DRUMLINS PARK LIMITED

DRUMLINS PARK WIND FARM

COUNTY MONAGHAN

OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

OCTOBER 2019

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DOCUMENT APPROVAL

PROJECT	Drumlins Park Wind Farm	
CLIENT / JOB NO	Drumlins Park Ltd.	5870
DOCUMENT TITLE	Construction Environmental Management Plan (CEMP)	

	Prepared by	**Reviewed/Approved by**
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Date October 2019	Signature	Signature

DRUMLINS PARK WIND FARM., CO. MONAGHAN

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

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1 INTRODUCTION

1.1 BACKGROUND TO REPORT

Drumlins Park Ltd. is proposing to construct eight (8) no. wind turbines with a max tip height of up to 180m and all associated site development and ancillary works, including foundations, hardstands, cabling, access tracks, meteorological mast, substation, occasional upgrade works to public roads along turbine haul route and grid connection.

Jennings O'Donovan & Partners Limited (JOD) has prepared this Outline Construction Environmental Management Plan (CEMP) for the proposed development. This document has been prepared on a preliminary (outline) basis and will be further developed and expanded following the appointment of the Contractor for the main construction works. Some items of this CEMP can only be finalised with appropriate input from the Contractor who will carry out the main construction works. This CEMP identifies for the incoming Contractor, the key planning, Environmental Impact Assessment Report (EIAR) and Contract Document constraints that must be adhered to in order to deliver optimum environmental reassurance for the site.

This document should be read in conjunction with the EIAR and Planning Drawings for the various elements of the proposed development.

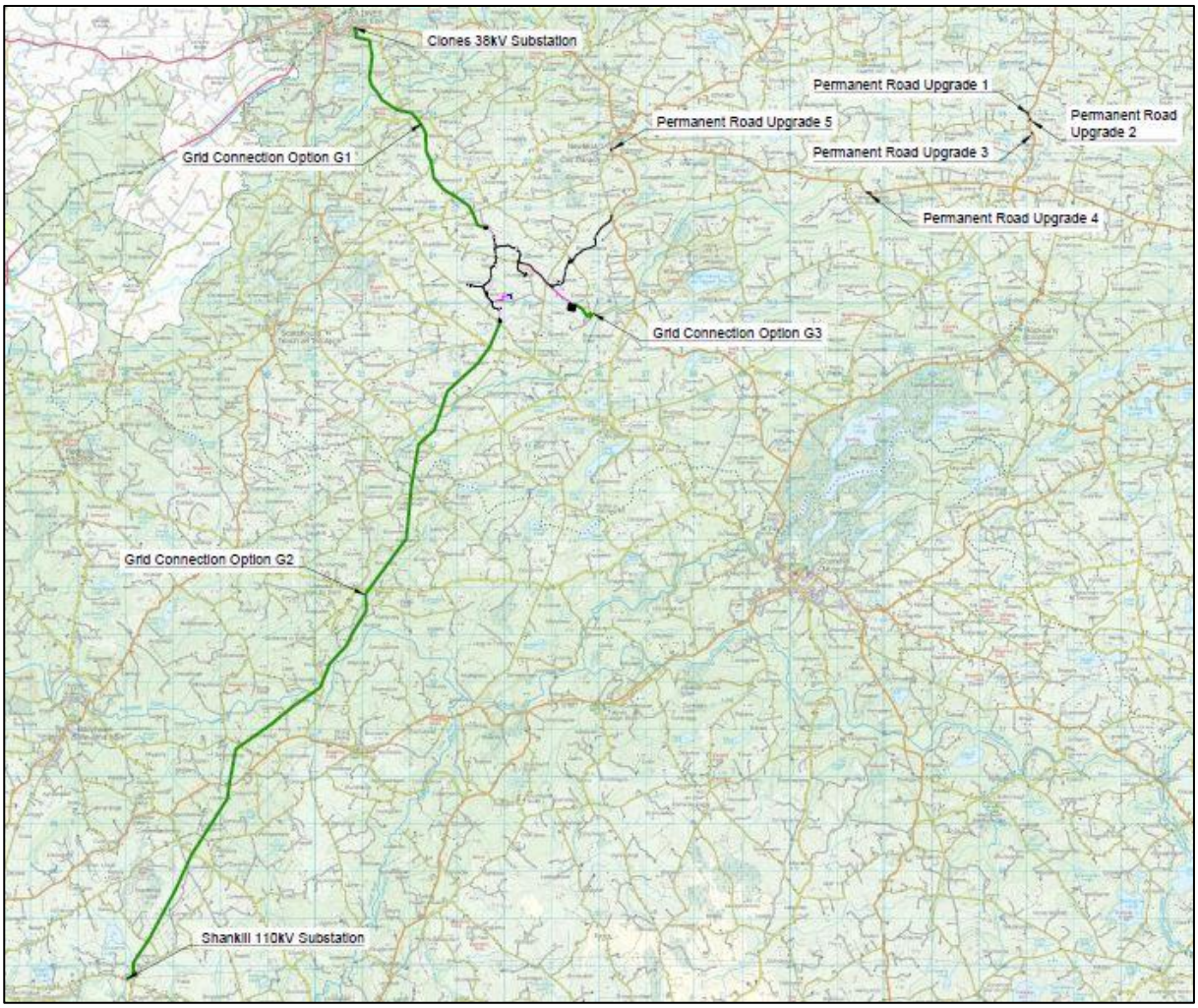

Figure 1.1 Proposed development location.

1.2 AIMS AND OBJECTIVES OF A CEMP

This CEMP has been developed in accordance with the Institute of Environmental Management and Assessment (IEMA) Practitioner "Environmental Management Plans", Best Practice Series, Volume 12, December 2008 and has been designed to cover the proposed environmental strategies that are to be carried out, before and during the proposed development works. This also correlates with ESB Contract Management Procedure 12 Environmental Management (ESB 2006). This procedure ensures that whilst work is being carried out that the contractor is solely responsible for ensuring that all aspects of the environment are managed according to required standards and legislation. It is intended that this outline CEMP will be finalised by the contractor in the form of a detailed CEMP should the works progress to construction stage.

