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Appendix 3D - Construction Environmental Management Plan (CEMP)

Ballynisky Wind Farm

Ballynisky Green Energy

December 2025

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Appendices

Appendix 1 – Environmental Management Plans

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1. Introduction

This preliminary Construction and Environmental Management Plan (CEMP) for the proposed 27MW Wind Farm (referred to as the 'Proposed Development') has been prepared by Malachy Walsh and Partners (MWP) on behalf of Ballynisky Green Energy. The development will consist of six (6) wind turbines, an on-site electrical substation and an underground electrical connection to the national grid. The CEMP has been prepared to accompany the submission of an Environmental Impact Assessment Report (EIAR) and planning application for the proposed development to Limerick City and County Council (LCCC).

This CEMP has been developed specifically for this proposed development and outlines construction practices and environmental management measures which will be implemented during the construction phase, in order to ensure that the proposed development is constructed in accordance with best practice, with the minimum impact on the surrounding environment.

Prior to construction, the Appointed Main Contractor will prepare an updated detailed CEMP taking into account methods/requirements outlined in this report. This CEMP will form the basis of the construction management approach on site, while the works are being completed; ensuring environmental management measures are in place and implemented during the construction phase.

1.1 CEMP 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. The principal objective of this CEMP is to avoid, minimise and control adverse environmental impacts associated with all aspects of the construction of the proposed development including the grid connection works. In essence, this preliminary 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 preliminary CEMP achieves this by providing the environmental management framework to be adhered to during the pre-commencement, construction and operational phases of the Ballynisky Wind Farm. 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 proposed development.

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 must 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. Project Location and Overview

The proposed development is a wind farm and associated grid connection within the townlands of Ballynisky, Graigoor, Ballyegny More, Kilbradran, Ballysteen, Dunmoylan, Carrons and Lisbane, to the west of Coolcappa, Co. Limerick.

It is referred to as "Ballynisky Wind Farm" for the purposes of this planning application and EIAR. The proposed development site lies approximately 9km north of Newcastle West and 6km northwest of Rathkeale (Figure 2-1). The site is rural in nature, with landcover comprising mainly agricultural land, farm holdings and residential dwellings in the vicinity of the development area.

It will contain six (6) wind turbines with a height of 158m, an on-site 38kV electrical substation and an underground electrical connection. Should it become operational, this wind farm will be capable of providing 27 megawatts (MW) of renewable electricity to the National Grid.

Access to the site will be via the Local Road network. The R521 between Foynes and Newcastle West is located to the west of the site. The R521 links the N21 National Primary Road to the southeast and the N69 to the north. The R521 can also be accessed at Ardagh from the R523 south of Rathkeale. Access to the site will be via the L1219 local road to the northwest of the site. The site layout is shown on in Figure 2-2.

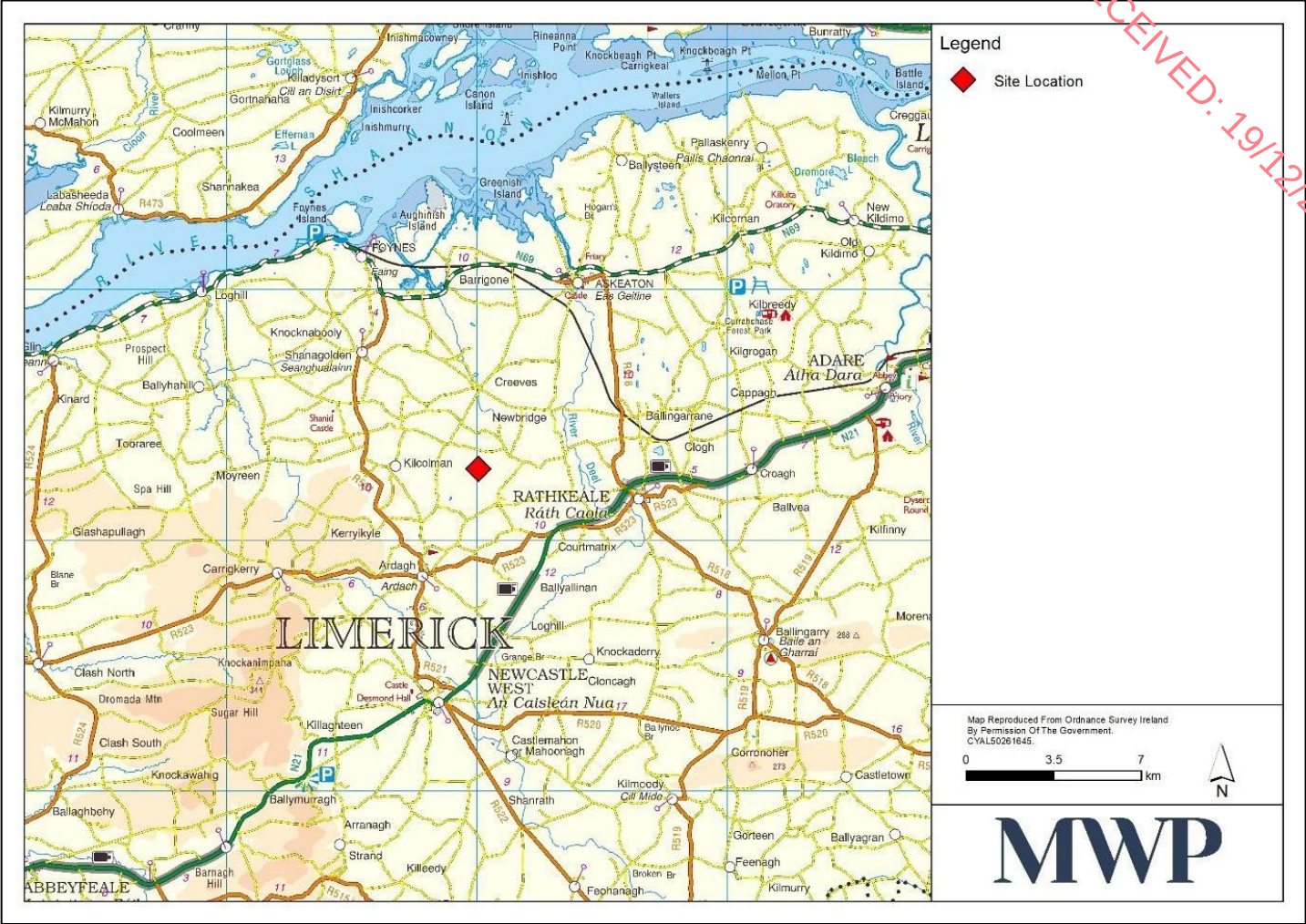


Figure 2-1: Proposed Development Location

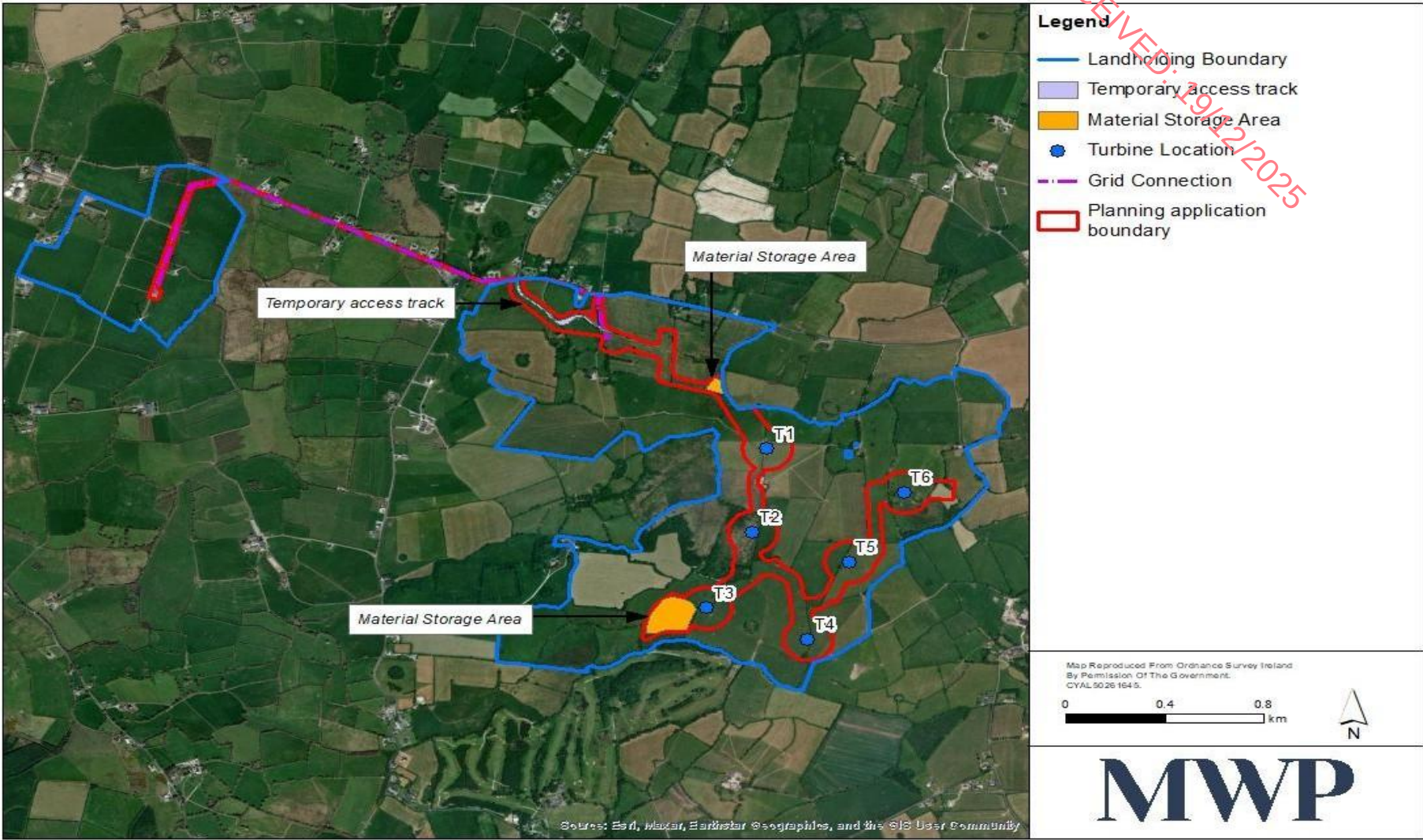


Figure 2-2: Infrastructure Layout

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3. Construction Works

3.1 Overview of the Construction Works and Machinery

Key elements of the civil works and activities associated with the construction phase of the development are as follows and are discussed in the following subsections:

- Site investigation work including pre-construction surveys;
- Site preparation and pre-construction activities;
- Construct temporary construction compound;
- Site drainage;
- Internal service tracks;
- Construction of the turbine bases;
- Installation of the proposed turbines;
- Construct substation control building and electrical compound;
- Complete electrical installation at the substation control building and compound;
- Commission and test plant;
- Complete site works, tidy up site;
- Demobilise offices; and
- Provide any gates, signs, etc. which may be required.

Mechanical machinery and electrical equipment typically used for construction projects will be required to construct the proposed wind farm and its ancillary infrastructure. The following is a non-exhaustive list of plant that is typically used for wind farm and heavy civil engineering work:

- 30-50T Excavators;
- 15-30T Excavators;
- Rubber Tired 15-20T Excavators;
- 3-10T Mini Diggers;
- Mobile Crane for construction;
- Rebar/shuttering/precast units/conc. pipes/box culverts etc 60t to 120t;
- Cranes (1 main, 1 assist) Erection 120t to 1000t;
- Telescopic Handler;

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- Tractors and trailers;
- Road grader;
- Double contained fuel bowsers;
- 12T Rollers;
- Diesel powered generators; and
- Water bowsers.

