- Management of Invasive Species;
- Monitoring and Auditing Procedures;
- Environmental Accidents, Incidents and Corrective Actions.

Construction method statements will be prepared prior to commencement of construction and incorporated into the CEMP.

Site Environmental Manager

Routine inspections of construction activity will be carried out on a daily basis by the Site Environmental Manager and/or appointed contractor staff to ensure all controls to prevent environmental impact, 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 the CEMP and that the requirements of the Conditions of Planning and associated documentation are being adhered to during construction. Only suitably trained staff will undertake environmental site inspections.

Habitats

General Protection of Habitats

The area of proposed works will be kept to the minimum necessary to minimise disturbance to habitats and flora. The footprint of the development area and construction area will be clearly marked prior to commencement of construction with secure posts and high visibility tape. These areas will be marked out with reference to design drawings, under the supervision of the project engineer and Project Ecologist/ECoW. There will be no removal of habitat, movement/storage of construction machinery or any other construction related activities permitted outside the Proposed Development area.

Vegetation removal will be minimised. Habitat disturbance will be limited by controlling the movement of plant, machinery and personnel.

Regarding tree, hedgerow and scrub habitats, including mature trees within linear habitat features, within the site that are not proposed to be removed as part of the works, these will be retained, and all possible measures will be taken to protect vegetation and/or the habitat feature from damage or disturbance. Such impacts may arise from physical damage to individual trees and shrubs, damage/alteration of the surrounding ground such as compaction of soil and/or changes in ground levels due to excavation. Any works in proximity of these areas will be undertaken in line with the advice of the Project Ecologist/ECoW and with regard to 'Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub, Prior, During and Post Construction of National Road Schemes' (NRA, 2006).

Exclusion Zones

Areas of ecologically sensitive habitat will be marked by secure posts and robust high visibility tape under the supervision of the Project Ecologist/ECoW and with reference to planning drawings. This will ensure that sensitive areas of the site and wider area, identified during the ecological constraints study, are excluded from any works activity or disturbance. Machinery will not be permitted to breach these exclusion zones, and there shall be no side casting of material or any other construction-related activity within these areas.

For example, the area of wet heath/upland blanket bog located in the north-west of the site, although currently degraded to some extent, was constrained out of the potential developable area during constraints analysis. This area will be encompassed within an exclusion zone to eliminate any potential impacts.

Removal of Vegetation (excluding conifer plantation)

In accordance with Section 40 of the Wildlife Acts, vegetation removal, including hedgerow and tree removal, will be conducted outside of the restricted bird nesting period (March 1st to 31st August). The provisions of Section 40 of the Acts do not relate exclusively to birds, but a range of biodiversity, the protection of which will contribute to local food chains and ecosystem functioning.

Forestry Felling

Overall, felling of appropriately 15.97 ha of commercial forestry will be required.

All tree felling will be undertaken in accordance with the conditions attached to the tree felling licence and in accordance with Forest Service Guidelines.

Hedgerow and Treeline Reinstatement

Where hedgerow and treeline removal are required within the proposed development site, the corresponding areas/length of loss will be fully reinstated within the proposed wind farm site. Appropriate planting of native trees and shrubs will be carried out along suitable stretches of the access tracks. Planting will comprise a mix of semi-mature specimen trees, immature trees and pollinator-friendly hedgerow species. Planting of species will be staggered to achieve structural heterogeneity, avoid excessive shading and promote natural diversity as the field and shrub layers establish over-time. Fast-growing species such as willow (*Salix* spp.) and alder (*Alnus glutinosa*) will be used, along with other native hedgerow species such as whitethorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), elder (*Sambucus nigra*), holly (*Ilex aquifolium*), rowan (*Sorbus aucuparia*), bramble (*Rubus fruticosus*), birch (*Betula* spp.) and hazel (*Corylus avellana*).

Reinstatement will ensure that there will be no net loss of these habitats. Please refer to the Biodiversity Enhancement Management Plan (Appendix 6E of EIAR) for details of proposed for reinstatement of hedgerow and treeline habitats.

Woodland/Scrub Habitat Reinstatement

Where there will be unavoidable removal of areas of semi-natural woodland as well as scrub, these areas of loss will be fully reinstated within the site with native tree and shrub species of a similar composition to affected areas.

The Project Ecologist will advise on the appropriate species and planting requirements in line with the species composition of the existing semi-natural habitats in the area.

Any reinstated vegetation will be monitored by the Project Ecologist. Spraying of vegetation using pesticides (herbicides, fungicides and insecticides) will not be permitted at any stage of development. Refer to the Biodiversity Enhancement Plan for areas proposed for reinstatement of woodland/scrub habitats.

Regarding removal of semi-natural grassland habitats, topsoil will be retained for use during reinstatement. A layer of topsoil will be spread evenly, as required, over the affected area under the supervision of the Project Ecologist. These areas shall then be temporarily fenced off and allowed to regenerate naturally. No fertiliser or herbicide shall be applied. These areas shall be monitored by the Project Ecologist for potential encroachment of invasive species. Where vegetation is slow to regenerate naturally, planting of native plant species will be undertaken. The Project Ecologist will advise on the use of appropriate species and planting requirements in line with the species composition of the existing semi-natural habitats in the area.

Habitat reinstatement will commence at construction stage. The success of any habitat reinstatement measures will be monitored by the Project Ecologist throughout the construction phase and continue into the operational phase.

Where habitat reinstatement measures are successfully implemented, monitoring of habitats can cease, as directed by the Project Ecologist. Where required, periodic management measures (e.g., checking of drains, removal of invasive species) will be implemented. Where required, alteration and/or additional enhancement measures will be implemented. This will be overseen by the Project Ecologist and monitored on an on-going basis.

Further details on habitat reinstatement measures are include in Appendix 6E.