This CEMP aims to define good practice as well as specific actions required to implement mitigation requirements as identified in the Natura Impact Statement (NIS) and Environmental Impact Assessment Report (EIAR), and/or other licensing or consenting processes to include Consultee recommendations. The principal objective is to avoid, minimise and control adverse environmental impacts associated with the development of the Drumlins Park Wind Farm. This document will act as a continuous link and main reference document for environmental issues between the design, construction and the maintenance and operation stages of the project.

The CEMP is considered to be a live document which will be developed further and / or amended where necessary subsequent to planning consent to take account of planning condition requirements and any information which may be made available from additional consultations, site surveys etc.
The CEMP will form part of the main Civil Construction works Contract. The Civil Contractor will take account of the structure, content, methods and requirements contained within the various sections of this CEMP when further developing this document (to include environmental plans and other related Construction Management Plans) as required by the Contract.

A summary of the CEMP development process and the required input from the main parties involved in the post planning and construction of the wind farm is indicated in Figure 1.2.

As such, the Developer commits to safeguarding the environment through the identification, avoidance and mitigation of the potential negative environmental impacts associated with the development, construction, operation of the Drumlins Park Wind Farm.

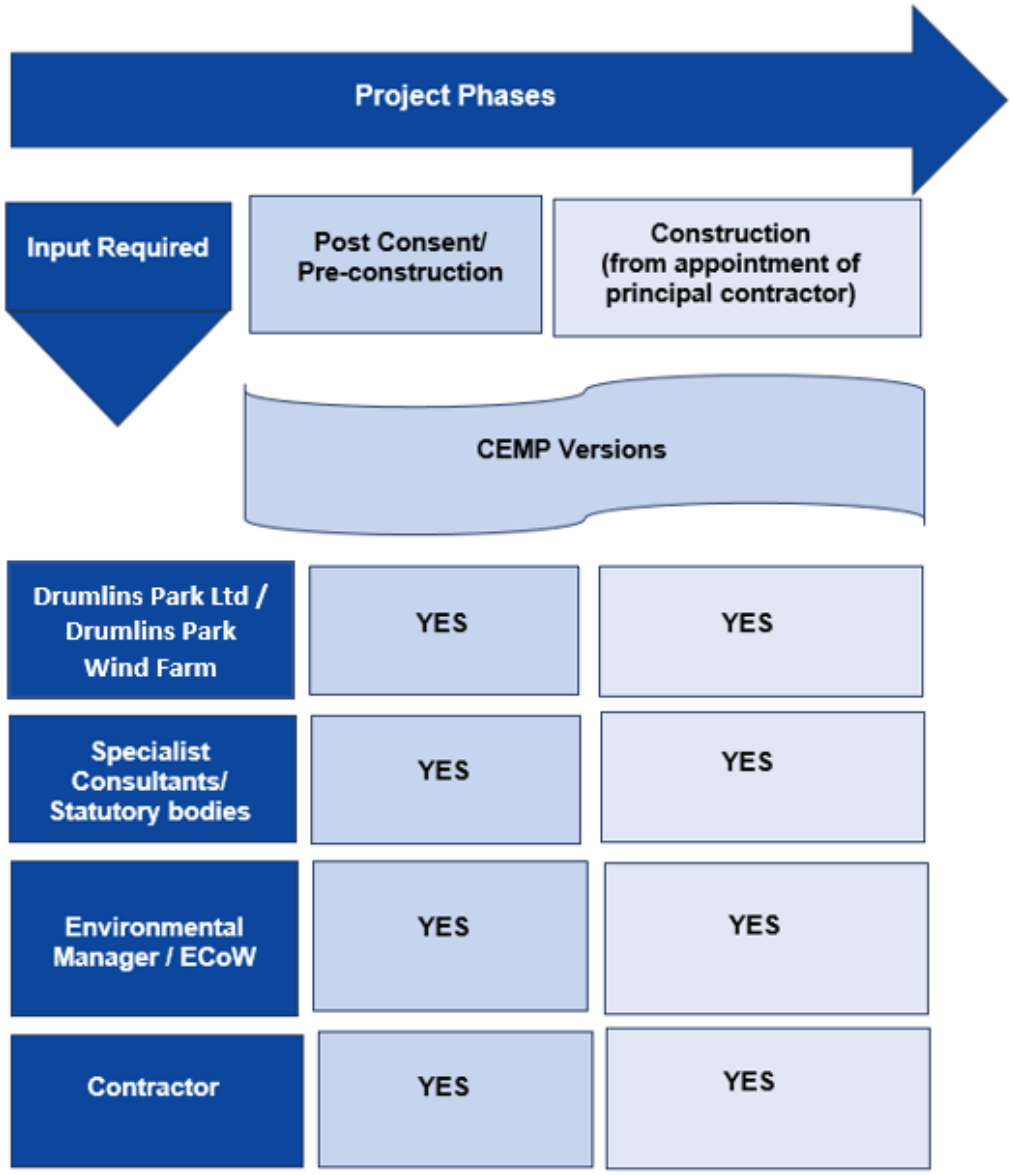

Figure 1.2 Summary of CEMP development process

1.3 CEMP ROLES & RESPONSIBILITIES

Prior to commencement of construction works, the Contractor will identify a core Environmental Management Group, comprising of specific project personnel and including the Ecological Clerk of Works (ECoW). The Environmental Management Group will meet monthly to discuss the monthly environmental report and will advise site personnel on areas where improvements may be made on site. The group will draw on technical expertise from relevant specialists where required and will liaise with other relevant external bodies as required.

The Contractor will appoint an Environmental Manager who will be responsible for coordination and development of the CEMP and any other surveys, reports or construction management plans required for discharge of relevant pre-commencement planning conditions. In conjunction with the ECoW, the Environmental Manager will also review the Contractors construction management plans, method statements and environmental plans as required by the CEMP, carry out compliance auditing during the construction phase and coordinate the Environmental Management Group and required liaisons between Drumlins Park Limited, the Contractor and other statutory authorities.