3.2 Wind Farm and Grid Connection Construction Schedule

The main components of the proposed development are as follows:

- Six (6) no. wind turbines, with a tip height of 158 metres, and all associated foundations and hardstanding areas;
- Approximately 3.4km of internal access tracks, associated drainage and turning areas;
- On-site interconnecting electrical cabling;
- On-site electrical substation;
- Excavated Material Deposition Areas;
- Grid connection comprising an underground cable route along the local road and adjacent lands to the existing substation at Carrons Wind Farm (Option A), or loop into the existing 38kV overhead line in Graigoor via the proposed 38kV substation (Option B);
- Turbine delivery route from port to site;
- A meteorological mast with a height of 90 meters;
- Temporary on-site construction compound;
- A clear span bridge crossing of the Ahacronane River and an associated 1.5m x 1.0m relief culvert within the floodplain;
- Off-site turbine delivery route works; and
- All associated site development works.

Subject to planning permission, it is envisaged that work would commence at the site in 2027, with a duration of 12 to 16 months. The wind farm construction works will be phased as outline 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; and

- 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	Vegetation clearance (to be completed prior to set-up of construction site)	1 month
Phase 2	Site preparation, pre-construction activities, temporary compound, site entrances	2 months
Phase 3	Construction of internal tracks, watercourse crossing & drainage infrastructure	3 months
Phase 4	Crane hardstand construction	2 months (1.5 weeks per turbine)
Phase 5	Turbine foundation construction	4 months (3 weeks per turbine)
Phase 6	Trenching & ducting – on-site	2 months
Phase 7	38kV Substation construction	6 months
Phase 8	Met mast construction	1 month
Phase 9	Turbine delivery	3 months
Phase 10	Turbine erection	4 months
Phase 11	Trenching & ducting – off-site for cable route	1 month
Phase 12	Wind farm commissioning	4 months
Total		12 - 16 months

3.3 Working Hours and Personnel

Construction activities will occur within the hours 07.00am – 7.00pm, Monday to Friday and 07.00am 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 proposed development and any changes in hours will be agreed with the Local Authority.

Works along public roads will be from 9.00a.m. to 5.00p.m. Monday to Friday and 9.00a.m. to 2.00p.m. on Saturdays.

A permit for moving abnormal loads will be sought from An Garda Síochána for the delivery of oversized wind turbine components (i.e. blades, nacelles and towers).

No work will take place on Sundays or bank holidays unless agreed in advance 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 proposed development would generate employment for 30 – 35

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. A further 3-5 personnel will be required for the export cable route works.

4. Construction Methodology and Environmental Mitigations

Key elements of the civil works and activities 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 walkover surveys;
- Pre-construction mammal surveys;
- Baseline water quality monitoring;
- Pre-construction invasive species survey; and
- Pre-construction 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 2-2. The temporary compound will be located in the northwest corner of the site adjacent to the proposed substation area. The compound will have a plan area of approximately 1,375m².

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 have to be put in place adjacent to the entrance and will have to 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 construction of the proposed 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. Figure 4-1 illustrates a typical construction compound on a wind farm.

Areas within the compound will be constructed as access tracks (in the same manner as those required to provide access between turbines) and used as vehicle hardstanding during deliveries and for parking. A bunded containment area will be provided within the compound for the storage of lubricants, oils, and site generators etc. The compound will be fenced and secured with locked gates. 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: Typical Temporary Site Construction Compound on a Wind Farm

4.4 Borrow Pit

There will be no on-site borrow pit for this proposed development. Construction materials, which will include stone and quarry-run material for various uses at the site, will be imported from local quarries. Limestone/sandstone will be used as capping for access tracks to assist in reducing sediment run-off during rainfall events.

4.5 Site Access

Access to the site will be via the Local Road network. A temporary site entrance will be established for the construction phase and a permanent site entrance will be established to provide access to the wind farm during operation. The temporary entrance will be located to the northwest of the site on the L1219 close to its junction with the L1220 and will only be used for the duration of the construction works (12-16 months). This will be used

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while also to satisfy the vertical alignment requirements of the turbine component delivery vehicles. See Section 4.7.2 for further details.

4.7 Site Drainage System and Water Quality Management

During the construction phase of the proposed development, there is potential for suspended sediment in surface water run-off from the construction work 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 installed adjacent;
- 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 watercourse or existing agricultural field drains. The silt fencing will slow overland flows and provide additional filtration of suspended solids prior to discharge entering watercourses. Silt fencing will be installed for the full length of any watercourse buffer where a track crosses a watercourse such as the Ahacronane river crossing between the substation and T1;
- 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 proposed wind farm drainage design is illustrated on Drawings 22569-MWP-00-00-DR-C-5006 and 22569-MWP-00-00-DR-C-5405. The proposed substation drainage layout is illustrated on drawing 22569-MWP-00-00-DR-C-5406.

Figure 4-3 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. In contrast, the subject site is relatively flat, resulting in lower runoff velocity, lower risk of sediment outflows and more controllable conditions.



Figure 4-3: Typical Three-tiered Settlement Pond with Stone Filter

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An additional flood relief culvert will be constructed under the site access track to the south of the bridge within the Ahacronane River floodplain. The culvert will be located 24m south of the southern riverbank. The culvert will consist of a precast box culvert providing a clear 1.5m wide x 1.0m tall conduit. The base of the precast culvert will be set a minimum of 300mm below existing ground level and reinstated to existing level with spoil and topsoil. Cable trenching will be installed in a trench adjacent to the site access track above the top of the relief culvert.

The bridge and culvert layouts and details are shown on Drawing 22569-MWP-00-00-DR-C-5413 and 22569-MWP-00-00-DR-C-5414.

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 Ballynisky Wind Farm 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 (see references).

For the construction of access tracks, the following best practice construction measures will be implemented:

- Construction of interceptor drains to divert run-off away from the upgradient side of tracks, with clean run-off being diverted under the tracks to the down gradient side where the need arises i.e. if there is significant gradient between the up and down slope sides of the access tracks;
- Access track culverts will be used, where required, to divert clean water to run-off to vegetated areas; and
- Temporary swales and or ponds will be provided on the downgradient side of the tracks to collect dirty water running off from the construction area. If necessary, silt curtains or silt busters will be used to clean sediment laden run-off prior to distribution over vegetation on the down gradient side of the tracks.

For construction of the turbine bases the following mitigation measures will be implemented;

- Construction of interceptor drains to divert run-off away from the upgradient side of the excavations with clean run-off being diverted around excavations to the down gradient side where there is significant gradient between the up and down slope sides of the excavations;
- Excavations will have a level base with a sump to allow sediment laden water either to percolate to ground or where required to be pumped out; and
- Temporary ponds will be constructed to contain sediment water collected from the excavations. The ponds will be designed to allow flow through the end via a silt curtain or else silt busters will be used to contain silt with clean water allowed to disperse over vegetation downstream of the temporary pond.

All temporary ponds and culverts will be back filled post construction and the areas revegetated as soon as possible.

In areas where potentially hazardous materials are handled the following will be implemented:

- All refuelling of plant and equipment will take place either off-site or at a dedicated impervious refuelling area in the construction compound;
- Where plant such as construction cranes require refuelling, this will be undertaken using fuel bowsters provided with double containment. The refuelling bowster shall also be fitted with spill containment kits;
- Where fuels are stored on site they will be located in bunded containment areas. No concrete batching will be undertaken on the site;
- No disposal of excess concrete or cleaning of concrete delivery trucks will be permitted on the site; and
- Concrete works will only be permitted in favourable weather conditions.

4.7.3 Water Quality Monitoring

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 and post construction phases.

It is proposed to undertake baseline water quality monitoring of the Ahacronane River along the northeast site boundary and of its tributary stream along the northwest site boundary before the construction works commence. Monitoring will also be undertaken on a monthly basis over the course of the construction programme to ensure that the works are not impacting on surface water quality downstream of the site.

The parameters analysed will include:

- pH;
- Suspended solids;
- Ammonia;
- Orthophosphate and total phosphorous;
- Nitrate;
- Nitrite;
- Chloride; and
- Biochemical oxygen demand (BOD).

The results will be compared to the Surface Water Environmental Quality Standards (EQS) in the Surface Water Regulations (SI-272 of 2009 and subsequent amendments 2017 and 2019). The Construction Site Manager will also be responsible for undertaking routine inspections of the surface water drainage system (drains streams and rivers) to ensure that the construction works do not impact on surface water quality.

4.8 Traffic Management

A detailed Traffic Management Plan (TMP) has been prepared and is included in Appendix 14A. 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 Limerick City and County Council and with An Garda Síochána 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 site will have two entrances, one to the northwest and one to the northeast. The northwest entrance will be used as a temporary entrance for all construction activities. Widening of the access track to allow for two-way traffic will be done at specific locations to allow vehicles to pass on another and enter and exit through this entrance. The north-eastern entrance will only be used for the operational phase. Should planning be granted, the final TMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by Limerick CCC. 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 Excavated Material Management and Volumes

It has been calculated that there will be approximately 48,100m³ of excavated spoil material (soil and subsoil) excavated during the construction of the wind farm. The calculated volume of excavated material is summarised in Table 4-4.

Some of the surplus excavated topsoil and subsoils will be re-used on-site in reinstatement, revegetation and landscaping works. Crane hardstanding areas, delivery vehicle turning heads and temporary tracks which are required for the construction phase will be revegetated by covering the crushed rock material with a geotextile layer and placing surplus topsoil generated through the construction of the onsite tracks on top of the geotextile layer. The topsoil will be reseeded where necessary.

The remaining surplus material will be stored in two (2) permanent storage areas onsite. One spoil deposition area will be located on lands southwest of T3 and the other will be to the east of the temporary construction compound (Figure 4-5). The area to the southwest of T3 has an approximate storage volume of 36,000m³ and the other on the east of the temporary compound has an approximate storage volume of 3,300m³. Spoil will be stored to a maximum height of 2m with a maximum batter ratio of 1V:3H. It is anticipated these areas will be covered by surplus topsoil and revegetated/planted in line with the Biodiversity Enhancement Management Plan (BEMP) (Appendix 6G). The shallow batter angle allows for the plants and vegetation to be maintained using agricultural vehicles.

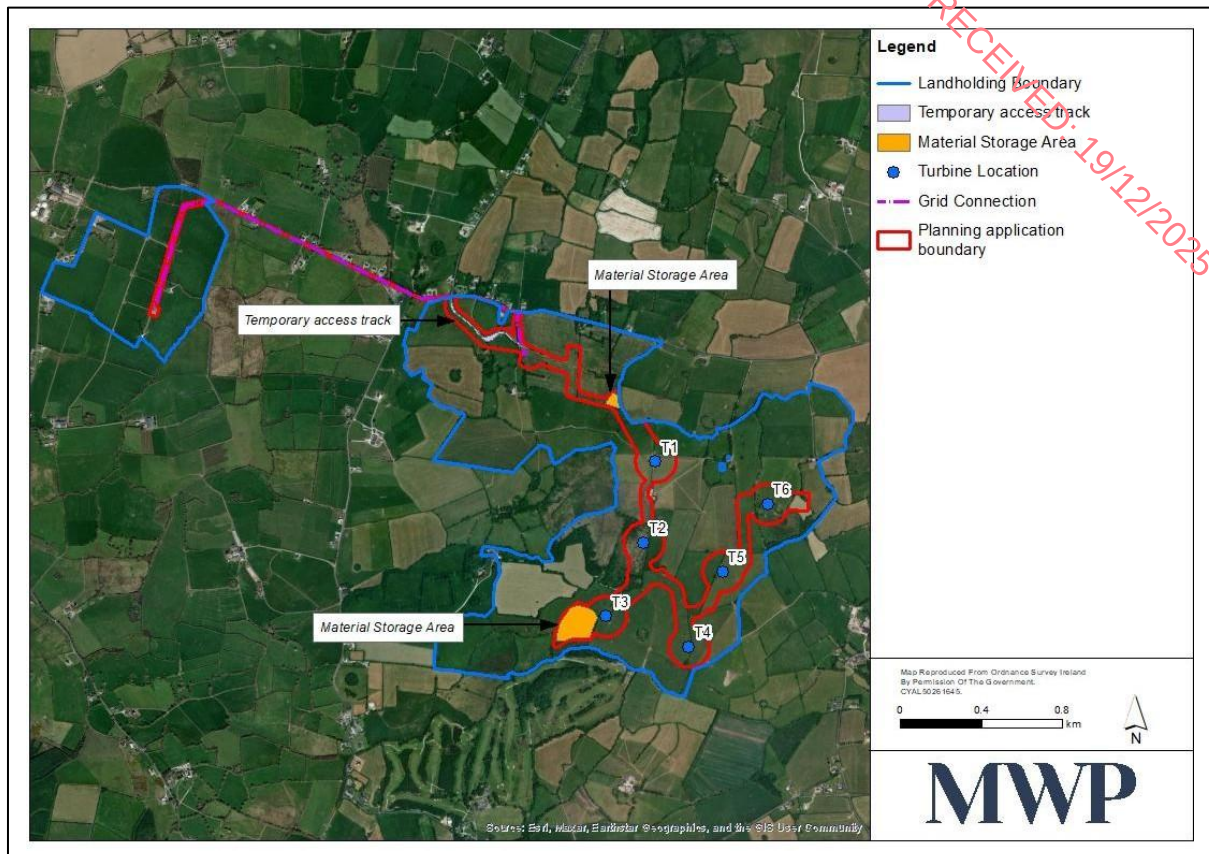


Figure 4-5: Soil Deposition Areas

Table 4-1: Spoil Excavation and Construction Material Volumes

Item	Quantity (m ³ unless specified)
<u>Excavation</u>	
Length of new internal tracks	3,400 m
Length of upgraded internal tracks	470 m
Excavation for turbine bases	14,778
Excavation for crane hardstands	7,830
Excavation for substation	700
Excavation for construction compound	705
Imported stone for met mast	430
Excavation for cable route	5,184
Volume of subsoil to be excavated	28,064