Protection of Fauna

Badger and Otter

A number of badger setts were identified during baseline ecology surveys, at least one of which was confirmed active at the time of surveys. These setts will be retained. None of the identified setts are within 30 m or 50 m of a proposed turbine location or access track; however, badgers move between setts and can excavate new setts.

No otter holts were identified, and no evidence of otter was found during the baseline ecology surveys.

Pre-construction surveys for non-volant mammals, such as badger and otter, will be undertaken prior to the commencement of any construction activity to identify any changes within the site with regard to protected mammals. The pre-construction surveys will be undertaken no more than 10-12 months in advance of construction. The surveys will be supplemented by an additional survey immediately prior to site works commencing.

Where areas of dense vegetation are to be removed, the Project Ecologist/ECoW will be present to oversee removal of vegetation and ensure any necessary mitigation measures are in place in the event that a previously unknown breeding or resting site of any protected mammal species e.g., badger sett, are encountered during the works.

If any badger setts are discovered, then all works within a 30 m buffer (50 m buffer during the breeding season) will cease. NPWS will be contacted, and the necessary mitigation implemented.

Surveys and implementation of best-practice guidelines for badger and otter will be overseen by the Project Ecologist/ECoW and in accordance with NRA/TII Guidelines 'Guidelines for the Treatment of otters prior to the Construction of National Road Schemes' (NRA 2008) and 'Guidelines for the Treatment of badgers prior to the Construction of National Road Schemes' (NRA, 2008).

Where relevant, mitigation for badger and otter will be carried out under in full accordance with NRA/TII Guidelines.

Red Squirrel, Pine Marten and Irish Stoat

Where possible, felling of forestry will be limited to periods outside of when red squirrel and pine marten are likely to have young in dreys/dens (peak period January to March for red squirrel, March and April for pine marten). If felling of forestry during these time periods is unavoidable, then the area to be cleared will be surveyed by a suitably-qualified ecologist to search for the presence of breeding sites. The general avoidance of removal of vegetation during the bird-nesting period (March to August, inclusive) will avoid disturbance to stoat during their peak breeding season.

Where any breeding sites will be disturbed, mitigation will be carried out under approval from NPWS as necessary and in full accordance with NRA/TII Guidelines.

Irish hare, Hedgehog and Pygmy Shrew

These species are mobile and so are expected to disperse from the area; however, young are vulnerable to impacts during vegetation clearance and/or during periods of hibernation, in the case of hedgehog. Prior to any vegetation clearance, the area to be cleared will be checked by a suitably-qualified ecologist to check for the presence of young mammals, or hibernating hedgehog, as appropriate.

Bats - Pre-construction Surveys

A number of trees were identified as Potential Bat Roosts (PBRs) within the proposed development site and along the turbine delivery route.

Pre-construction roost surveys of structures and trees will be carried out at the project site, including along the route of the proposed grid connection in advance of construction commencing. Emergence/re-entry surveys may be required at structures/trees, pending the results of the surveys.

Prior to the felling of any trees identified as PBRs, detailed physical inspections of the trees Potential Roost Features (PRFs), using endoscope and high-powered torch, and/or dusk/dawn surveys will be undertaken at each affected tree to determine if roosting bats are present.

In the event that a bat roost is identified, mitigation will be recommended by the Project Ecologist/ECoW, as required, and will follow best practice guidance as per:

- Bat Mitigation Guidelines for Ireland Ver 2. Irish Wildlife Manuals, No 134 (Marnell et al., 2022);
- Bats and onshore wind turbines – survey, assessment and mitigation. (SNH, 2021);
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, undated);
- Guidelines for the treatment of bats during the construction of National Road Schemes (NRA, undated).

All bats, and their roosts, are afforded legal protection by the Wildlife Act, 1976 to 2021, as amended, and the European Communities (Birds and Natural Habitats) Regulations 2011 - 23 (as amended). In the event that any active roosts are identified which it is proposed to remove, it will be necessary to submit an application for a Derogation Licence (issued under Regulation 54 of the Habitat Regulations). Strict criteria must be met before such a licence can be approved by the Minister who can only issue such derogation licences in very limited circumstances.

Bat Activity Surveys

If three or more years lapse from between the baseline surveys and commencement of the construction stage, it will be necessary to repeat the bat activity surveys, described above, in order to establish a robust and reliable baseline for future monitoring. Future survey work will be completed according to the best practice guidelines then pertaining.

Turbine Buffer Felling

SNH (2021) recommends a buffer distance of 50 m between a turbine blade tip and nearest woodland (or other key habitat feature for bats e.g., wetland) (SNH, 2021). This buffer creates a clearance setback of 50 m between the arc of the blade's sweep and the forest edge which could be used by bats to minimise risk of collision with the turbine blades.

To calculate the necessary buffer distance required between the edge of the woodland (feature) and the centre of the tower to achieve the 50m clearance setback, as above, the following formula (adapted from SNH, 2021) is used to calculate (D), the distance;

$$D = [(50 + bl)^2 - (hh - fh)^2]^{½}$$

Where: **bl** = blade length, **hh** = hub height, **fh** = feature height (all in metres).

Based on this formula and proposed turbine dimensions, a felling distance of up to 95m around each turbine within the development boundary is proposed to minimise impacts to foraging bats, in line with SNH (2021). This buffer felling distance has been calculated based on a proposed turbine blade length of 68m, hub height of 90m and the various tree/hedgerow heights. This buffer felling distance around all turbines is therefore highly precautionary and is indicative of the maximum potential buffer felling area across all turbines.

Control of regrowth of trees/encroachment of scrub will be managed and controlled within buffer areas for the lifetime of the wind farm to maintain vegetation at low-height, and thus retain clearance setbacks around relevant turbines. Vegetation will be managed by appropriate mechanical means. Chemical control will be prohibited.