The Contractor will appoint an independent Ecological Clerk of Works (ECoW). The main roles and responsibilities of the ECoW relate to compliance monitoring with the CEMP and planning conditions and advice provision in relation to ecological matters. The ECoW will also assist the Environmental Manager.

1.4 REPORTING PROCEDURES

Figure 1.3 provides a diagrammatic outline of the general tasks and communication lines, based on the roles described in Tables 3.2 and 3.3 in Section 3, and tasks detailed in the Management Plans. The Contractor will update this information as part of the detailed CEMP.

The Environmental Incident and Emergency Response Plan (ERP) includes a figure illustrating the communications plan for reporting procedures for all potential environmental risks, hazards or incidents which may relate to ecology, water quality, dust, noise or archaeology.

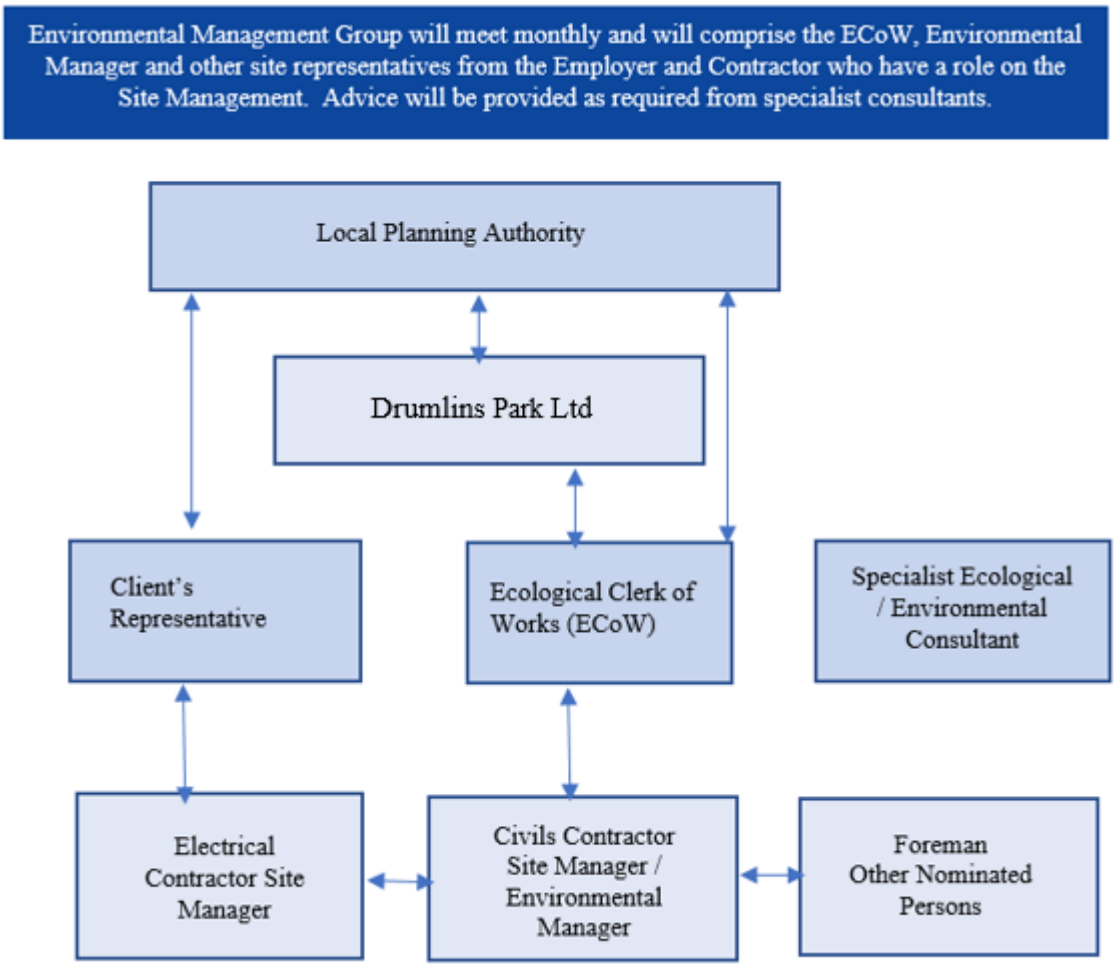

Figure 1.3 General Communication Plan

1.5 CEMP STRUCTURE

The CEMP is divided into discreet Sections which are designed to be filed as separate documents / folders if required. A copy of the CEMP documents / folder(s) will be kept in the site offices for the duration of the site works and will be made available for review at any time. The Contractor's Environmental Manager will be responsible for the CEMP and will keep all sections updated throughout the construction phase.

Where the Contractor has standard documents within his own company / corporate Environmental Management Plans which cover a particular requirement of this CEMP, these will either be inserted or cross referenced within the relevant Section of this CEMP. An indicative structure of this CEMP is provided at Figure 1.4 below:

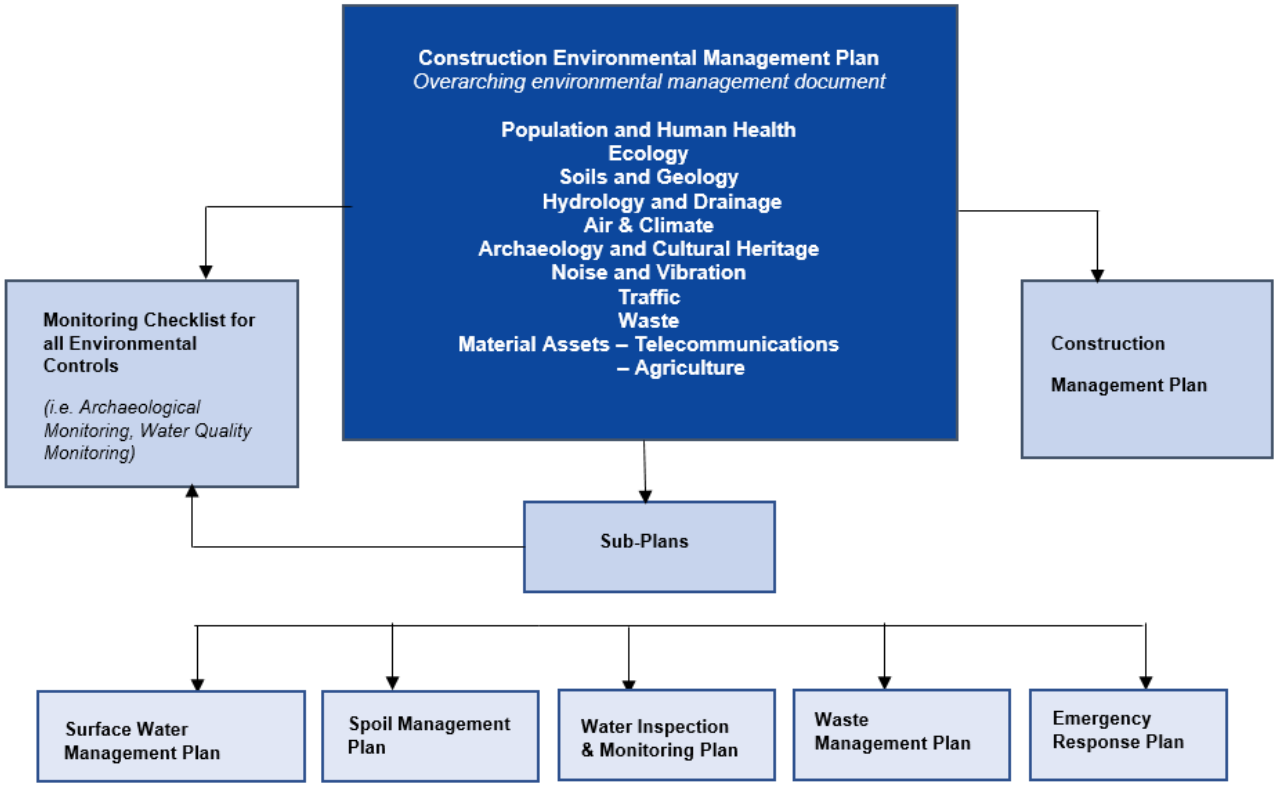

Figure 1.4 Structure of the CEMP and Sub Plans

Sections within the CEMP are listed in Table 1.1 as follows:

TABLE 1.1 OUTLINE OF DOCUMENT STRUCTURE OF THE CEMP		
Section	**Title & Brief Description**	**Contractor Development Required**
1	Introduction	No (Information purposes only)
2	Project Information Provides details on site location, scheme description. Provides details on relevant Planning History. Any documents prepared by Drumlins Park Ltd. in response to Consent will be recorded in Table 2.4. Contains a record of all Scheme Amendments and a Register of Variations.	Yes Any documents prepared by the Contractor in response to Consent Conditions will be recorded by the Contractor in Table 2.4 and inserted in the CEMP where necessary. Any Scheme Amendments and / or Variations to the CEMP required during the works will be recorded by the Contractor in Tables 2.5 and 2.6.
3	Environmental Communications Plan Contains details on specific requirements relating to: • Contact details for Drumlins Park Ltd.	Yes The Contractor will: i) Insert contact information for regulatory authorities and other stakeholders (where

TABLE 1.1 OUTLINE OF DOCUMENT STRUCTURE OF THE CEMP		
Section	**Title & Brief Description**	**Contractor Development Required**
	personnel, technical specialists, Contractor personnel, regulators, landowners, other stakeholders etc. • Meetings, reports and consultations • Roles and responsibilities, and • General reporting procedures and tasks	not already provided) into Table 3.1. ii) Refer to Table 3.2 for details on requirements for meetings, reports and consultations. iii) Insert information on Contractor appointments and responsibilities relating to environmental management and implementation of this CEMP into Table 3.3. iv) Refer to Figure 1.3 for a summary of the main communication lines.
4	Correspondence, Records, Reports This Section relates to document control and retention of records. The information at the start of Section 4 provides: • A list of all documents to be retained / filed within the CEMP. Table 4.1 provides a record of all Environmental Consents, Licences and Permits issued for the project.	Yes The Contractor will complete Table 4.1. Throughout the duration of the Contract, the Contractor will insert / file all communication records, data, field records and reports associated with Environmental Management and implementation of this CEMP into this Section 4. This Section may be sub-divided into sub-folders for specific information relating to discrete areas of Environmental Management (such as waste management, pollution prevention, water quality monitoring, ecology etc.). The filing method selected by the Contractor will be made explicit at the start of Section 4.
5	Management Plans & Available Information include the following: Management Plan 1: Environmental Incident and Emergency Response Plan (ERP) Management Plan 2: Surface Water management Plan (SWMP) As such, the Developer commits to safeguarding the environment through the identification, avoidance and mitigation of the potential negative environmental impacts associated with the development, construction, operation of the Drumlins Park Wind Farm. Management Plan 3: Water Quality Inspection and Monitoring Plan (WQIMP) Management Plan 4: Spoil Management Plan (SMP) Management Plan 5: Waste Management Plan (WMP)	Yes The Contractor is required to develop the Management Plans and/or include additional information or method statements as appropriate and where required by the Contract. The development of the Management Plans will generate more site-specific documents which address particular environmental management procedures applicable for works in specified areas of the site. These Management Plans form the Contractor's Environmental Plans (for example, Waste Management Plan). Table 5.1 lists all Management Plans and provides information on Contractor responsibilities.