Item	Quantity (m ³ unless specified)
Volume of topsoil to be excavated	20,042
Total volume of excavated material	48,107
<u>Re-Use & Storage On-Site</u>	
Volume of subsoil to be re-used on-site	1,555
Volume of topsoil to be re-used on-site	11,694
Volume of subsoil/topsoil/rock to be stored on-site	34,858
Total volume retained on-site	48,107
<u>Imported</u>	
Imported stone for tracks	20,700
Imported stone for turbine bases	4,825
Imported stone for crane hardstands	11,745
Imported stone for met mast hardstand	750
Imported stone for construction compound	963
Imported stone for substation compound	1,400
Imported stone for cable route	2,160
Total volume of imported stone required	42,543
Concrete for bases (6 @ 800 m ³ each)	4,920
Concrete for substation & met mast foundations	90
Reinforced steel for turbine bases (6 @ 80 tonnes each)	480 t

4.10 Wind Turbines and Hardstands

4.10.1 Wind Turbine Model, Colour and Location

The turbine model will be a Vestas 136, with a rotor diameter of 136m, a tower (hub) height of 90m and a tip height of 158m. The turbine will be certified under the International Electrotechnical Commission IEC 61400-1 safety standards or equivalent and will be designed to withstand the environmental conditions encountered on site. Requirements for finish and colour are set out in the 2006 Wind Energy Development Guidelines as follows:

- Turbines shall be finished to a white, off-white or light grey colour to correspond with the colour scheme; and
- All surfaces will have a matt non-reflective finish.

The draft 2019 Wind Energy Guidelines have the same turbine finish and colour requirement. It is proposed to install lighting on the turbines in a pattern that is acceptable to the Irish Aviation Authority (IAA) for aviation visibility purposes.

Turbines will be of modern design and will comprise a steel tube tower fixed to a reinforced concrete foundation. The tower will support a nacelle and rotor hub. Three (3) aerofoil blades will be fixed to the rotor hub. Commercial wind turbine hubs and towers are made of steel, while the blades can be made of a matrix of glass-fibre reinforced polyester or wood-epoxy or a similar composite material.

For illustration and further details of specification, refer to Planning Drawing 22569-MWP-00-00-DR-C-5401.

It is proposed to install six (6) no. wind turbines each with a maximum tip height of up to 158 metres (m). The turbine co-ordinates are detailed in Table 4-2.

Table 4-2: Turbine Co-ordinates

Turbine No.	Grid Coordinates (ITM)	
	Easting (X)	Northing (Y)
T1	529899	643084
T2	529841	642685
T3	529655	642322
T4	530064	642172
T5	530232	642542
T6	530454	642876

4.10.2 Foundation, Crane Hardstands and Laydown Areas

Each turbine will be supported by a reinforced concrete base or foundation with a central upstand above the base which will be excavated to good ground bearing levels. The foundation will bear onto rock, or other such suitable bearing stratum determined during pre-construction site and geotechnical investigations. The foundation base will be approximately 28m in diameter and installed to an excavation depth of approximately 3m below ground level, depending on ground conditions. Piled foundations may be required subject to the findings of the geotechnical ground investigation which will be carried out prior to the construction phase. Once completed, a portion of the foundation (typically a 6m $\varnothing$ concrete plinth) will be raised above existing ground level by 0.05m to help prevent groundwater ingress to the turbine tower base. Refer to Planning Drawing No. 22569-00-00-DR-C-5401 for further details on foundations.

Each wind turbine will have an associated main crane hardstand area, two (2) support crane hardstanding areas and a temporary laydown area adjacent to the foundation. Crane hardstands and temporary lay down areas are required to accommodate the delivery and temporary storage of the turbine components prior to their erection and to support the craneage operations during turbine erection. The crane hardstanding areas also support maintenance of the wind turbine during the operational life of the development.

The hardstand areas will be excavated and bear onto rock (or other suitable bearing stratum) with a foundation depth of 0.5 -1.5m depending on the local bedrock profile and the varying depth to competent soil. The main crane hardstand and component storage area is proposed to be approximately 1,725m² (69m long x 25m wide). The two (2) support crane hardstanding areas are proposed to be approximately 174m² each. The additional temporary storage area for turbine blade and tower components adjacent to the main crane hardstand is proposed to be approximately 1,617m² (77m long x 21m wide). The hardstanding and temporary laydown areas

at each turbine will remain in place during the lifetime of the wind farm but will be reinstated with a layer of soil and revegetated following construction.

For illustration and further details of dimensions, refer to Drawing 22569-MWP-00-00-DR-C-5402.

4.11 Electrical Transmission / Distribution

4.11.1 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 track edge (as illustrated on Drawing 22569-MWP-00-00-DR-C-5006). Access to the cable ducting is provided by intermittent chambers and pull pits at defined locations adjacent to the access track infrastructure.

Existing overhead low voltage powerlines are present onsite. In the vicinity of the proposed substation, T1 and the met mast the overhead lines may need to be diverted or undergrounded if required by the distribution network operator ESB Networks. Any diversion or undergrounding works undertaken will be completed following agreement with ESB Networks and in accordance with their specifications and requirements.

4.11.2 Wind Farm Substation

The proposed onsite 38kV wind farm substation will occupy an area of approximately 1,228m² and will comprise an outdoor electrical yard and a single storey building.

The substation building will be approximately 160m² in area and contain a control room, communications room, ESB room, switchgear room and storeroom. It will be approximately 6.2m in height, with pitched roofs and an external blockwork and plastered finish.

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.

During operations, access to the substation will be from the L1219 local public road via an existing farm entrance track, as shown on Figure 2-2 and Drawings 22569-MWP-00-00-DR-C-5005 and 22569-MWP-00-00-DR-C-5406.

An example of a typical substation compound similar in scale and design to that proposed is shown in Figure 4-6.



Figure 4-6: Example of a Substation Compound

4.11.3 External Grid Connection

In order to connect the wind turbines to the National Grid, two potential options are being considered. The first option involves installing approximately 2.54km of 38kV underground electrical cable will be installed along the L1219 local road to the north extending west to connect the wind farm substation to the existing Dunmoylan 38kV substation at Carrons Wind Farm.

The alternative option involves connecting into an existing 38kV overhead line that transects the site before continuing to the 110kV substation in Rathkeale. This option would include diverting the line at a pole location and running it underground to the 38kV substation proposed on site and back out to reconnect with the overhead line at the next existing adjacent pole location.

The proposed grid connection routes are shown in Figure 4-7 and is subject to agreement with ESB Networks.

Laying of underground cabling will require trenching in accordance with standard ESB Networks requirements, to a typical depth of ca. 1.2m and a width of 0.60m, insertion of ducting, backfilling of trenches and subsequent pulling of cable (typically 400mm² XLPE insulated cable). Trenching and surface finishing will be completed in accordance with the Guidelines for Managing Openings in Public Roads as discussed with Limerick City and County Council. A typical cable trench detail is provided in Drawing 22569-MWP-00-00-DR-C-5415.

Cable trenching in the public road will be carried out in the road edge or in the grass verge where it exists. This will be done under the terms of road opening licences from Limerick City and County Council. Road closure applications may also be required. All works will be planned and undertaken in full consultation with Limerick City and County Council, in particular the Roads Department and the Roads Engineer for the area.

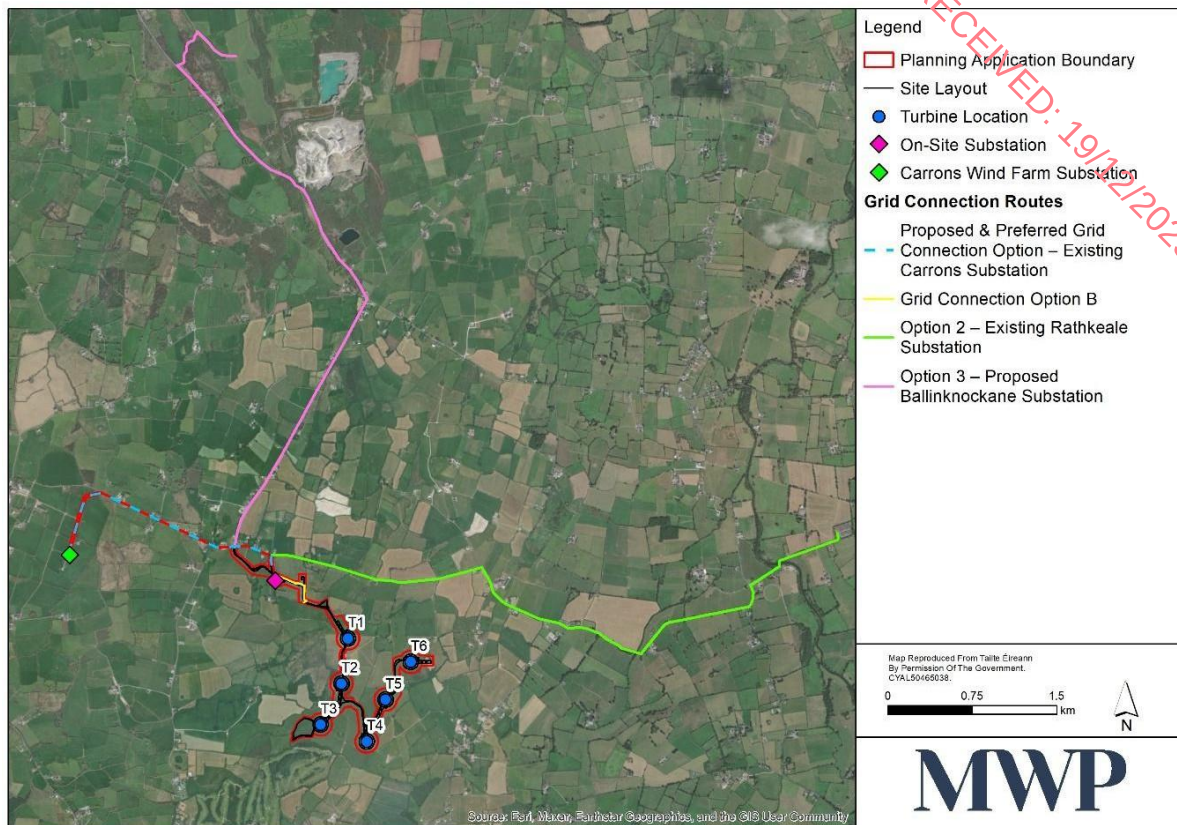


Figure 4-7: Grid Connection Routes

4.12 Permanent Meteorological Mast

A permanent meteorological mast will be erected within the site to monitor the local wind regime while the wind farm is in operation. It will be 90m high (in line with the hub height of the proposed turbines) and located to the east of the wind farm substation.