Tree-felling

All tree-felling will be conducted in a manner sensitive to bats, and in accordance with NRA (2005). Any ivy-covered trees which are felled will be left to lie for a minimum 24 hours after felling to allow any bats present to leave. Tree felling will be carried out in line with a felling licence where required.

Bat-boxes (Loss of potential roost-sites)

Where tree-felling of PBRs is required, bat boxes will be erected prior to any tree felling to mitigate for loss of potential roost-sites. The number and type of bat boxes required will be determined by the species recorded and number of bats or roosts that are affected and/or the category and number of PBR trees proposed to be felled.

Design and installation of the bat box scheme will be as per NRA (undated) and overseen by a bat specialist and/or the Project Ecologist/ECoW.

Lighting

Appropriate lighting will be employed during the construction phase to minimise impacts on local bat populations. Use of lighting will be minimised and avoided, where possible. Construction lighting will be targeted to minimise/avoid light spill to enable the retention of dark-corridor connectivity within the landscape for commuting bats.

Where lighting is required, the following will be considered:

- Lighting that meets the lowest light levels permitted under health and safety will be installed. Low-pressure sodium lights will be used instead of high-pressure sodium lights or mercury lamps. If mercury lamps are to be used, they will be fitted with UV filters.
- LED luminaires will also be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.
- All lighting used will lack UV/IR elements to reduce impact.
- Directional lighting will be used to prevent overspill on to forestry/woodland edges, riparian zones or other habitat features of importance to bats. This will be achieved with the use of covers and shields (baffles, hoods or louvres) to reduce light spill and direct lighting to the intended area only.
- Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Only luminaires with an upward light ratio of 0% and with good optical control will be used.

- Luminaires will be mounted on the horizontal, i.e. no upward tilt.

Any external security lighting will be set on motion-sensors and short (1min) timers.

The use of 'white lights' on the turbines will not be permitted as these can attract insects, which in turn can attract bats (Bat Conservation Ireland, 2010).

Any lighting introduced to the Proposed Development site will follow guidance in the documents:

- Institution of Lighting Professionals (ILP) (2023). Guidance Note 08/18. Bats and Artificial Lighting in the UK - Bats and the Built Environment Series;
- Bats & Lighting. Guidance Notes for: Planners, engineers, architects and developers (BCI, 2010);
- Bat Mitigation Guidelines for Ireland Ver 2. *Irish Wildlife Manuals*, No 134 (Marnell *et al.,* 2022);
- Scottish Natural Heritage (SNH). Bats and onshore wind turbines – survey, assessment and mitigation (2021).

Amphibians

Amphibian surveys will be carried out by an ecologist in advance of construction works. These surveys will focus on breeding areas potentially used by amphibians. Methodology for frog surveys will follow Reis et al. (2013). In the event that there is a requirement to disturb breeding frogs, frog spawn and/or spawning habitat, appropriate actions will be followed by the project ecologist to ensure their preservation including seeking derogation licence where frogs will require translocations in order to proceed with proposed works. Translocation efforts include the capture and removal of frogs, frogspawn, and tadpoles from any affected habitat to the nearest available and suitable habitat. These efforts will be undertaken in advance of construction works commencing. Furthermore, habitats in the vicinity of T1, wherein frog spawning habitat was identified, will be enhanced with the creation of approximately 1.8ha of wet grassland area and approximately 2.1ha of wet heath/upland bog habitat. Additionally, the nearby Cappateemore East stream to the south east of T1 (ca. 130m of nearest frog spawning) and an unnamed tributary of the Glennagross stream to the west of T1 (ca. 330m), both 1st-order streams, both offer suitable areas nearby for translocation efforts.

Frogs are relatively opportunistic in habitat choice and are likely to occupy silt ponds where they are created. These silt ponds are likely to support amphibian and macroinvertebrate biodiversity during operational phases and beyond where are retained.

Marsh Fritillary

Suitable habitat for marsh fritillary, as per habitat criteria as set out by the NBDC as 'Good Condition Habitat', was identified within the study area, however outside the development area for the proposed development and marsh fritillary were confirmed present in these areas (please see Appendix 6D). Areas of suitable marsh fritillary habitat identified within the proposed development will be marked and fenced off prior to the commencement of works. This will ensure no inadvertent loss or disturbance from machinery or storage of materials or equipment.

This species has a meta-population structure. The extent and magnitude of these populations is dependent on the suitability of habitat patches and the topography of the landscape. While the proposed development has avoided, as part of design, areas identified as good habitat for marsh fritillary, the remaining surveyed areas, determined to be 'Unsuitable Habitat' at the time of baseline surveys, have the potential to become more favourable for marsh fritillary should existing land management practices change in the intervening period between the baseline surveys and construction.

Given the presence of a confirmed population of marsh fritillary, outside but in close proximity to the proposed development site, on a precautionary basis, pre-construction larval web surveys for marsh fritillary will be undertaken in potentially suitable habitat by a suitably qualified ecologist, in line with NBDC guidance, prior to

construction works commencing, in order to identify any areas additional to those mapped in the Marsh Fritillary Survey Report and appropriate mitigation measures will be taken. Mitigation measures for Marsh Fritillary include pre-construction surveys for marsh fritillary as well as the marking and fencing off of suitable marsh fritillary habitat prior to the commencement of works.

In the event that marsh fritillary are discovered within the proposed development site, the Project Ecologist/ECoW will require appropriate mitigation measures, in line with NPWS guidance, where required.

Where suitable marsh fritillary habitat occurs in close proximity to the proposed infrastructure, side casting of material will be to the opposite side of the proposed infrastructure to where the suitable habitat occurs. This will ensure that there is no potential for direct or indirect impacts on marsh fritillary habitat. This measure will also protect existing suitable habitat for other Lepidoptera/pollinator species of local importance.