1.6 CEMP DEVELOPMENT & IMPLEMENTATION

The CEMP takes into account requirements of relevant planning conditions for the construction and operational phases of the development. It is a live document and will be developed further by the Contractor with site specific method statements and plans as required prior to each phase of the works. It is also effectively a document management system for recording information and data relating to environmental checks, reports, surveys, monitoring data and auditing. Upon completion of the construction works, the Contractor will submit a complete CD/USB pen drive copy of the final CEMP to Drumlins Park Ltd. for their records. This final CEMP will include electronic scans of all hard copy reports, data, field records and correspondence which are gathered over the course of the construction works.

While version numbers may remain fixed depending on the stage of the project, it is acknowledged that the CEMP is a continually evolving document which can be updated in part or whole at any stage of the Project. Hence, revision and document distribution records are included at the front of each CEMP document to enable individual documents to be updated at any time.

A summary of the CEMP development process and the required input from the main parties involved in the post planning and construction of the project is indicated in Figure 1.2.

2 ENVIRONMENTAL CONTROLS

Prior to commencement of construction works the contractor will draw up a detailed Construction Management Plan which will be informed by the guidance documents and best practice measures listed below. This Construction Management Plan will be adhered to by the contactor and will be overseen by the project representative/foreman.

The contractor is required to supply a detailed Construction Management Plan for proposed activities on site which demonstrate how the environmental controls are outlined in the following sections are to be achieved on site. The Construction Management Plan is subject to review and are to be agreed in advance of any works taking place on site. In some instance, with reference to works which may present a risk of sediment release, it will be requirement that the Inland Fisheries Ireland (IFI) are consulted with respect to the development of the Construction Management Plan.

The following documents should contribute to the Construction Management Plan supplemented by specific additional measures proposed below:

- Guidelines on Protection of Fisheries during Construction Work in and Adjacent to Water (IFI, 2016).
- Environmental Guidance: Drainage Maintenance & Construction (OPW, 2019).

2.1 BIODIVERSITY

All mitigation measures have been developed in the context of national and international legislative guidance for the protection and management of flora, habitats of conservation importance, fauna and aquatic ecological interest. The description of mitigation measures is provided in terms of mitigation by avoidance, reduction and remediation.

Mitigation by avoidance has therefore sought to maximise the distance to any designated nature conservation sites. This will be achieved as a consequence of avoidance; the actual benign nature of the proposed development; through the implementation of best-practice construction methods; and adherence to all relevant environmental standards and guidance.

The majority of habitats on the site comprise improved agricultural grassland, hedgerows, wet grassland and treelines, which are of typically of Local Importance only or lower sensitivity. The receiving environment is not considered generally sensitive to development of this type. Guidelines to be adhered to in the delivery of the CEMP and method statements include the following:

- *'Bats and onshore wind turbines – survey, assessment and mitigation.'* Scottish Natura Heritage (2019)
- *'Guidelines on protection of fisheries during construction works in and adjacent to waters'* (IFI, 2016)
- *'Guidelines for the treatment of Badgers prior to the construction of National Road Schemes'* (NRA, 2005)
- *'Guidelines for the protection and preservation of trees, hedgerows and scrub prior to, during and post construction of National Road Schemes'* (NRA, 2006a)
- '*Guidelines for the treatment of bats during the construction of national road schemes'* (NRA, 2006b)
- *'Guidelines for the treatment of Otters prior to the Construction of National Road Schemes' (NRA, 2006c)*
- *'Guidelines for the crossing of watercourses during the construction of national road schemes' (NRA, 2008b)*
- *'Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads'* (NRA, 2010)

An Ecological Clerk of Works (ECoW) and Environmental Manager will also be employed for the duration of the construction works.

In advance of works, a detailed CEMP will be prepared by the appointed contractor detailing construction methodologies and appropriate mitigation measures to be implemented across the entire extent of the construction phase. All mitigation measures outlined will be incorporated into the CEMP. At a more targeted level, method statements will be drawn up by the contractor detailing work practices for precise locations.

2.1.1 Statutory Protected Sites

Wind Farm Development

The proposed wind farm site does not lie within any Natura 2000 site. The closest Special Area of Conservation (SAC) to the proposed wind farm is the Kilroosky Lough Cluster SAC, which is located c. 6km north of turbine T1. The Lough Oughter and Associated Loughs SAC (000007) is located c. 10km south-east of the proposed wind farm site. The closest Special Protection Area (SPA) to the wind farm site is the Upper Lough Erne SPA, located c. 6km west and is situated just along the border with Northern Ireland.

There are no Natural Heritage Areas (NHA) within the footprint of the proposed wind farm site or within 5km of the proposed wind farm site. The closest NHA is the Eshbrack Bog NHA (001603), situated some c. 19km north of the wind farm site. There are no proposed Natural Heritage Areas (pNHA) within the footprint of the proposed wind farm site. The closest pNHA is the Drumgole Lough pNHA (001601). This pNHA is located c. 3.7km east of the proposed wind farm site. Drumcor Lough pNHA is also c. 5.8km west and Lisabuck Lough pNHA is located c. 3.8km north-west.

There are no Ramsar sites or other protected sites on the proposed wind farm site. The closest Ramsar Site to the proposed wind farm is Lough Oughter (Ramsar Site No. 853) which overlaps Lough Oughter SAC and SPA. Following this, the Magheraveely Marl Loughs are also noted as a Ramsar Site (No. 1717), which are also designated as a SAC.

Grid Connection Option G1

Grid connection Option G1 is not located within any Natura 2000 site. The closest Natura 2000 Site to the grid connection route is the Kilroosky Lough Cluster SAC (001786), which is located c. 1.2km north. The Magheraveely Marl Loughs SAC (UK0016621) is located c. 2km north. The closest SPA to this grid connection route is the Upper Lough Erne SPA (UK9020071), situated c. 5.2km south-west.

There are no NHA within the footprint of grid connection Option G1 or within 5km. The closest NHA to Option G1 is the Eshbrack Bog NHA (001603), situated some c. 14km north. There are no pNHAs within the footprint of the grid connection route. The closest pNHA is Lisabuck Lough pNHA, situated c. 1.3km west. Following this, the Kilroosky Lough Cluster pNHA is also located c. 1.3km from the route but is located to the north.