The mast will have a foundation of approximately 36m² and hardstanding area of 572 m² (22m wide x 26m long). It will be equipped with tower-mounted meteorological instruments and telecommunication equipment and will be enclosed by a powder coated steel palisade fence, 2.4m in height.

For further details, refer to Planning Drawing 22569-MWP-00-00-DR-C-5403.

A photo of a typical meteorological mast is shown in Figure 4-8.



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Figure 4-8: Example of a Meteorological Mast on a Wind Farm

4.13 Turbine Delivery Route

The wind turbines proposed will have an overall tip height of 158 metres. The components (nacelle, tower, blades) will be delivered to Foynes Port by sea and transported to the site along the national, regional and local road network to site where they will enter via the temporary site entrance. Refer to Planning Drawing 22569-MWP-00-00-DR-C-5008 and Figure 4-9. A turbine delivery assessment report has been prepared and is attached as Appendix 3A.

The components for each turbine are expected to be delivered by road in approximately 90 no. deliveries. Due to their abnormal size, blades and towers will be delivered at night to avoid disruption to daytime traffic. The turbine blades will be the longest components to be transported from port to site at approximately 68m in length and the base tower sections will be the heaviest at 85 tonnes. The blades will be transported on a blade adapter vehicle which will allow the blade to be raised to an angle of 60 degrees to the horizontal. This will allow the blades to negotiate bends and junctions along the delivery route without requiring excessive clearing or road widening works. A permit for moving abnormal loads will be sought from An Garda Síochána for the delivery of oversized wind turbine components (i.e. blades, nacelles and towers).

The delivery route extends eastwards from Foynes along the N69 and turning onto the local road network, as follows:

- Starting at Foynes Port use the port access road to reach the N69 junction.
- Turn left and head southwards on the N69 for 1.8km.

- Turn right onto the L1222 and travel southeast for 5.1km to Creeves Cross.
- At Creeves Cross, turn right and head south for 2.5km to the temporary site entrance located at the L1219 T-junction.

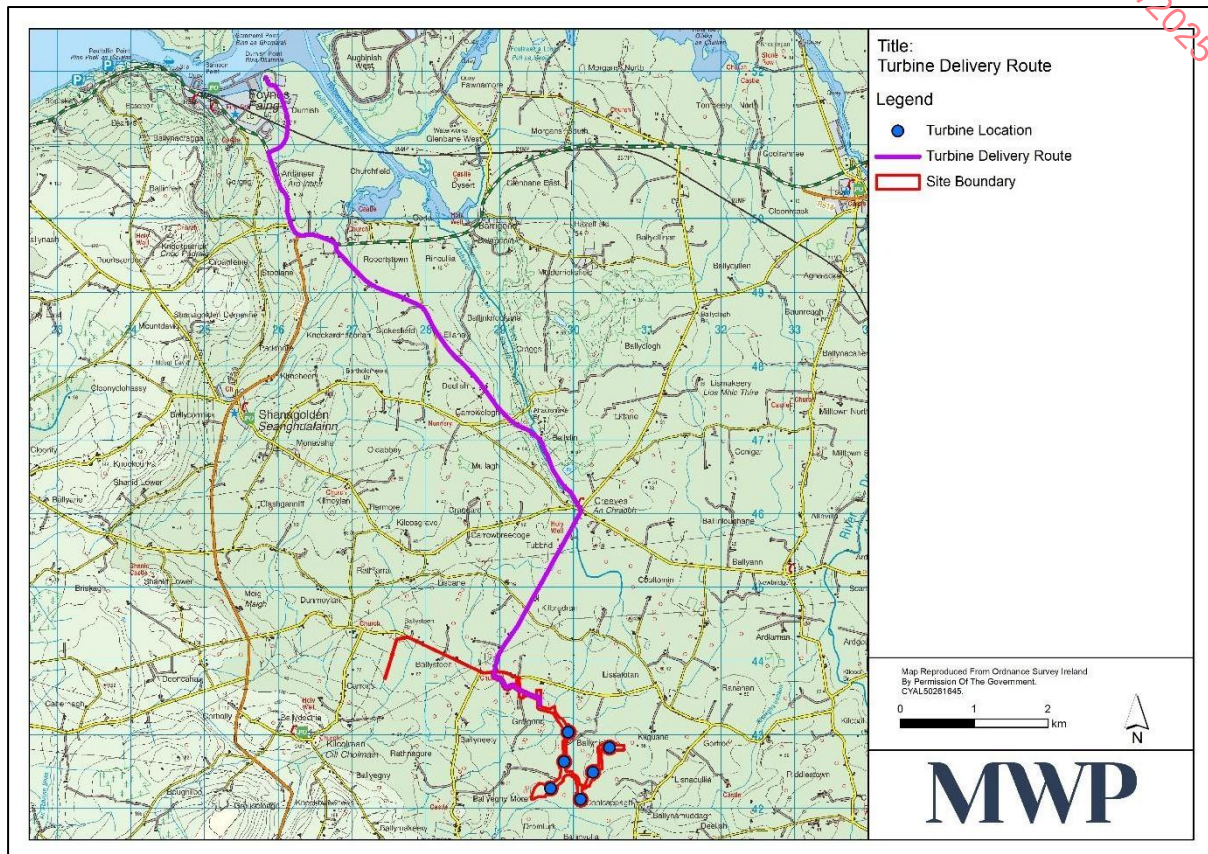


Figure 4-9: Proposed TDR Ballynisky Wind Farm

4.14 Turbine Erection

The erection of turbines will occur in the last month of the construction phase. The erection of turbines is typically phased at an average of one turbine per week. The erection of turbines is a specialist process with specially designed large-scale cranes required to erect the turbine components. The cranes 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.

The wind turbine components will be delivered from port to each turbine location following the route as outlined Section 4.13. Wind turbine components will be unloaded and stored at the turbine location in accordance with a Lift and Temporary Storage Plan to be developed by the lifting contractor and turbine manufacturer. The plan will ensure the minimal manoeuvring of the components during turbine erection and to avoid double handling of components on the hardstanding and temporary storage areas. The most appropriate turbine assembly sequence will be decided by the lifting contractor and the turbine manufacturer well in advance of turbine erection and lift plans generated for same circulated to the PSDP and Project Manager for consideration.

One large crane will be required for erecting the turbines, supported by smaller assist cranes. As with all other vehicles, refuelling of cranes will be carried out in accordance with site procedures detailed in this report to minimise the risk of spillage or pollution. Work on assembly will not start until a suitable weather window is available.

The Project Manager for the site will notify Limerick City and County Council and the Irish Aviation Authority (IAA) 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 IAA.

4.15 Wind Farm Commissioning

The final stage of the proposed development 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 Overview

The detailed Contractor's CEMP shall fully address the requirements outlined in this preliminary CEMP and any updated or new supplementary environmental reports made available to the Contractor as necessary. The CEMP shall also comply with the requirements of the relevant authorities/environmental bodies. The CEMP shall be prepared by the Contractor and submitted to Limerick City and County Council for approval prior to works commencing on-site.

It shall be prepared in sufficient detail to describe the framework of the Contractor's proposed management, control and mitigation strategy for each environmental aspect. Consideration will also be given to relevant adjacent developments in the management of future construction activities on Site. The CEMP will include, where required, specific Method Statements for specific works and these will be included in Appendix 1. The CEMP shall be developed/updated as necessary during the course of the design and construction phases and will be reviewed on a regular basis with Limerick City & County Council as necessary.

5.2 Environmental Aspects and Impacts

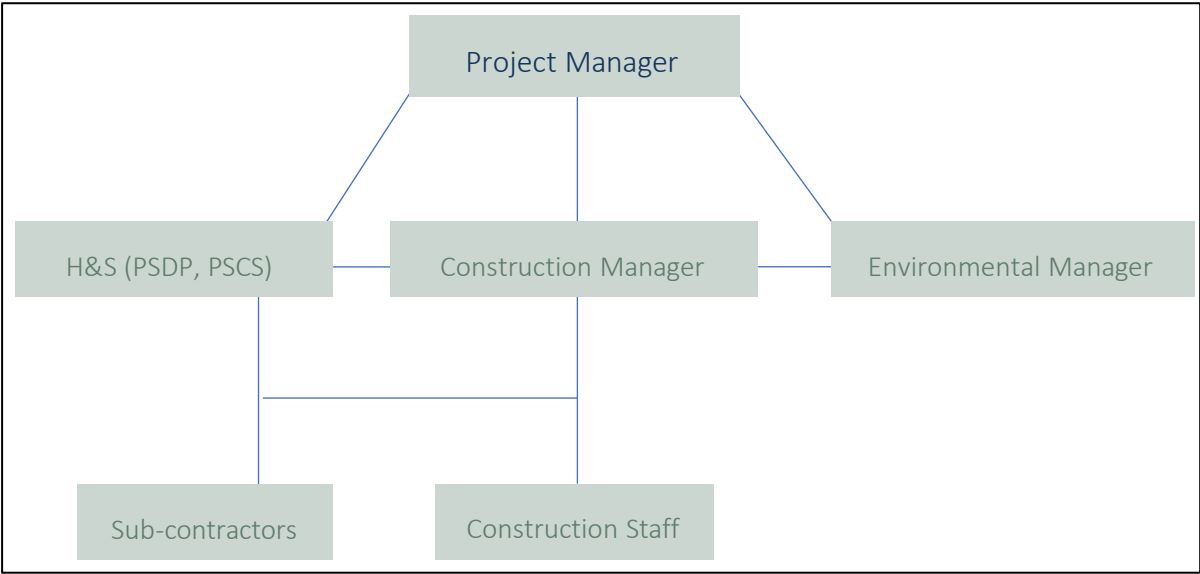
The Contractor will prepare a project specific Environmental Risk Assessment (ERA) which will include the following:

- Environmental guidelines on how to prepare an ERA;
- Monitoring and checklists that shall be implemented to manage the environment;

- Environmentally sensitive area(s) and control measures to be implemented on-site which will be included as an appendix to the CEMP; and
- The procedure for undertaking an ERA to assist in the identification of environmental aspects of the project's activities, products and services.

5.3 On Site Organisational Structure and Responsibility

The Organisational Structure for the Contractor's Project Team is illustrated in Figure 5-1. This structure is defined by the Contractor and will include the names of the assigned personnel with the appropriate responsibility and reporting structure reflected.



*H&S – Health and Safety

*PSDP – Project Supervisor Design Process

*PSCS – Project Supervisor Construction Stage

Figure 5-1: Contractors Organisational Structure

The Contractor will select the Project Team for the construction of the proposed development. 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.

5.4 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 of environmental damage 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); and
- The Environmental Manager - ensures that the CEMP is developed, implemented and maintained. The Environmental Manager's tasks at the construction site are described below at Section 5.4.4. 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:

- Health and Safety (PSDP and PSCS);
- Waste Management Coordinator (report to the Environmental Manager); and
- Geotechnical Engineer (as required by Design Engineer).

5.4.1 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:

- Liaising with the Environmental Manager to ensure all aspects of the Construction and Environmental Management Plan (CEMP) are implemented;
- 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.

5.4.2 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:

- Site-Specific Method Statements:
 - Liaising with the Environmental Manager in preparing site-specific Method Statements for all Works activities where there is a risk of environmental damage, 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.
- General:
 - Being aware of all projects 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 work 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.

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5.4.3 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.

5.4.4 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; and
 - 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 of environmental damage. 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); and
 - 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 proposed development;
 - 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; and
 - 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; and
 - 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 proposed development;
- 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; and
- 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 proposed development 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.

5.4.5 Other Roles

5.4.5.1 Ecological/Environmental Clerk of Works (ECoW)

A suitably qualified and experienced project ecologist will be employed during the construction phase of the development. Duties will include the review of all method statements, delivery of toolbox talks and monitoring of construction phase activities to ensure all environmental controls and EIAR mitigation is implemented in full. The ECoW will closely work with the Environmental Manager.

The project ecologist 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.

5.4.5.2 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; and
- All other required legal duties.

5.4.5.3 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; and
- Liaison with the Project Manager/client/developer.