General Protection of Fauna

The following general measures will be implemented during construction:

- Habitat disturbance to fauna will be limited by controlling the movement of plant, and vehicles. Construction vehicles will not encroach onto habitats beyond the proposed project footprint.
- Unless permitted by the planning authority the duration of construction activities will be restricted to between 7am and 7pm, Monday to Friday and between 7am and 2pm on Saturdays, but not during darkness, unless in exceptional circumstances to reduce potential disturbance to fauna.
- Should the resting or breeding place of any protected species be discovered within the site prior to or during construction works, any works in the vicinity will cease immediately, the area will be cordoned off and advice will be obtained from the Project Ecologist/ECoW and NPWS, where required. The Project Ecologist/ECoW will implement relevant mitigation and protection measures, as required (i.e. setting up an exclusion zone). Any additional site-specific mitigations deemed required by the Project Ecologist/ECoW will be prepared in agreement with NPWS. Such mitigations may include obtaining a derogation licence where protected species, frog for example, may require translocation.
- All construction activity and site works will be undertaken in accordance with relevant best-practice guidance.
- The mitigation measures for bats will follow:
    - Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, undated);
    - Guidelines for the treatment of bats during the construction of National Road Schemes (NRA, undated);
    - NPWS Irish Wildlife Manuals, No. 25: Bat Mitigation Guidelines for Ireland (Kelleher & Marnell, 2006);
    - Scottish Natural Heritage (SNH). Bats and onshore wind turbines – survey, assessment and mitigation (2021).
- Mitigation measures for birds involves avoiding works on nesting habitats during the nesting season (March – August inclusive) and avoidance of such habitats insofar as possible (see **Section 6.5.1** of EIAR and **Chapter 07 Ornithology** for more detail).

Management and Treatment of Invasive Alien Species (IAS)

Species identified on-site include Japanese knotweed, Himalayan balsam and cherry laurel. An Invasive Species Management Plan (ISMP) has been developed (see **Appendix 6F**) and will be incorporated into the finalised Contractors CEMP. The project proponent will engage the services of an invasive plant species specialist to prepare and oversee the implementation of the Site-Specific Management Plan. The Management Plan will be in place for the duration of the construction phase of the proposed project.

The Management Plan will describe the best practice measures that will be adhered to during the construction phase of the proposed project, including the installation of the grid connection, to manage and/or control IAS on-site, and will be in line with the National Roads Authority – The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads (NRA, 2010). Best practice and mitigation will be incorporated into the project construction phase via the CEMP.

A pre-construction survey for invasive species will be conducted and will include the proposed wind farm site and the grid connection route. Should invasive species be recorded at works locations along the grid connection route or within the development footprint, other than those species/infestations already documented as part of baseline ecology surveys, the ISMP will be updated accordingly, prior to construction works commencing.

All areas where invasive species occur will be identified during the pre-construction surveys. All areas will be demarcated prior to commencement of construction.

Treatment and management of Japanese knotweed and Himalayan balsam on-site will follow Best Practice Management Guidelines produced by NRA (2010), and Invasive Species Ireland (Kelly et al., 2008a, and 2008b), as relevant.

For more information, please see the ISMP for the proposed development, which can be found in **Appendix 6F**, which details containment and eradication measures.

Biosecurity

Prior to being brought onto site, all plant, equipment and PPE will be clean and free of soil/mud/debris or any attached plant or animal material. Prior to entering the site, all plant and equipment will be thoroughly cleaned down using a power washer unit to prevent the spread of IAS. All plant/equipment will be visually inspected to ensure all adherent material and debris has been removed.

Prior to being brought to site, certification will be obtained from suppliers that all raw materials including soil, fill, sand, gravel and landscaping materials to be imported are free from IAS. Locations for supply e.g. quarries etc., will be assessed for the presence of IAS prior to materials being brought to site.

All footwear/waders and/or equipment that will be used within the aquatic environment will be treated to prevent foreign flora/fauna entering the water, and again after use, to prevent spread to other catchments.

Non-native species control will be implemented and managed according to the following IFI document, noting that some works components are located at/near watercourses 'IFI Biosecurity Protocol for Field Survey Work' (IFI, 2010).

For more information, please see the ISMP for the Proposed Development, **Appendix 6F**, which outlines all mitigation measures in relation to biosecurity on-site.

Water Quality

The main potential for impacts is during the construction phase. Run-off of silt and pollution by accidental concrete/fuel/oil spill, will comprise the main sources of potential water quality impacts during the construction stage.

Construction phase mitigation for hydrology will follow that outlined in Chapter 08 Water.

A site-specific Surface Water Management Plan has been designed for the proposed development to avoid/minimize impacts to water quality within and downstream of the site. Refer to Chapter 03 Civil Engineering for full details. In addition, the CEMP provides various management plans for the protection of water quality during the construction phase. The CEMP also provides for the appointment of a Site Environmental Manager who will be responsible for checking and monitoring construction works from an environmental perspective, including the protection of water quality in receiving watercourses.

A programme for water monitoring will be prepared in consultation with Inland Fisheries Ireland prior to the commencement of the construction of the wind farm. The plan will include monitoring of water during the pre-construction, throughout construction and in the immediate post construction phases.

Further baseline water quality monitoring of all streams near the development site will be undertaken prior to construction to confirm existing conditions at the time of construction. This baseline data will include the main components of a full hydrograph for the streams including both high spate flow and base flow where possible.

Silt control will be a primary concern during the construction stage, as silt has been identified as a sediment source to downstream areas. Silt ponds will be required mitigation to tracks and swales at the proposed development site as these are considered an effective method of retaining silt. The design of these features will be in accordance with best practice, oversized and retained post construction.