There are no Ramsar sites or other protected sites along the route of grid connection Option G1. The closest Ramsar Site to Option G1 is Lough Oughter (Ramsar Site No. 853), which is also a SAC and a SPA. Following this, the Magheraveely Marl Loughs is also noted as a Ramsar Site (No. 1717), and a SAC.

Grid Connection Option G2

Grid connection Option G2 is not located within any Natura 2000 site. The closest Natura 2000 site is the Lough Oughter and Associated Loughs SAC (000007), situated c. 4.5km north-west. The

closest SPA to the grid connection route is the Upper Lough Erne SPA, c. 5.9km north-west, with the Lough Oughter SPA situated c. 6.8km west.

There are no pNHA within the footprint of the grid connection route G2. The closest pNHA is the Drumcor Lough pNHA, situated c. 3.8km north-west. The Lough Oughter and Associated Loughs pNHA are also situated c. 3.9km north-west.

There are no Ramsar sites or other protected sites along the route of grid connection Option G2. The closest Ramsar site to Option G2 is Lough Oughter (Ramsar Site No. 853), which is also a SAC and a SPA. Following this the Magheraveely Marl Loughs is also noted as a Ramsar Site (No. 1717), which is also a SAC.

Grid Connection Option G3

Grid connection Option G3 is not located within any Natura 2000 site. This grid connection route is located just outside the site boundary of the proposed wind farm. It consists of a new substation with minimal cabling required resulting in a small footprint. The closest Natura 2000 site to the grid connection option is therefore similar to those given for the proposed wind farm site.

There are no NHA within the footprint of grid connection Option G3 or within 5km. The closest NHA is the Eshbrack Bog NHA (001603), situated some c. 20km north of Option G3. There are no pNHAs within the footprint of the route. This grid connection route is located just outside the site boundary of the proposed wind farm. It consists of a new substation with minimal cabling required resulting in a small footprint. Therefore, the closest pNHAs are therefore similar to those given for the proposed wind farm.

There are no Ramsar sites or other protected sites within the footprint of Option G3. Given the proximity of grid connection Option G3 to the wind farm site, the same Ramsar sites are relevant to Option G3.

2.1.1.1 Mitigation Measures

Mitigation measures for Natura 2000 sites outlined in the Natura Impact Statement for the proposed development prepared by Ecofact (2019b) are outlined below. These mitigation measures are considered sufficient to also avoid any potential construction phase impacts on the Lough Oughter and Associated Loughs pNHA and Ramsar site, as this is also a SAC. The mitigation measures are as follows:

- Water quality will be protected through best-practice construction phase management process. For example, excavation works will not be undertaken during times of prolonged or intense rainfall or if such weather events are forecast and no development works will be commenced at a specific location until such time as the drainage management system is in place, to the satisfaction of the Environmental Manager, for the relevant works.

- Water quality will be protected by implementing the Construction Environmental Management Plan (CEMP) and Surface Water Management Plan (SWMP). Outline plans have been prepared and have had regard to the 'Guidelines for the crossing of watercourses during the construction of national road schemes' (NRA, 2008b) and 'Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters' (IFI, 2016).

- The (detailed) 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 implementation of these measures will ensure that no surface water runoff is discharged to any watercourse without being fully treated in advance.

- Timing of the proposed works will also take account of the fisheries constraints within the study area, where no works will be undertaken in the instream/near-stream environment during the salmonid close season (October–March annually), which also avoids the lamprey spawning season, as a precautionary measure.

- All access tracks, foundations and areas of hardstanding will be designed to minimise excavation on the site and to reduce the risk of sediment runoff. The drainage management system will be constructed to ensure that all 'dirty' water is intercepted and is fully attenuated by passing it through a treatment train to remove all sediment. Runoff, once treated, will be discharged via a buffered outfall to ensure that no erosion of soil occurs.

- All infrastructures shall have a setback 50m away from all streams within the site except for the locations of watercourse crossings. Any access tracks crossing watercourses will be constructed as clear span bridges (bottomless culverts), insofar as is possible to minimise works within/in the immediate vicinity of watercourses. Where access tracks pass close to watercourses, silt fencing will be used to protect the streams. A sealed silt fence will be placed at both sides of any crossing points and to a minimum of 10m upstream and downstream of each crossing at both sides of the access track. The maintenance and monitoring of such silt fences will be subject to an on-site water quality monitoring programme.

- Temporary spoil heaps from the excavations for the turbine bases and trenches (where cables are to be buried) will be covered with geotextile and surrounded by silt fences to filter sediment

from the surface water run-off from excavated material. Spoil will only be stockpiled on-site for a short duration and will be used for landscaping/reinstatement (e.g. berms) or will be disposed of in the dedicated spoil deposition areas. Berms will be surrounded by silt fencing until vegetation has been established in the following growing season.

- Secure concrete washout areas will be designated on site and the washout of concrete trucks will only be permitted at these locations.
- Standing water in the excavations at the turbine bases will contain an increased concentration of suspended solids. The excavations will be pumped into the drainage treatment train and all such water will be fully treated prior to discharge.
- Portaloos will be used to provide toilet facilities for site personnel and all sanitary waste will be removed from site via a licensed waste disposal contractor and will not be discharged on site.
- Any diesel or fuel oils stored on site will stored in the temporary construction compound and will be bunded to 110% of the capacity of the storage tank. The bund will also be roofed to avoid the ingress of rainwater. Such facilities will not be located near any drain or watercourse and will be placed as far away from any drainage feature as is possible. Design and installation of fuel tanks will be in accordance with best practice guidelines.
- From the construction compound, fuel will be transported to works area by a 4x4 in a double skinned bowser with drip trays under a strict protocol and carried out by suitably trained personnel. The bowser/4x4 will be fully stocked with spill kits and absorbent material, with delivery personnel being fully trained to deal with any accidental spills. The bowser will be bunded appropriately for its carrying capacity.