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

5.4.5.5 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; and
- Providing advice on geotechnical aspects of the works.

5.4.5.6 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; and
 - An unauthorised discharge to ground, water or air, damage to a protected habitat, etc.

5.5 Contacts

5.5.1 Main Contractor Contacts

Refer to Table 5-1 for the main contractor contact details to be provided once they have been confirmed.

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*

5.5.2 Employer Contacts

Refer to Table 5-2 for the employer contact details to be provided once they have been confirmed.

Table 5-2: Employer Contacts

Position Title	Organisation	Name	Phone	Email
Employer				
Employer's Representative				

5.5.3 Third Party Contacts

Refer to Table 5-3 for the third-party contact details to be provided once they have been confirmed.

Table 5-3: Third Party Contacts

Organisation:	Position:	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	Limerick City & County Council	Limerick County Merchants Quay, Limerick, V94 EH90	(061) 556000	customerservices@limerick.ie
Health and Safety Authority	Health and Safety Authority		(01) 6147000	wcu@hsa.ie
An Garda Síochána	Henry Street Garda Station Newcastle West Garda Station	Henry Street Limerick	(061) 212400 (069) 20650	

Organisation:	Position:	Name/Address:	Phone:	Email Address:
		Churchtown Road, Newcastle West, Co. Limerick		
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. 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 and Land and Soils
EMP-2	Surface Water Management and Run-off Control
EMP-3	Fuels and Oils Management
EMP-4	Management of Concrete
EMP-5	Construction Noise and Vibration
EMP-6	Construction Waste Management Plan
EMP-7	Construction Traffic Management Plan
EMP-8	Construction Dust and Air Pollution Management
EMP-9	Ecological Management Plan for the Protection of Habitats and Fauna

Ref:	Procedure:
EMP-10	Landscape and Visual Management Plan
EMP-11	Cultural Heritage Management Plan
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

7. Auditing, Monitoring and Response

The Environmental Monitoring Schedule for construction will also provide for the checking of equipment, materials storage and transfer areas and specific environmental controls.

A Preliminary Monitoring Schedule is provided in Table 7-1 and will be finalised pending appointment of the Contractor.

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		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)	Regular/daily/weekly during the construction phase as well as during and after significant rainfall events	Environmental Manager
	Discharges from on-site sediment and erosion controls	Visual inspection	Colour, presence of silts		Environmental Manager
Water quality monitoring	Discharges from on-site sediment and erosion controls	Visual inspection	- Unacceptable level of sediment/silt on the access track surface - Presence of waste	Weekly	Environmental Manager
	Internal site tracks	Visual inspection	Unacceptable level of sediment/silt on the access track surface	Daily	Environmental Manager
	Site Entrance		- Presence of waste - Surface Condition		
	Water quality sampling at watercourses draining site	Water Samples	Minimum parameters: pH, Suspended Solids, metals, nitrates, phosphates	Monthly	Environmental Manager

Aspect	Area of Inspection	Monitoring Required	Note/Checks	Frequency	Responsibility
	Water quality sampling at watercourses draining site	Water Samples	Turbidity monitoring	Daily turbidity monitoring at outflows from the settlement ponds	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
Archaeology	Area of ground works & excavations	Visual Inspection	Archaeological monitoring during ground works & excavations	To be scheduled with ground works & excavations	Archaeologist
Ecology	Material and Waste Storage	Daily	Integrity of silt-retaining measures down-gradient of stockpiled materials	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
	Concrete pours	Visual inspection	Run-off / spills	Weekly	Project Manager
Operation Control	Dust generation	Visual Inspection	- Cleanliness of tracks and compound area - Dust at stockpiles - Dust from delivery vehicles	To be scheduled with pours	Project Manager

The Contractor will assign an on-site Environmental Manager to monitor the construction activities on a day-to-day basis. The duties will include completing the required checklists and coordinating with the relevant personnel (e.g. Project Ecologist, Project Archaeologist and the Design Engineer as required) ensuring all environmental monitoring is carried out.

These records and results will be maintained by the Site Manager and will be stored on site during the construction phase.

The Contractor will develop daily site checklists that will include the information shown in Table 7-2 at a minimum:

Table 7-2: Site Checklist

Area of Inspection	Environmental Hazards
Sediment settlement ponds	- Leaks - Cracks/broken plastic piling - Build-up of sediment
Silt filters	- Missing filters - Blocked filters – build-up of sediment
Cut off swales and conveyance swales	- Damage - Silt build-up - Blockages in the pipes conveying the runoff to the settlement pond drains
Cross drains – located under drain crossings	- Damage - Silt build-up - Blockages in the pipes
Post and wire boundary fence	- Signs of movement (i.e. not in a straight line) - Damaged or fallen sections of fence
The land adjacent to the development	- Presence of waste - Presence of construction equipment - Presence of invasive species identified during the preconstruction survey
Site tracks	- Unacceptable level of sediment/silt on the track surface - Presence of waste
Site compound – storage area	- Damage - Untidiness
Site compound – waste collection area	- Damage - Untidiness - Full skips
Site compound – oil storage area	- Damage to containers or ancillary equipment - Leakages - Unlocked storage container
Dry wheel wash	Build-up of sediment
Waste water facilities	Holding tank requiring emptying
Concrete chute washout area	- Damages - Leakages - Unacceptable level of concrete washings
Site Entrance	- Unacceptable level of sediment/silt on the track surface - Presence of waste

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 must 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 will be investigated and remedial action taken as necessary. The Contractor will ensure that the following response actions will take place:

- 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;
- The Project Manager will conduct/co-ordinate an investigation to determine the potential influence that could have led to the non-compliance;
- The Project Manager will notify and liaise with the appropriate site personnel where required, e.g., Site Environmental Manager, Project Ecologist, Project Archaeologist;
- 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;
- If necessary, the Project Manager will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident;
- The details of the incident will be recorded on an Incident / Complaints Form which will 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;
- 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; and

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

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Appendix 1

Environmental Management Plans

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Appendix 1

Environmental Management Plans

- EMP-1 Management of Excavations and Land and Soils
- EMP-2 Surface Water Management and Run-off Control
- EMP-3 Fuels and Oils Management
- EMP-4 Management of Concrete
- EMP-5 Construction Noise and Vibration
- EMP-6 Construction Waste Management Plan
- EMP-7 Construction Traffic Management Plan
- EMP-8 Construction Dust and Air Pollution Management
- EMP-9 Ecological Management Plan for the Protection of Habitats and Fauna
- EMP-10 Landscape and Visual Management Plan
- EMP-11 Cultural Heritage Management Plan
- 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

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EMP 1: Management of Excavations and Land and Soils

Purpose

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

Procedure

Excavations:

Some of the surplus excavated soil and subsoil material will be re-used on-site in reinstatement and landscaping works. The remaining surplus material will be stored in two (2) permanent deposition areas onsite. One spoil deposition area will be located on lands southwest of T3 and the other will be to the east of the temporary construction compound. The area to the southwest of T3 has an approximate storage volume of 36,000m³ and the other on the east of the temporary compound has an approximate storage volume of 3,300m³. Spoil will be stored to a maximum height of 2m with a maximum batter ratio of 1V:3H. These areas will be covered by surplus topsoil and revegetated or planted. The shallow batter angle allows for the plants and vegetation to be maintained using agricultural vehicles. The following will be undertaken as part of the excavation management on site:

- 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;
- Drainage and associated pollution control measures will be implemented on site before the main body of construction activity commences;
- Soil Stripping:
 - The timing of the construction phase soil stripping and excavation works will take account of predicted weather, particularly rainfall;
 - Soil stripping activities will be suspended during periods of prolonged rainfall events; and
 - The area of exposed ground will be kept to a minimum by maintaining where possible existing vegetation that would otherwise be subject to erosion in the vicinity of the wind farm infrastructure. The clearing of soil will be delayed until just before construction begins rather than stripping the entire site months in advance particularly during access track construction.
- Storage and Stockpiles:
 - Excess spoil material will be stored on site in the two (2) designated deposition areas;
 - Temporary stockpiles of excavated spoil, stored in the footprint of the excavation areas, will then be directed for use in backfilling, landscaping and restoration or placed in the deposition areas on site;
 - Stockpiles of stripped topsoil will be in locations with minimum trafficking to prevent damage and dusting;
 - Reusable excavated sub-soils and aggregate will be stored in temporary stockpiles at suitably sheltered areas to prevent erosion or weathering and shall be shaped to ensure rainfall does not degrade the stored material;
 - Where unsuitable material is encountered this will be removed to the soil deposition areas for permanent storage;

- Stockpiled materials will be located at least 50m away from drainage systems and silt retaining measures (silt fence, / silt curtain or other suitable materials) to reduce risk of silt run-off shall be installed along the downgradient edges of stockpiled earth materials; and
- In the two permanent soil stockpile areas, spoil will be stored to a maximum height of 2m with a maximum batter ratio of 1V:3H. These areas will be covered by surplus topsoil and revegetated/planted in line with the Biodiversity Enhancement Management Plan. The shallow batter angle allows for the plants and vegetation to be maintained using agricultural vehicles.

Land use and Erosion:

- To reduce the potential effect of changing the land use associated with the footprint of the proposed development, the footprint of the works has been minimised to avoid unnecessary soil sealing, disruption, etc;
- Material extraction will be minimised as much as possible;
- A minimal volume of soil and subsoil will be removed to allow for infrastructural work to take place in comparison to the total volume present on the site due to optimisation of the layout by mitigation by design;
- A minimal volume of material will be imported to accommodate the works. This material is required for access track construction, hardstand construction and other structures such as the compound and storage facilities;
- Turbine locations, the alignment and rotation of the hardstands, and the routes of proposed new access tracks were designed to optimise the balance between access criteria and the required volumes of excavated and imported materials;
- The turbine 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;
- The proposed grid route options are located in so far as possible to the connection point in order to minimise the length of cabling to connect the wind farm to the grid and within the existing road network, thereby not impacting on current land use; and
- The implementation of erosion and sediment controls will be made prior to the commencement of site clearance works. Silt traps, such as geotextile membrane, will be placed in the existing drainage network prior to construction work. These will be inspected weekly by a suitably qualified and experienced civil / structural engineer and cleaned regularly as required.

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; and
- All responsibilities will be finalised by the Appointed Contractor.

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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.

Procedure

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 installed adjacent;
- Dirty water drains will be installed around the perimeter of all designated material storage areas prior to the excavation or placement of any materials within the storage area;
- 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. All outfalls from settlement ponds will be located outside the 50m buffer from rivers or streams;
- 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 entering watercourses. Silt fencing will be installed for the full length of any watercourse buffer where a track crosses a watercourse including the crossing of the Ahacronane River between the substation and turbine T1;
- 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 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 a 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 leave the sump. 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. These are routine measures which are known to work and are designed to prevent materials entering waters.
- Drainage System Inspection & Maintenance will include:
 - The drainage and treatment system will be managed and monitored and particularly after extreme rainfall events during the construction phase. Controls will be regularly inspected and maintained to ensure that any failures are quickly identified and repaired so as to prevent water pollution. A programme of inspection and maintenance will be designed and dedicated construction personnel assigned to manage this programme. A checklist of the inspection and maintenance control measures will be developed and records kept of inspections and maintenance works.

The following mitigation measures will be implemented during construction:

- 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 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;
- Temporary Construction Compound:

- Drainage within the temporary site compound will be directed to an oil interceptor to prevent pollution if any spillages occur;
- No domestic wastewater discharges to the environment. Temporary toilet facilities will include an integrated wastewater holding tank which will be emptied routinely by a licenced waste contractor;
- 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.