During the construction phase of the project, water quality in the streams and outflow from the drainage and attenuation system will be monitored, field-tested and laboratory tested on a regular basis during different weather conditions. This monitoring together with the visual monitoring will help to ensure that the mitigation measures that are in place to protect water quality are working effectively.

During the construction phase of the project, the development areas will be monitored regularly for evidence of groundwater seepage, water ponding and wetting of previously dry spots, and visual monitoring of the effectiveness of the constructed drainage and attenuation system to ensure it does not become blocked, eroded, or damaged during the construction process.

Prior to any construction activity being carried out, the subject part(s) of the proposed development site will be inspected for areas that may be prone to siltation of nearby rivers/streams and drains as appropriate. Where necessary, check dams, sand-bags and/or silt fences will be installed in adjacent trackside drainage ditches to ensure an optimum standard of water running into adjacent streams from the trackside drainage. During periods of heavy precipitation and run-off, works will be halted if posing a risk to the water environment or working surfaces/pads will be provided to minimise soil disturbance. Any requirement for temporary fills or stockpiles will be covered with polyethylene sheeting of suitable grade/gauge to avoid sediment release during periods of heavy rainfall.

Additional infrastructure and measures used to control water quality will include:

- Settling out as far as reasonably practicable any silty water generated on site through drainage mitigation measures (silt traps, etc.) and channelled into suitable vegetation (as defined by ECoW) at least 50 m from watercourses;
- Establishing vegetation on exposed areas by using top sod or reseeding with a suitable seed mix;
- Regular track cleaning;

- Use of wheel washes;
- Use of check dams on drains to slow water velocity;
- Use of silt fences on drains to reduce sediment loading;
- Daily and weekly weather forecast monitoring; and
- Programme of daily, weekly, and monthly water quality monitoring.

All design and works in proximity to watercourses shall follow the best practice guidance outlined in the following documents:

- Draft Revised Wind Energy Development Guidelines (DHPLG, 2019);
- 'Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters' (IFI, 2016);
- 'Control of water pollution from linear construction projects' (Murnane et al. 2006);
- 'Guidelines for the crossing of Watercourses during Construction of National Road Schemes' (NRA, 2008).

A site-specific Water Quality Management System has been designed for the proposed development to avoid and minimize impacts to water quality within the site (refer to **EIAR Chapter 03 Civil Engineering**).

Dewatering

All ground water/surface water that may enter turbine foundations or cable trenches/joint bays will be removed and treated and disposed of appropriately, in accordance with best practice. Any dewatering (if/where required) will adhere to the following measures:

- Ground water/surface water will not be pumped directly into access trackside drains/watercourses;
- Ground water/surface water which has become silted within the turbine foundations will be pumped to the surface water drainage system to settle out; and
- Ground water/surface water which has become silted within the trenches/joint bays will be pumped and allowed to infiltrate to a designated percolation area (area designated by the ECoW). Dedicated settlement ponds will be provided adjacent to the site tracks, proposed borrow pit location, hard stands, substation. The design and locations of the ponds are outlined in **EIAR Chapter 03 Civil Engineering**. Where necessary, sediment ponds will be partly filled with stone so that they will not present a long-term safety risk. The remaining ponds will be left to fill in and re-vegetate naturally or retained as ponds.

Cement Bound Granular Mixtures (CBGM)

For the cable trench construction, temporary storage of CBGM will be on hardstand areas, or areas that are not prone to run off. These areas will be located where there is no direct drainage to surface waters and where the area has been appropriately bunded. Bunding will be in the form of sandbags, geotextile sheeting, or silt fencing. This method will prevent any solid run-off. Concrete truck chutes will be washed out at a dedicated, bunded area.

Forestry Felling

Harvesting/felling is a forest operation that can cause nutrient run-off to water bodies and contribute to their eutrophication unless mitigating measures are taken. The *Forestry and Water Quality Guidelines*[1] (DMNR, 2000)

and *Standards for Felling & Reforestation*[2] (DAFM, 2019) describe best practice that must be adopted if carrying out felling. A harvesting plan and associated mapping will be prepared and will include a review of the felling areas, environmental receptors – water features (including aquatic zones, relevant watercourses, hotspots, water abstraction points and crossing points), biodiversity (including hedgerows and other habitats), selection of felling and extraction system and machinery, silt and sediment control, timing, and extraction management.

Fuel Management

All plant will be refuelled on site e.g. excavators, dumpers etc, while rigid and articulated vehicles will be fuelled off site as will all site vehicles (jeeps, cars and vans). At construction stage, a Fuel Management Plan will be developed specific to the site and the particular plant and equipment required for construction.

The plan outlined will have regard to the following elements:

- Mobile bowsers, tanks and drums will be stored in a secure, impermeable storage area, away from drains and open water;
- Fuel containers will be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores;
- Ancillary equipment such as hoses, pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and oil stores, including tanks and drums, will be regularly inspected for leaks and signs of damage;
- Only designated trained operators will be authorised to refuel plant on site;
- Procedures and contingency plans will be set up to deal with emergency accidents or spills; and
- An emergency spill kit with oil boom and absorbers will be kept on site in the event of an accidental spill.