2.1.2 Habitats and Flora

Wind Farm Development

The habitats on the proposed wind farm site are typically of Local Importance only and are habitats that are widespread and common across Ireland and the Co. Monaghan countryside. A total of 10 habitats described as per Fossitt (2000) were recorded within this area: Eroding / Upland Rivers (FW1); Treelines (WL2); Hedgerows (WL1); Drainage Ditches (FW4); Buildings and Artificial Surfaces (BL3); Wet Grassland (GS4); Mixed Broadleaved Woodland (WD1); Poor Fen and Flush (PF2); Improved Agricultural Grassland (GA1) and Scrub (WS1).

A large area of degraded poor fen and flush habitat is located alongside the arterial access track from R189 to T7, with some scrub / poor fen and flush mosaic habitat also present. This is the most ecologically important area of the site. It is almost entirely avoided by the proposed access track.

All watercourses recorded in the current habitat surveys were identified as being Eroding / Upland Rivers (FW1). The habitats recorded on site are shown on Figure 2.1a and 2.1b.

Grid Connection Option G1

The majority of habitats noted along the grid connection Option G1 are considered to be similar to those of the proposed wind farm site. These habitats mostly consist of improved agricultural grassland, hedgerows and treelines. There will be direct habitat loss at the footprint of each poleset required for the grid connection route. It is considered that this area of habitat loss is very minor.

Grid Connection Option G2

The majority of habitats noted along the grid connection Option G2 are considered to be similar to those of the proposed wind farm site. These habitats mostly consist of improved agricultural grassland, hedgerows and treelines. There will be direct habitat loss at the footprint of each poleset required for the grid connection route. It is considered that this area of habitat loss is very minor.

Grid connection Option G2 does cross some previously identified Sensitive Receptor Areas. The areas of particular note are the River Bunnoe and associated wetland area. This habitat is considered to be of more importance to wildlife. However, again the direct loss of habitat would indeed be minor.

Grid Connection Option G3

The majority of habitats noted along the grid connection Option G3 are considered to be similar to those of the proposed wind farm site. These habitats mostly consist of improved agricultural grassland, hedgerows and treelines. There will be direct habitat loss at the footprint of each poleset required for the grid connection route. It is considered that this area of habitat loss is very minor. Option G3 also involves a substation. However, the footprint of the substation is also small and would results in minor habitat loss. Option G3 would have the least amount of impact on habitats in the study area.