The proposed export cable route (Option A) will require two (2) watercourse crossings. One of the crossings will be along the public road and the other will be in private land at the western end of the export cable route. Directional drilling will be employed to construct the watercourse crossings for the export cable route. The directional drilling process involves deepening the cable trench at a defined slope as it approaches the watercourse down to a sufficient depth below the watercourse. The trench will then pass under the watercourse and begin to raise at a defined slope until it reverts to the standard trench depth (1.2m). The direction drill will be carried out as follows:

- The directional drilling machine will set up at a launch and reception pit (an enlarged cable trench, i.e., a cable trench on either side of the crossing point at an appropriate distance back from the watercourse);
- The drill will then bore in an arc under the watercourse feature;
- The drilling head of the boring tool has a series of nozzles that feed a liquid bentonite mix along the bore direction, which provides both lubrication and seals the cut face of the bore;
- Once the bore reaches the far side, the HDPE duct is then attached to the drill head and the duct is pulled back along the route of the bore to the original drilling point;
- Any bentonite mix is deposited within the bore shaft and spillage is collected at either end of the bore with a dedicated sump; and
- Once the duct is in place under the watercourse, the normal process of trenching can continue from either side of the launch and reception pits. Launch and reception pits at the river crossings will be backfilled.

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; and

- Water Monitoring Programme to include monitoring of streams and from end points of the drainage system and visual monitoring of sediment and erosion control measures.

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; and
- The Construction Manager (or a designate) is responsible for ensuring the spill kits are adequately stocked and should inform the Environmental Manager when items have been used.

Reference

Surface Water Management Plan (Appendix 3E).

Planning Drawing 22569-MWP-00-00-DR-C-5006.

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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

- Refuelling of Construction Plant On-Site:
 - Refuelling will be carried out using 110% capacity double bunded mobile bowzers. 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;
 - Plant nappies or absorbent mats will be placed under refuelling points during all refuelling to absorb drips;
 - Mobile bowzers, tanks and drums will be stored in secure, impermeable storage areas, at least 50m away from drains and open water;
 - 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;
 - Should there be an oil leak or spill, the leak or spill will be contained immediately using oil spill kits, all oil and any contaminated material will be removed and properly disposed of in an appropriately authorised 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.;
 - 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; and
 - 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.
- Materials Handling, Fuels and Oil Storage:
 - Storage of fuels/oil will be located at least 50m from watercourses;
 - Fuel containers will be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores;
 - 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 fuel/ oil from stores will be prevented by storing these materials 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; and
 - 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 recycling 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, must designate personnel to the tasks relating to Fuels and Oil, as outlined above.

Reference

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

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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; and
 - 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:
 - Designate a concrete washout area away from drains and watercourses;
 - No disposal of concrete remnants will be permitted on site;
 - On-site washing of concrete truck barrels will not be allowed. Washout of concrete trucks will occur off-site at a designated, contained impermeable area (generally source quarry).
 - The washing of the chutes at the rear of the trucks may be permitted. A designated chute wash down area, which will retain the washout water, will be located within the construction compound and there will be no other chute wash down activity on any other part of the site.

Responsibilities

- All concrete pours will be supervised by suitable personnel;
- 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; and
- 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.

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EMP 5: Construction Noise and Vibration Management

Purpose

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

Procedure

Noise

Prior to the commencement of construction an active community engagement exercise shall be undertaken by the community liaison officer. Letter drops shall take place in advance of the works. The nature of the information letters provided details of the Project, specifically:

- Contractor name and contact details;
- Project description;
- Expected duration of works; and
- A commitment to implement procedures and measures to minimise noise and vibration.

This community notification exercise should be repeated in the event of an expected intensification of works in any area and/or in advance of works that occur outside of the permitted construction operating hours (any such works will be subject to prior agreement with the Local Authority).

A site representative responsible for matters relating to noise and vibration will be appointed

Noise – During construction

Regarding construction activities, reference shall be made to *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise* and where appropriate, *Mineral Policy Statement 2*. BS5228 offers detailed guidance on the control of noise and vibration from construction activities. It is proposed that various practices be adopted during construction as required, including the following:

- Limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- Establishing channels of communication between the contractor/developer, Local Authority and residents;
- Appointing a site representative responsible for matters relating to noise and vibration; and
- Keeping the surface of the site access tracks even to mitigate the potential for vibration from lorries.

Furthermore, a variety of practicable noise control measures will be employed. These include:

- Selection of plant with low inherent potential for generation of noise and/or vibration; and
- Placing of noisy/vibratory plant as far away from sensitive properties as permitted by site constraints.

The contract documents shall specify that the Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures when deemed necessary to comply with the recommendations of *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction on open sites – Noise* and *Mineral Policy Statement 2*, where appropriate. The following list of measures will be implemented, where necessary, to ensure compliance with the relevant construction noise criteria:

- No plant used on site will be permitted to cause an on-going public disturbance due to noise;
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations;

- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract;
- Compressors will be attenuated models, fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- Any plant, such as generators or pumps, which is required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen;
- During the construction programme, supervision of the works will ensure compliance with the limits detailed in Chapter 11 of the EIAR using methods outlined in *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise and Mineral Policy Statement* where appropriate; and
- The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 07:00hrs and 19:00hrs weekdays and between 07:00hrs and 13:00hrs on Saturdays. However, to ensure that optimal use is made of good weather period or at critical periods within the programme (i.e. concrete pours) or to accommodate delivery of large turbine components along public routes it could be necessary on occasion to work outside of these hours. Any such out of hours working will be agreed in advance with the local Planning Authority.

Vibration

Vibration from construction activities will be limited to the values set out below:

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	10 to 50Hz	50 to 100Hz (and above)
8mm/s	12.5mm/s	20mm/s

It should be noted that these limits are not absolute but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage, these limits may need to be reduced by up to 50%.

With regards to piling it is considered that, based on the large distances between locations where piling may take place and the nearest NSLs, no significant impact will be experienced. Therefore, no mitigation measures are proposed.

Blasting

The following mitigation measures will be employed to control the impact during blasts, if blasting is required during the construction phase, a blast management plan will be prepared and implemented.

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.

Minerals Policy Statement 2: Controlling and Mitigating the Environmental Effects of Minerals Extraction in England – Annex 2: Noise (2005).

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

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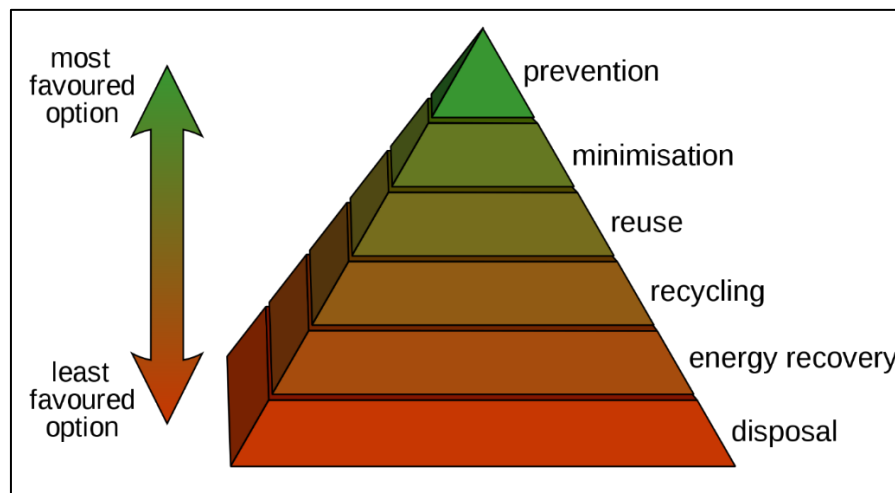
EMP 6: Construction Waste Management Plan

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 are 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, construction compound and pipe outfall, mainly comprising excavated excess sub-soils;
 - 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, geotextile 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 construction. At the end of construction, 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, this material will be recycled; and
- Wastewater from office and welfare facilities. These facilities will be regularly emptied by licensed/suitable contractors.
- Wastewater 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 1,500 – 1,750 litres per day (based on an estimated workforce of 30 to 35 people generating on average 50L/person).

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 their 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 Plan

Purpose:

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

Scope:

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

Procedure:

The proposed development would generate an increase in the numbers of heavy vehicles using the local road infrastructure. The following measures will be implemented to ensure a safe and regulated traffic management system is enforced:

- Pre-construction and post-construction surveys will be carried out to ensure the structural integrity of the proposed haulage route road network. Repairs will be carried out on the public roads, as necessary, during the construction phase, to ensure that the condition does not deteriorate below a standard that could affect the use of the site, as required;
- Ensure a strict protocol for HGV drivers to follow the designated haulage route and timing restrictions;
- Haulage traffic would share the same route with local residents, tourists, and other road users, which would present risks. Advance warning will be given to the local residents and other users (i.e. cyclists) for specific times when large volumes of HGV traffic may occur;
- All traffic management and road signage will be in accordance with the Department of Transport (DoT) Traffic Signs Manual Chapter 8: Temporary Traffic Measures and Signs for Road Works; and in agreement with Limerick City and County Council;
- A well planned and executed delivery programme avoiding peak traffic on typical days will be ensured;
- Adequate parking will be provided on site for both employees and visitors to ensure parking will not occur on the public road; and
- A road sweeping vehicle will be provided as required to remove any mud that is deposited on the local road in the vicinity of the site access.

Traffic management and control procedures will include:

- General
 - Excavation, backfilling and reinstatement of trenches in roads will be completed within the shortest possible time frame.
 - The planning of road closures and traffic diversions will ensure that reinstatement of the trenches, joint bays, launch and reception pits are completed and all temporary traffic measures (lane and road closures/diversions) are removed in progressive stages.
- Access for Residents
 - The appointed contractor shall make provision for safe access at all times to private residences in proximity to the construction works.
 - Steel plates or stone will be made available to allow access to residential properties. This will be done in co-operation / communication with local residents in the area.

- The appointed contractor will inform local residents of the programme of works in their area and local access will be catered for where possible.
- Access to Commercial/Business Properties
 - The appointed contractor shall make provision for safe access to commercial and business premises for employees, customers, the general public and for deliveries.
- Pedestrian Safety
 - The appointed contractor shall ensure that throughout the course of the works its operations do not put pedestrians at any risk.
 - Where the construction work necessitates the restriction or partial closure of a pedestrian access, the appointed contractor shall provide adequate safety barriers, signposts, lighting and temporary surfacing (if applicable) to ensure safe passage for pedestrians.
 - Where the construction work necessitates the closure of a pedestrian access, the appointed contractor shall provide a safe and reasonable alternative. The appointed contractor shall provide adequate safety barriers, signposts, and lighting (if applicable) to direct pedestrians and ensure their safe passage.
 - With respect to pedestrians, the appointed contractor shall refer to and observe the requirements of the updated version of the Traffic Signs Manual 2019 titled Temporary Traffic Measures and Signs for Roadworks.
- Emergency Crew
 - The appointed contractor's emergency contact telephone number shall be displayed at the appointed contractor's site office and shall be notified to the Local Authority Roads Engineer, Utility companies and the Emergency Services Providers. This telephone will be manned by the appointed contractor's Project Manager or by an authorised deputy capable of making decisions in an emergency situation.
 - The appointed contractor shall set up an emergency crew, led by an experienced foreman or an engineer, for dealing with emergencies arising as a result of the works on roads outside of normal working hours. The emergency crew shall be available to respond to an event seven days a week.
 - The appointed contractor will issue the emergency crew with contact details for the emergency services and the utility companies, in the event that they are required.

Measures to be implemented in line with the traffic management plan include:

- A system of single lane road closures will be implemented along the underground grid connection route (Option A) in the public roadway. This is to ensure the cable route can be constructed safely to protect construction workers and members of the public.
- Grid Connection (Option A) will require a Road Opening License (ROL) prior to the commencement of any grid connection works on the public road. The road surface of the public roads will be reinstated to the standards set out by the Department of Transport (DoT) Guidelines on the Opening, Backfilling and Reinstatement of Trenches on Public Roads (April 2017). All road permanent reinstatement works will be in accordance with the requirements of Limerick City and County Council.