Refuelling of Construction Plant On-Site

The following measures will be undertaken to avoid or minimise negative effects to water quality as a result of the use of hydrocarbons:

- Refuelling will be carried out using 110% capacity double bunded mobile bowsers. The refuelling bowser will be operated by trained personnel. The bowser will have spill containment equipment which the operators will be fully trained in using;
- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage area, away from drains and open water;
- To reduce the potential for oil leaks, only mechanically sound vehicles and machinery will be allowed onto the site. An up to date service record will be required from the main contractor;
- Should there be an oil leak or spill, the leak or spill will be contained immediately using oil spill kits; the nearby dirty water drain outlet will be blocked with an oil absorbent boom until the fuel/oil spill has been cleaned up and all oil and any contaminated material removed from the area. This contaminated material will be properly disposed of in a licensed facility;

- Immediate action will be facilitated by easy access to oil spill kits. An oil spill kit that includes absorbing pads and socks will be kept at the site compound and also in site vehicles and machinery;
- In the event of a major oil spill, a company who provide a rapid response emergency service for major fuel spills will be immediately called for assistance, their contact details will be kept in the site office and in the spill kits kept in site vehicles and machinery;

Construction Wheel Wash

A Construction Wheel Wash will be used for vehicle wheels and undersides entering and leaving the construction site. Water residue from the wheel wash will be fed through a settlement pond for settling out of suspended solids. The wheel wash area will be cleaned regularly so as to avoid the buildup of residue.

Temporary Construction Compound

The following measures will be undertaken to avoid or minimise negative effects to water quality as a result of the erection of the temporary compound:

- Drainage within the temporary site compound will be directed to an oil interceptor to prevent pollution if any spillage occur;
- A bunded containment area will be provided within the compound for the storage of fuels, lubricants, oils etc.; and
- The compound will be in place for the duration of the construction phase and will be removed once commissioning is complete.

Temporary Local Road Widening

The following measures will be undertake to avoid or minimise negative effects on water quality as a result of temporary road widening;

- Works will be suspended during periods of rainfall;
- Silt fencing will be erected to prevent surface run-off;
- Vehicles will not be refuelled at the location.

Storage

The storage of materials, containers, stockpiles, and waste, however temporary, will follow best practice at all times and be stored at designated areas. Storage will be located as follows:

- Away from drains and sensitive habitats (IEFs);
- On an impermeable base;
- Under cover to prevent damage from the elements;
- In secure areas; and
- Well away from moving plant, machinery and vehicles.

All containers will be stored upright and clearly labelled. Sufficient storage will be supplied near to all working areas.

Excavation Works

Excavation works relate mainly to trench digging and excavations. Mitigation in soil management as outlined in Chapter 09 Land and Soil will also apply. The following measures will be undertaken to avoid or minimise negative effects to water quality as a result of excavation works:

- Earth movement activities will be suspended during periods of prolonged rainfall events;
- The earthworks material will be placed and compacted in layers to prevent water ingress and degradation of the material; and
- Drainage and associated pollution control measures will be implemented on site before the main body of construction activity commences.

Excavated Materials and Soil Management

All soils generated from excavation works within the wind farm associated with turbines, access track, internal cable, substation, met mast and grid route construction will be retained on site and reused in bunding, landscaping and restoration of the borrow pit and deposition areas where possible. Permanent stockpiling of soils will not take place.

During excavations in the existing tracks, excavated material will be temporarily stockpiled adjacent to the section of trench, with appropriate material used as backfill. Appropriate siltation measures will be put in place prior to excavations. Stockpiles will be stored a minimum of 50m back from rivers/streams on level ground with a silt barrier installed at the base.

Monitoring

An operational phase monitoring programme for areas of habitat enhancement and other biodiversity enhancement measures will be developed by the Project Ecologist/ECoW and incorporated into the BEMP. This monitoring programme will be implemented during construction and operation and will evaluate the success of biodiversity enhancement measures within the site.

Responsibility

Environmental Manager

Construction Manager

References

Institution of Lighting Professionals (ILP) (2023). Guidance Note 08/18. Bats and Artificial Lighting in the UK - Bats and the Built Environment Series.

Bats & Lighting. Guidance Notes for: Planners, engineers, architects and developers (BCI, 2010).

Bat Mitigation Guidelines for Ireland Ver 2. Irish Wildlife Manuals, No 134 (Marnell et al., 2022).

Scottish Natural Heritage (SNH). Bats and onshore wind turbines – survey, assessment and mitigation (2021).

Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (NRA, undated).

Guidelines for the treatment of bats during the construction of National Road Schemes (NRA, undated).

NPWS Irish Wildlife Manuals, No. 25: Bat Mitigation Guidelines for Ireland (Kelleher & Marnell, 2006).

EMP 11: Landscape and Visual Management

Purpose

To describe measures to avoid, reduce or remediate, wherever possible significant negative landscape and visual effects of the Construction Stage of the proposed development.

Management Measures for Landscape and Visual

The following mitigation measures are proposed:

- Tree protection and fencing will be carried out where necessary during the construction phase, specifically in the vicinity of the substation.
- Mitigation measures including the re-instatement of areas following the construction phase, including replanting of hedgerows with native species similar to what is to be removed will be carried out. The borrow pit and deposition areas will be re-vegetated.
- Areas of cut and fill will be minimised and any bare will naturally re-vegetate (or as otherwise advised by ecologist).
- There will be no bunding or stockpiling of materials near the archaeological features in the north-west of the site.

Responsibility

Environmental Manager

Construction Manager

EMP 12: Emergency Response Plan

Purpose

To describe measures for the prevention of an environmental accident or incident and the response required to minimise the impact of such an event.

Procedure

In the event of an environmental emergency, all personnel will react quickly and adhere to this procedure.

All site personnel will be inducted in the provisions of the Emergency Response Plan.

The following outlines some of the information, on the types of emergency, which must be communicated to site staff:

- Release of hazardous substance – Fuel and oil spill;
- Concrete spill or release of concrete or silt;
- Flood event – extreme rainfall event;
- Environmental buffers and exclusion zones breach;
- Housekeeping of materials and waste storage areas breach;
- Stop works order due to environmental issue or concern (threat to archaeological or ecological feature);
- Fire on site (cross-reference site Safety Emergency Plan as appropriate).

If any of the above situations occur; the Emergency Response Plan is activated. The Environmental Manager will most likely be responsible for overseeing the Emergency Response Plan (to be confirmed by the Appointed Contractor(s)) and will be prepared and ready to implement the plan at all times. The Environmental Manager will be immediately informed and report to the scene. He / she must be aware of the:

- Nature of the situation – brief description of what has happened;
- Location of the incident;
- Whether any spill has been released;
- Whether the situation is under control.

Oil Spillages

The following list outlines issues likely to be appropriate for inclusion the plan:

- Site staff will report the spillage immediately to the Environmental Manager or Construction Manager;
- Where relevant, the Environmental Manager will report the spillage to Inland Fisheries Ireland and Clare County Council;
- Where possible, the source of pollution will be identified;
- Switch off all sources of ignition;
- Stop the spillage spreading;
- Use absorbent materials from the spill kit to mop up the spill (sand or absorbent materials will be used rather than detergents);

- Place boom across watercourse or in nearby downstream existing drains as a precaution;
- Do not wash spillage into drainage system. Washing will only make the situation worse and extend the pollution to other water bodies/drainage systems;
- If the spill has already reached drains, block the inlet of the dirty water cross pipes in the nearby drainage outflow points on the trackside drains with oil absorbent booms, which will prevent oils flowing into the existing drains;
- Shovel contaminated sand/earth/absorbent granules into sacks or skips;
- A specialist oil removal company will remove pooled oil.

Concrete Spillages

The following list outlines issues likely to be appropriate for inclusion in such a plan:

- Site staff will report the concrete spillage immediately to the Environmental Manager or Construction Manager;
- Where relevant, the Environmental Manager will report the spillage to Inland Fisheries Ireland and Clare County Council;
- If there is a risk of concrete spreading into the drainage system, the inlet of the dirty water cross pipes in the nearby drainage outflow points on the trackside drains will be blocked using the absorbent booms, which will prevent concrete flowing into the existing drains;
- Do not wash spillage into drainage system. Washing will only make the situation worse and extend the pollution to other water bodies/drainage systems;
- If the spill has already reached drains, acid may be added to the drains by the Environmental Manager to neutralise the alkalinity of the concrete;
- Shovel contaminated concrete granules into sacks or skips for treatment in the trackside Concrete Wash unit.

Contacts

As an Environmental Control Measure, the Environmental Manager will append the relevant contact details to the Emergency Response Plan document. Examples of such contact details include:

- Environmental Manager;
- Specialist oil removal company;
- Clare County Council;
- Inland Fisheries Ireland;
- National Parks and Wildlife Service.

Location of Emergency Spill Kits

- A map indicating the location of all emergency spill kits will be attached to the Emergency Response Plan document.
- Emergency oil spill kits will also be carried in all site vehicles and machinery and in the site office.

Responsibility

- The Environmental Manager will prepare and finalise an Emergency Response Plan to be ready to respond to any incident.
- All site personnel will report any spillages of oil or chemicals to the Environmental Manager and Construction Manager immediately.
- As appropriate, the Environmental Manager will report the spillage to the Regional Fisheries Board, Clare County Council and any other relevant authority.

EMP 13: Site Environmental Training Awareness

Purpose

To describe measures for informing the public of no public access to the construction site and the training of all site personnel in the protection of the environment and the relevant controls.

Scope

Notification to the public of no public access to the site. All site personnel and construction teams which may influence environmental impacts.

Procedure

Site signage will be provided at the entrance to the site to inform the public that access to the site is restricted to those directly involved in the construction of the proposed development.

External to the site, areas of knotweed will be clearly barriered off with signage warning that access to the area is not permitted.

An initial site environmental induction and ongoing training will be provided to communicate the main provisions of the CEMP including this EMP to all site personnel. Two-way communication will be encouraged to promote a culture of environmental protection.

The following outlines some of the information which will be communicated to site staff:

- Environmental procedures of the CEMP;
- Housekeeping of materials and waste storage areas;
- Environmental Emergency Response Plan.

Housekeeping and Storage of hazardous materials

- Hazardous materials will only be stored in a secure storage container in the temporary site construction compound.
- Sub-contractors will provide a copy of the Material Safety Data Sheets for all hazardous substances brought on site.

All finalised CEMP policies will be adhered to, in the management of fuels and oils, concrete, and installation of sediment and erosion controls and drainage features. All finalised details will be communicated with site personnel. Environmental Training including spill kit training, installation of silt fence training is to be provided by the Appointed Contractor(s). Environmental training records will be retained in the site office.

Responsibility

Construction Manager

Environmental Manager

All site personnel

EMP 14: Monitoring and Auditing

Purpose

To describe measures for environmental monitoring during the construction works and audit of control measures to ensure environmental protection.

Procedure

All mitigation measures, any planning conditions and relevant construction methods will be monitored on site. The Contractor will nominate an Environmental Manager for the works. The Environmental Manager will provide Audit Checklists to ensure regular checks of the site's control measures for the ongoing protection of the environment.

Monitoring

Monitoring will be carried to ensure adherence EMPs 1 to EMP 18.

Checklists for daily, weekly or monthly site audits will be finalised by the Environmental Manager and the relevant personnel informed of their duties. Checklists will include (but are not limited to) confirmation that fuel is stored appropriately, waste management rules are adhered to, all environmental buffers are maintained, surface water and run-off control measures are in place and functioning, and concrete chute wash-out procedure is being followed. Checklists will be finalised with the Contractor's EOP.

All environmental records, including completed checklists, will be retained at the site office.

Responsibility

Project Manager

Environmental Manager

Construction Manager

Project Ecologist

Project Archaeologist

EMP 15: Environmental Accidents, Incidents and Corrective Actions

Purpose

To describe measures for the recording, investigating and close-out of any environmental accidents or incidents on the site.