- Single Lane Closures
 - Single lane closures will be implemented as the construction of the cable trench progresses along the cable route. It is envisaged that 100 - 200m of the cable route will be constructed each day and therefore single lane closures will move with the works. The single lane closure will be controlled by way of either a stop-go system, a priority yield system or by temporary traffic lights. The appointed contractor will ensure that procedures and works for single lane closures are in accordance with *Temporary Traffic Management Design Guidance, Third Edition 2019*. Temporary traffic management and roadwork signs will be to Chapter 8 of the *Traffic Signs Manual 2019*.
- Road Closures
 - Cable trenching in the public road will be carried out in the road edge or in the grass verge, where it exists. This will be done under the terms of road opening licences from Limerick City and County Council. Road closure applications may also be required. All works will be planned and undertaken in full consultation with Limerick City and County Council, in particular the Roads Department and the Roads Engineer for the area.
- Diversions
 - Diversions will be implemented to provide an alternative route for road closures during construction. Road closures if required will be sequenced in order to prevent unnecessary delays to the public and allow the appointed contractor to achieve their construction timeline. Information and directional signage will be provided to inform the public of road closures and direct them along diversion routes. Local access will be maintained for residents where possible. The appointed contractor will ensure that procedures and works for diversions are in accordance with the *Temporary Traffic Management Design Guidance, Third Edition 2019*. Temporary traffic management and roadwork signs will be to Chapter 8 of the *Traffic Signs Manual 2019*.
- Joint Bays
 - It may be necessary that joint bays on the grid connection cable route are required to be left open overnight for pulling cables through the ducts and jointing the cables together. Joint bays will be individually assessed to determine what type of traffic management system will be required at each location. Safety barriers or fencing will be erected around each open joint bay with either a priority yield or temporary traffic light system utilised to safely navigate vehicles around.
 - The appointed contractor will ensure traffic management controls are in accordance with Chapter 8 of the *Traffic Signs Manual 2019* and the *Temporary Traffic Management Design Guidance, Third Edition 2019*.
- Personnel Traffic
 - All traffic arising from personnel (appointed contractors, sub-appointed contractors, site operatives etc.) will park their vehicles at the appointed contractors main site compound within the wind farm site. This will be done so as to prevent traffic disruption to construction and to local residents by prohibiting personal vehicles being parked along the local road network.

Responsibility

- Project Manager;
- Construction Manager;
- Construction personnel;

- Sub-contractors as appropriate; and
- Delivery personnel.

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EMP 8: Construction Dust and Air Pollution Management

Purpose

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

Procedure

Construction phase generated dust will be minimised by the following measures:

- 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;
- Public roads will be inspected regularly for cleanliness and cleaned as necessary;
- All loads entering and leaving the site will be covered during dry periods if dust becomes a disturbance on site;
- Control of vehicle speeds passing over access tracks and crane hardstanding areas within the site;
- Wheel wash facilities will be implemented at the site entrance from the public road to facilitate removal of any material collected by vehicles entering or leaving the site and preventing its deposition on public roads;
- Site stockpiling of materials will be designed and laid out to minimise exposure to wind; and
- Daily site inspections will take place to examine dust measures and their effectiveness.

Construction traffic emissions will be reduced using the following measures:

- Ensure regular maintenance of plant and equipment. Carry out periodic technical inspection of vehicles to ensure they perform most efficiently;
- Implementation of the Traffic Management Plan (Volume III, Appendix 14A) to minimise congestion; and
- All site vehicles and machinery will be switched off when not in use - no idling.

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 bowzers 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 site as soon as possible;
 - Cover seed or fence stockpiles to prevent wind whipping;
 - Ensure all vehicles switch off their engines when stationary – no idling vehicles; and
 - 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 Limerick City and County Council when requested; and
- 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).

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EMP 9: 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.

Procedure

Mitigation By Design:

Habitat:

- The project has been designed to minimise the footprint of the proposed development on more sensitive habitats, noting that minimum distances are required between turbine locations. This has been achieved in collaboration with engineering constraints by taking account of habitat value and areas of habitats affected. The project design has followed the basic principles outlined below to reduce/eliminate the potential for significant effects on ecological receptors:
 - Avoidance/minimisation of turbine array and wind farm infrastructures at sensitive habitats (e.g. hardstanding areas designed to the minimum size necessary to minimise habitat loss);
 - Avoiding wildlife refuge sites (e.g. waterbodies) insofar as possible;
 - Grid connection route and internal access tracks selected to utilise existing built infrastructure for the majority of its length (i.e. cables to be laid within public roads and existing tracks); and
 - Cables laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds.
 - Avoidance of habitats of County Importance.
- A small area of Poor Fen and Flush (PF2) occurs to the southeast of proposed T6. This area is a wetland and is also discussed in the aquatic ecology report (Chapter 6, Appendix 6C), where it is referred to as the Ballynisky Pond. This habitat is rare in the locality and as such is evaluated as being of County Importance (CI). This habitat will be avoided during construction by way of an exclusion zone.
- Hedgerows are important in checking overland flow of water and such attenuation can reduce silt and nutrient loss to surface water features. There will be loss of this linear habitat at various locations during construction stage. Where such habitat loss will occur, there will be resultant potential erosion and increased overland flow. Hedgerow continuity will be maintained through planting, to bridge gaps created by construction. Native species including whitethorn, hazel and holly will be planted along the infrastructure boundaries to bridge the gaps in hedgerows created. Double rows set a distance of 1 meter apart are required in order to mimic the existing hedgerow widths. Subject to planning consent, planting of new hedgerows will commence where possible as a first step of the construction phase of the proposed development. This will allow time for these planted features to become established prior to any significant loss of existing features. Hedgerow management and maintenance is outlined in Chapter 06, Appendix 6F BEMP.
- Bats:
 - For sites, such as at the proposed development site, SNH (2021) recommends a buffer distance of 50m between a turbine blade tip and the nearest woodland. In the case of the proposed Ballynisky turbines, the foraging features pertain largely to hedgerow habitats. The 50m buffer creates a

clearance setback of 50m between the arc of the blade's sweep and the nearest hedgerow which could be used by bats. To calculate the clearance distance, the formula here is used to calculate (D), the distance between the edge of the hedgerow and the centre of the tower:

$$D = [(50 + bl)^2 - (hh - fh)^2]^{1/2}$$

- Where bl = blade length, hh = hub height, fh = feature height (all in metres). Based on this formula, a clearance distance of 91m around proposed turbines T1, T2, T4, T5 and T6 will be maintained to comply with Natural England (2014) guidelines for minimising impacts to foraging bats. A clearance distance of 98.4m will be maintained at T3. Clearance will be undertaken at each of the proposed turbines where hedgerow occurs within these areas;
- To ensure that the buffer areas do not develop into the types of habitats that support high value macroinvertebrate production that would be a prey resource for bats, the lands around the turbines will be used for production of grass corresponding to the improved agricultural grassland that occurs at the site; This will also discourage foraging by birds of prey such as Kestrel.
- Some mature trees will be felled where they occur in line with the infrastructure footprint and/or for bat buffer (Section 6.8.1.2 of Chapter 06 of the EIAR) purposes. Such trees will ideally be felled at a time of year when bats are least likely to be present i.e. winter months. In any case, all trees with bat roost potential, will be soft-felled (lowered slowly to ground) and left for a day without further disturbance prior to being moved or worked; and
- Lights on turbines can reduce the potential risk of collision to bats; however, the use of "white lights" on the turbines will be avoided as these can attract insects, which in turn can attract bats. Any form of lighting on the turbines or other structures will have to be agreed in advance with the Irish Aviation Authority. Any lighting introduced to the development site will follow guidance in the document:
 - Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25 (Marnell et al. 2022).
 - Institute of Lighting Professionals Guidance Note 08/2311 Bats and artificial lighting at night.
- Water Quality:
 - No work will take place within 50m buffer zones of watercourses except for drainage / stream crossings and associated track construction.
 - 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 of pollution occurring.
 - The proposed site layout boundary will be marked by secure posts and robust high visibility tape. These areas will be marked out with reference to design drawings, under supervision of the project engineer/manager and the site ecologist.
 - Sensitive areas such as the wet grassland area to the west of proposed turbine T2 outside of the site layout boundary and Ballynisky Pond will be avoided and an exclusion zone put in place. Machinery will not be permitted to breach these agreed boundaries during the work construction phase.
 - The site drainage system was designed integrally with the wind farm infrastructure layout as a measure to ensure that the proposal will not change the existing flow regime across the site, will

not deteriorate water quality and will safeguard existing water quality status of the catchments from wind farm related sediment runoff.

- Silt control will be a primary concern during construction stage. Measures outlined below are included in the design of the proposed development to avoid or minimise water quality impacts from arising during the construction phase of the development. Protecting water quality will protect aquatic fauna in fluvial habitats downslope of the proposed development site.
- 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; and
- The two (2) permanent deposition areas onsite are located 50 metres away from the nearest watercourses. For example, the larger of the two permanent deposition areas is separated from the Riddlestown Stream by an area of wet grassland. This habitat will act as a buffer for overland flow, attenuating any potential runoff from the deposition area and preventing the ingress of sediment to this stream.
- Incorrect practices in land use, and improper management during construction projects can lead to excessive runoff of silt, nutrients and organic matter in times of heavy rainfall. A Surface Water Management Plan (SWMP) has been produced for the proposed development in advance of any works taking place (Refer to Appendix 3E of Volume III). The SWMP will detail method statement(s) for protecting water quality in the watercourses affected. The SWMP will be distributed and discussed with all parties involved in construction (including any sub-contractors) to protect aquatic conservation interests within the study area. Silt control will be a primary concern during the construction stage, as silt has been identified as a sediment source for downstream areas. The SWMP will set out measures to avoid siltation, erosion, surface water run-off and accidental pollution events which all have the potential to adversely affect water quality within the site during the construction phase. The following measures will be implemented on site during construction and have been incorporated into the design where appropriate:
 - Any new development at watercourse crossings (upgrading/new tracks) will consider fish passage;
 - Existing tracks will be used insofar as possible;
 - Infrastructure will be placed on areas away from watercourses and on ground with low gradients insofar as possible;
 - Any works involving stream crossings will maintain or improve faunal connectivity upstream and downstream of works;
 - Ponds will be constructed as part of the SWMP to attenuate water draining denuded areas during construction; and
 - The proposed development will be constructed in cognisance of the following guidelines:
 - *'Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes'* (NRA, 2008); and

- 'Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters' (IFI, 2016).
- Livestock in some fields at the proposed development site currently have access to watercourses at various locations. Animals accessing the Ahacronane River and Riddlestown Stream for drinking water has the potential to damage both instream and riparian areas due to riverbed disturbance, defecation, poaching and associated denudation and erosion. This is likely impacting aquatic life quality and negatively affecting water quality primarily by siltation. Access to watercourses will be prevented going forward.
- A minimum riparian setback zone of 2 meters is proposed along all EPA registered streams within adjoining lands within the proposed development site. This will create an intact and permanent buffer area of natural vegetation alongside the aquatic zone, in order to protect water quality and aquatic ecosystems from possible overland flow of sediment and nutrient runoff from both the proposed development and impacts associated with current land practices. A riparian setback breaks the 'pathway' between the source of possible pollution and the receiving watercourse.

Mitigation By Management:

- Habitats

- There will be loss of wet grassland habitat associated with the proposed development (T2 and T6) which is of some value to frogs and the Annex II Marsh Fritillary Butterfly. To offset this, locally important wet grassland habitats will be managed by maintaining an appropriate level of grazing during the lifetime of the Plan. This will be achieved by following best guidance for the creation of suitable habitat for the Marsh Fritillary butterfly.
- Management of retained wet grassland habitats around T2 and proposed new areas of wet grassland will be undertaken to enhance this habitat for Marsh Fritillary, to compensate for any loss of vegetation containing Devil's-bit scabious that may be required to facilitate the build out of T2 and access track. This should be undertaken by grazing, with the aim of preventing scrub encroachment within areas of wet grassland, and to maintain the overall sward height of the vegetation at 12 to 25 cm tall, such that the habitat improves or continues to be of 'good condition' for Marsh Fritillary. Care should be taken not to permit overgrazing of the fields, as livestock may damage larval webs and their supporting vegetation.
- While the management will be focused on grazing levels, no other land use activities will be allowed within the retained or created wet grassland plots, such as insertion of new drains or tracks, or the planting of trees.