Procedure

- The Environmental Manager or Construction Manager will be contacted as soon as possible where there is any incident that carries the possibility of negative environmental consequences (e.g. minor oil leakage or blockage of drainage pipe).
- The Emergency Response Plan and standard emergency procedures will be applied to get the incident under control and prevent injury or loss of life in the first instance.
- Work in the area will be halted and the Environmental Manager will be called to the scene to assess the situation and to decide on initial responses and remedial measures.
- Once the situation is under control, the environmental accident or incident will be recorded and the cause investigated.
- Any remedial action required will be taken to mitigate any damage and prevent a reoccurrence.
- Corrective actions will be communicated to personnel and sub-contractors where relevant – particularly where it results to a change in procedure.

Example list of environmental accidents & incidents

- Accidents involving a large spill of fuel or concrete from delivery truck (emergency response required);
- Spills of fuel and oil (minor);
- Waste or rubbish left around the site (not in dedicated waste areas);
- Breach of any buffers (archaeological, ecological, watercourse);
- Failure of any control measures (silt fences collapsed in a storm);
- Concrete chute wash out in a non-dedicated area;
- Unplanned vehicle movement off the access tracks;
- Unplanned vehicle movement within a buffer zone.

Responsibility

- Site staff will contact the Environmental Manager or Construction Manager as soon as possible where there is any incident that carries the possibility of negative environmental consequences.
- The Environmental Manager is responsible for alerting the relevant authorities.

EMP 16: Environmental Complaints

Purpose

To describe measures for the recording and resolving complaints by third parties, including local residents or members of the public.

Procedure

Any environmental complaints received, whether internal or external, will be recorded and investigated. Immediate action will be taken as relevant to resolve environmental complaints to avoid any nuisance to the local community or any environmental damage.

This procedure includes:

- Recording of any complaints to a Site Log;
- Follow up by the relevant site representative – Environmental Manager;
- Remedial measures where required;
- Ongoing communication with complainant to confirm resolution;
- Any required training or communication with site personnel and sub-contractors as a result.

The out of hours contact number for the site is: TBC

Responsibility

Project Manager

Environmental Manager

Construction Manager

EMP 17: Management of Material Assets

Purpose

To describe measures to avoid, reduce or remediate, wherever possible significant negative material assets effects of the Construction Stage of the proposed development.

Management Measures for Material Assets

The following mitigation measures are proposed:

Water and Wastewater:

All wastewater during the construction phase will be taken off-site by an authorised waste contractor and brought to an authorised waste facility.

Television and Telecommunications

In the event of interference to television and telecommunication services arising from the wind farm development, Ballycar Green Energy are committed to work with telecommunication providers to remedy any issues of interference to affected communication links.

Aviation

Ballycar Green Energy will agree an acceptable aviation obstacle warning lighting scheme with the Department of Defence and the AirNav Ireland head of turbine construction and will supply the coordinates and elevations for built turbines, as is standard for wind farm developments.

To prevent any interference to surveillance radar to Woodcock Hill MSSR and the Shannon Airport PSR mitigation measures outlined in the Aviation Impact Assessment & Mitigation report will be applied, refer to Appendix 15A. of this EIAR.

Responsibility

Developer (Ballycar Green Energy)

Project Manager

Environmental Manager

Construction Manager

References

Ballycar Wind Farm Aviation Impact Assessment & Mitigation report (Volume III Appendix 15A)

EMP 18: Management of Rock Blasting

Purpose

To describe measures to avoid, reduce or remediate, wherever possible significant negative rock blasting effects of the Construction Stage of the proposed development.

Management Measures for Rock Blasting

The following mitigation measures will be implemented:

- As part of the constraints led design process, the borrow pit and the most northerly proposed turbine foundations have been located in areas away from steep slopes, a large change in the topography, and of thin soil cover. Turbines and infrastructure in these areas are deemed to have low susceptibility to landslides.
- In order to further mitigate against possible slope instability close to the borrow pit, blasting will not occur after periods of heavy rainfall. In particular, no blasting will take place for at least 24 hours following a period of rainfall which exceeds 25mm within the previous 24 hours.
- Rock blasting will only take place within the borrow pit if extraction using rippers or hydraulic breakers is deemed impractical. Circumstances include where the rock strength is such that other means of extraction are not possible and production rates need to be increased to keep up with the construction programme.
- If rock blasting proves to be necessary, a detailed blasting design will be undertaken by a suitably qualified and experienced specialist for each location to ensure that a peak particle velocity (PPV) of 10 mm/s is not exceeded at a distance of greater than 20m from the blast holes as per BS 7385 Part 2: 1993. If this cannot be achieved, blasting will not be permitted at this location.
- To mitigate against the risk of slope failure occurring, blasting will not be permitted at turbine locations unless robust mitigation measures are put in place.
- Blasting for the access track cuttings and hardstands will be subject to the same rigorous controls as that proposed at borrow pit and turbine foundation locations.
- To mitigate against the risk of excessive dust within the vicinity of the borrow pit, the blast areas will be lightly sprayed with water prior to blasting. A Blast Management Plan will ensure compliance with the Explosive Act 2006 (amended by Part 6 of the Criminal Justice Act 2006) and related legislation, and BS 7385 in relation to blasting.
- Clare County Council, An Garda Síochána, and adjoining landowners will be notified in advance of any blasting activities on the site.
- The Blast Management Plan will be prepared by the appointed contractor prior to the construction phase and in consultation with Clare County Council, An Garda Síochána and adjoining landowners.
- Blasting will not occur at the same time as blasting at the adjoining quarry.
- Additionally, the NPWS and any other required consultees will be consulted as part of the general consultation and blasting.

Responsibility

Project Manager

Environmental Manager

Construction Manager

References

Explosive Act 2006 (amended by Part 6 of the Criminal Justice Act 2006)

BS 7385-2:1993 Evaluation and measurement for vibration in buildings Guide to damage levels from groundborne vibration.