- Mammals

- Pre-construction mammal surveys to be undertaken by ecologist before any vegetation removal;
- In the unlikely event that protected faunal species are found actively using the site for breeding/roosting during the construction phase, works will cease immediately, and the area will be cordoned off until advice is sought from a suitably qualified expert or member of NPWS.
- Should the resting or breeding places of any protected species be discovered within the site during construction works, advice will be sought from NPWS and applicable guidelines will be adhered to notably NRA Guidelines (2005b – now known as TII).

- Seasonal restrictions for vegetation removal will apply in relation to the ecological features listed in Chapter 6, Section 6.8.3.1 - Table 6-22.
- Marsh Fritillary and its supporting foodplant Devil's-bit scabious:
 - Any clearance or disturbance of Devil's-bit scabious within the site layout and in proximity to proposed turbine T2 has the potential to result in the mortality of marsh fritillary and/or significant reduction in the quality of habitat for marsh fritillary, should the species be present at the time of construction.
 - Appropriate mitigation measures will be implemented to ensure Marsh Fritillary and its habitat are not significantly affected by the proposed construction works in the vicinity of T2. This will comprise of a check for larval webs 24 hours in advance of any vegetation clearance and, should any Devil's-bit scabious plant be found supporting marsh fritillary, the plant will be dug out by hand and translocated to an area of suitable retained habitat.
 - In areas where works take place on habitats that have been selected as Key Ecological Receptors (KERs), and where these areas will not be required during operation stage, such areas will be reinstated;
 - Spraying of vegetation using pesticides (herbicides, fungicides and insecticides) will not be permitted at any stage of development. Fluvial habitats will be protected by maintaining water quality in the receiving waterbodies;
 - A Biodiversity Enhancement Management Plan (BEMP) will be implemented onsite, as compensation measures are considered necessary to off-set significant residual effects (refer to Chapter 06, Appendix 6F BEMP of the EIAR).
- Ornithology
 - Prior to commencement of construction works, a pre-construction walkover survey will be carried out by a qualified and experienced ornithologist following standard methods. The surveys will be undertaken prior to any vegetation clearance on Site.
 - Following on from the walkover, guidance will be provided to the contractor if restrictive zones are required during the bird nesting season.
 - The development design includes the following measures to minimise effects on ornithological features:
 - Retainment of areas of more important habitat within the landscape design (e.g., waterbodies and woodland);
 - Minimisation of the extent of habitat loss during construction as much as is possible within the development design;
 - Selection of delivery routes which use existing built infrastructure wherever possible, with laying of cables underground; and
 - Presence of an ECoW on site to oversee any ornithological issues during construction.
 - The following supplementary and/or additional measures are proposed to avoid significant effects on the identified bird populations (Chapter 07 of the EIAR). In addition to avoiding significant impacts on non-target farmland birds, these measures would further reduce the potential for adverse effects on other Key Ornithological Features (KOF) during construction and operation.

- Habitat reinstatement and creation

Habitats will be created in proportion with the type and extent of habitat loss during construction. The design and management of this habitat will take into consideration the suitability of this habitat for birds including the KOF identified in Chapter 07 of the EIAR. The locations of habitat reinstatement and enhancement measures will take into consideration the risk of effects from collisions with wind turbines, with creation of features which could bring target species into proximity with wind turbines to be avoided.

Detailed habitat re-instatement and creation is described in Chapter 06, Biodiversity, Appendix 6F BEMP. This includes the following:

Wet grassland: to compensate for the loss of wet grassland, retained wet grassland south of T6 will be enhanced by a reduction in grazing intensity and sensitive management to increase its suitability for breeding and wintering waders and lepidoptera. Wet grassland will also be enhanced north-west of T1, south-west of T3 and south and west of T2. Retained and enhanced wet grassland will be managed throughout the operational lifetime of the project.

Hedgerows: native tree species will be planted to bridge hedgerow gaps in order to maintain habitat quality and connectivity. Double rows of trees planted one metre apart will ensure replacement hedgerows are consistent with those to be removed as part of the proposed development and that they are suitable for nesting, foraging and roosting birds (notable non-target farmland species). Retained and created hedgerows will be left in situ following decommissioning.

Watercourse buffering: a riparian buffer zone will be established to provide a buffer between the proposed development site and the receiving watercourses within the site (e.g., the Riddlestown Stream and the Ahacronane River). This will create an intact and permanent buffer area of natural vegetation alongside the aquatic zone, protecting water quality and aquatic ecosystems from possible overland flow of sediment and nutrient runoff from both the project and non-project land practices on site. In addition to maintaining the suitability of these watercourses for notable bird species (e.g., little egret, grey wagtail), the riparian buffer zone will create structural diversity and important woodland edge and open habitats suitable for a range of bird species at various times of year.

Field Margins: In total ca. 1,748 m of rough tussocky grassland that is at least 4 m wide with a litter layer of dead grass that is at least 7 cm deep will be created predominantly to the north and northeast of the proposed development boundary in proximity to confirmed barn owl (*Tyto alba*) nest locations (to the northeast) and in proximity to riparian habitat and mature hedgerows to the north of the proposed development.

When creating rough tussocky grassland a native grass/seed mix should be used which best suits the local conditions, and most closely resembles the original unimproved grassland in the area. Tall, tussock-forming species (e.g. cocksfoot, false-oat and timothy) as well as softer, shorter grasses (e.g. Yorkshire fog, fescue and bent species) are best.

No management during the first year is required as the new grass should be left to grow tall and collapse in the autumn to form the 'litter layer'. Following establishment, areas should be topped or lightly grazed in the autumn every second or third year.

There will be complete avoidance of herbicides, and the field margins will be fenced off to prevent grazing.

Pond creation: Where conditions allow, silt ponds constructed for water quality protection (in line with drainage design and sensitively placed regarding turbine locations) will be retained to provide a permanent enhancement for various bird species including little egret, waders and non-target farmland species (Davies et al., 2016). The ECoW and site engineer will decide the final pond locations but they will broadly correspond to locations indicated in Appendix 6F, BEMP Figure 2-1.

Mitigation By Avoidance:

- No work will take place within 50m buffer zones of watercourses identified in the Water Chapter of the EIAR except for drainage / stream crossings and associated access track construction;
- 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 of pollution occurring; and
- The proposed development site boundary will be marked by secure posts and robust high visibility tape. These areas will be marked out with reference to design drawings, under supervision of the project engineer/manager and the site ecologist. This will ensure sensitive areas will be avoided insofar as possible. Machinery will not be permitted breach these agreed boundaries during the work. If there is scope for avoidance of KERs or habitats of potential use to KERs within the boundary, then these areas will be avoided.

Monitoring

- In the unlikely event that protected faunal species are found actively using the Site for breeding/roosting/nesting during the construction phase, works will cease immediately, and the area will be cordoned off until advice is sought from a suitable qualified expert / NPWS.

Responsibility

A suitably qualified and experienced project ecologist will be employed during the construction phase of the project. Duties will include the review of all method statements, delivery of toolbox talks and monitoring of construction phase activities to ensure all environmental controls and EIAR mitigation is implemented in full. The project ecologist 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.

References

Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25 (Marnell et al. 2022).

'Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters' (IFI, 2016).

'Guidelines for the Crossing of Watercourses during Construction of National Road Schemes' (TII, 2008).

EMP 10: Landscape and Visual Management Plan

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.

Procedure

Tree protection and fencing will be implemented where necessary during the construction phase, in the vicinity of the substation and temporary compound. Works will be avoided near the bases of mature trees. No works will take place along the mature Lime tree avenue in the area of the former Waterville house, as this area is outside the planning application boundary.

Mitigation measures include the re-instatement of the areas following the removal of the temporary construction compound and the closure and re-instatement of the temporary site entrance to the west of the site, including replanting of the hedgerow with native species similar to what is to be removed. The deposition areas will be vegetated to enhance biodiversity in line with the BEMP.

For the grid connection route (Option A), the section of the road adjacent to the church and graveyard at Kibradran will avoid any works near the enclosing wall of the graveyard and will be located within the road corridor to the opposite side of the road.

Monitoring

To ensure that the planting mitigation measures establish successfully, a comprehensive long term landscape maintenance and management regime will be in place following completion of the construction of the proposed development.

Responsibility

- Environmental Manager/ECOW; and
- Construction Manager.

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EMP 11: Cultural Heritage Management Plan

Purpose

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 within the boundary limits of the development site.

Procedure

- Exclusion zones (reflecting RMP zone combined with ZON) will be established on the ground around recorded monuments: ringfort LI019-132, enclosure LI019-270, ringfort LI028-182, ringfort LI028-043, ringfort LI028-039 and ringfort LI028-038 to avoid accidental damages to the monuments. No heavy machinery, tree felling, or any groundworks will be undertaken within the exclusion zones.
- A program of archaeological test excavation trenching, under licence from NMS, will be undertaken to establish the veracity of anomalies recorded in the geophysical survey. Furthermore, archaeological test excavations will also be undertaken across the limits of the proposed core wind farm components. It is proposed to excavate series of 157 test trenches (T1-T157) on the footprint of the wind farm components and locations of positive geophysical anomalies. The scope of the test excavations should be agreed following consultation / liaison with the LCCC Archaeologist.
- Archaeological monitoring of archaeological sensitive areas will be undertaken of elements of the proposed core wind farm components under the license from the NMS
- Groundworks associated with the external grid connection to the existing substation at Carrons within the greenfield sections should be archaeologically tested in advance under licence from the NMS. It is proposed to excavate series of 7 test trenches (T1-T7) within the greenfield section of proposed grid connection. The scope of the test excavations should be agreed following consultation / liaison with the Limerick City & County Council Archaeologist.
- A targeted section of the external grid connection along the existing road within the ZON of the recorded graveyard LI019-131002 should be archaeologically monitored under the licence from the NMS. This section should extend within ZON of the graveyard (LI019-131002) and be physically established prior the construction stage.
- Groundworks associated with cuttings through the townland / parish/ barony boundaries will be kept to a minimum. The cutting locations of these boundaries will be archaeologically recorded and all boundary cuttings shall be archaeologically monitored with photographs and written descriptions.

Monitoring

The grid connection cable trench will be archaeologically monitored during construction. Archaeological monitoring and recording will be carried out during the construction phase.

Responsibility

- Project Manager;
- Environmental Manager;
- Construction Manager; and
- Project Archaeologist.

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); and
 - 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; and
 - Whether the situation is under control.
- Oil Spillages:

The following list outlines issues likely to be appropriate for inclusion in 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 Limerick City and 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 should 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; and
- 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 Limerick City and 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; and
- Shovel contaminated concrete granules into sacks or skips for treatment in the concrete chute wash out.

- 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;
- Limerick City and County Council;
- Inland Fisheries Ireland; and
- 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; and
- 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; and

- As appropriate, the Environmental Manager will report the spillage to the Regional Fisheries Board, Limerick City and County Council and any other relevant authority.

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EMP 13: Site Environmental Training Awareness

Purpose

To describe measures for informing the public of restricted 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 restricted 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;
- 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; and
 - Environmental Emergency Response Plan.
- Housekeeping and Storage of hazardous materials:
 - Hazardous materials marked with the following symbols 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 will be provided by the Appointed Contractor(s). Environmental training records will be retained in the site office.

Responsibility

- Construction Manager;
- Environmental Manager; and
- 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 will be carried out to ensure adherence with the following;
 - EMP-1 Management of Excavations and Land and Soils;
 - EMP-2 Surface Water Management and Run-off Control;
 - EMP-3 Fuels and Oils Management;
 - EMP-4 Management of Concrete;
 - EMP-5 Construction Noise and Vibration;
 - EMP-6 Construction Waste Management Plan;
 - EMP-7 Construction Traffic Management Plan;
 - EMP-8 Construction Dust and Air Pollution Management;
 - EMP-9 Ecological Management Plan for the Protection of Habitats and Fauna;
 - EMP-10 Landscape and Visual Management Plan; and
 - EMP-11 Cultural Heritage Management Plan.
- 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; and
- All environmental records, including completed checklists, will be retained at the site office.

Responsibility

- Project Manager;
- Environmental Manager;
- Construction Manager;
- Project Ecologist; and
- 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; and
- 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 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; and
- 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; and
- The Environmental Manager is responsible for alerting the relevant authorities.

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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 disturbance 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; and
 - 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; and
- Construction Manager.