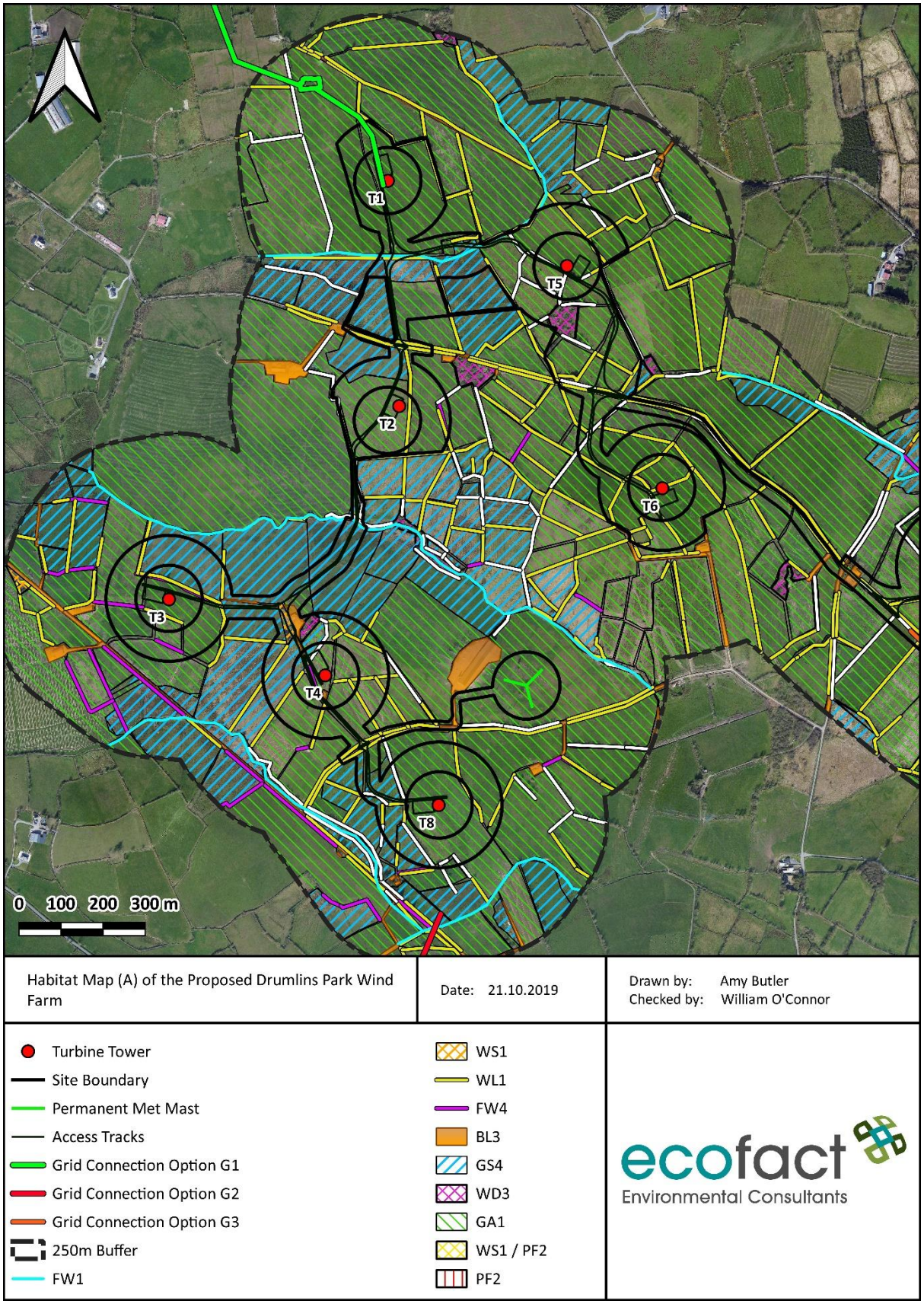

Figure 2.1a Habitat Map (A) of the Proposed Drumlins Park Wind Farm

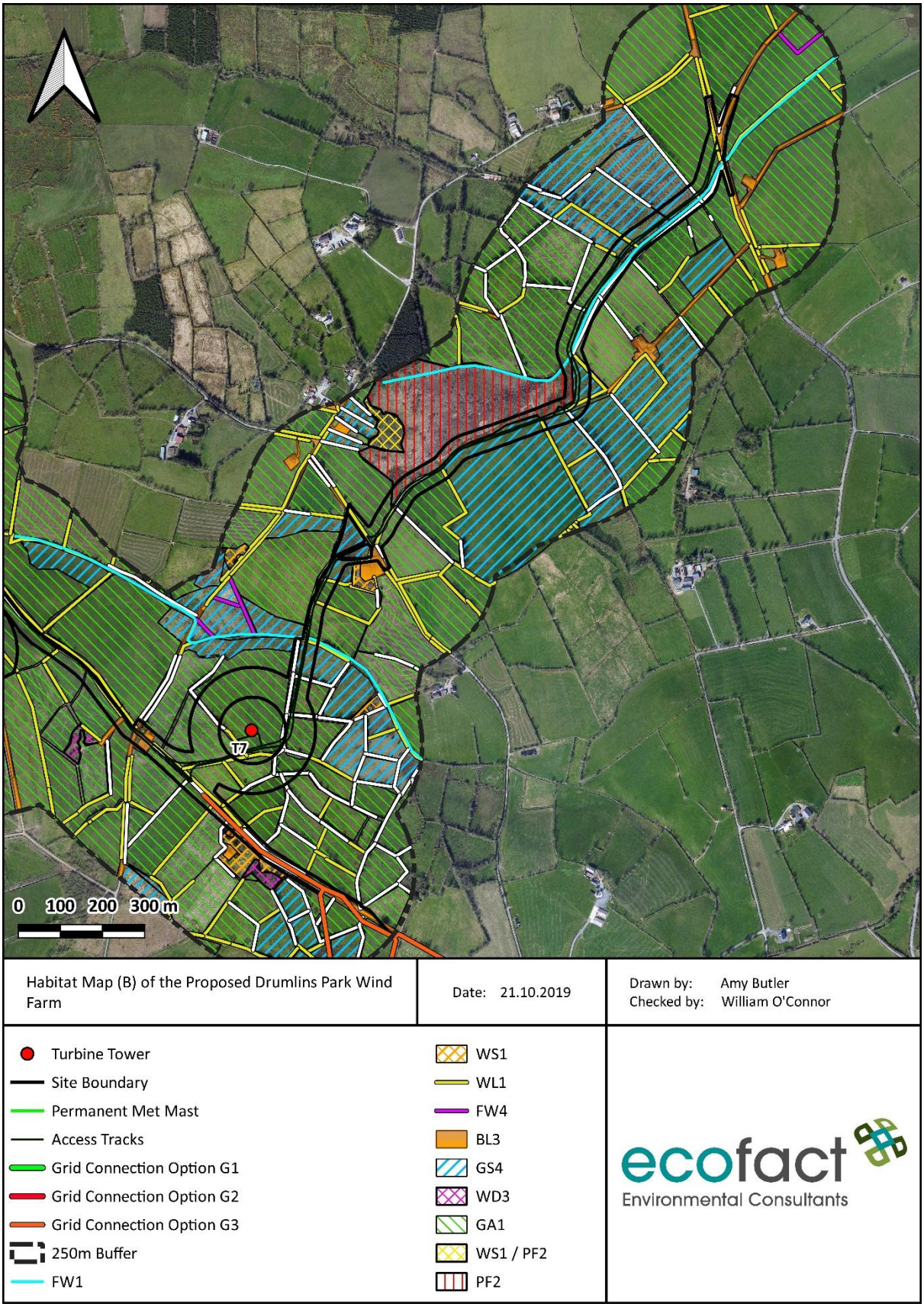

Figure 2.1b Habitat Map (B) of the Proposed Drumlins Park Wind Farm

2.1.2.1 Mitigation Measures

- Land clearance and soil stripping within the footprint of the works will be limited to the works area, with habitats outside of the required works or access requirements left intact. Disturbed areas within the footprint of the works will be allowed to regenerate naturally or will be reseeded with native species. The required works footprint for the proposed development, including turbine locations, access roads etc will be clearly defined to reduce land take impacts affecting habitats during construction. Fencing of the works area during construction will minimise impacts on adjoining habitats. Specifically, where the access road from the R189 to T7 runs adjacent to the Newbliss Stream, berms will be created during the construction phase to ensure run-off from this access road does not enter this watercourse. Silt fences, and other water treatment measures will also be provided in this area to prevent run-off to the Newbliss stream.
- Replanting for loss of hedgerow habitats will ensure that there is no net loss of these locally important habitats within the study area. Any planting to be carried out will utilise native species only and will take cognisance of the existing habitat structure within the local landscape. It is noted that the replanting will be undertaken to maintain the wildlife value of the site – rather than improve it for species such as Buzzards and Kestrels.
- Excess material arising from excavations for the polesets (associated with grid connection Options G1 and G2) will be disposed of through a registered waste company and will not be used for infilling any areas other than those areas excavated for the proposed development. There will be no permanent stockpiles in situ following the completion of construction. Polesets will be set back from riparian areas near any watercourse crossings. No instream works will be undertaken as part of grid connection works. Relevant guidelines listed above will ensure care is taken when working alongside watercourses. Any temporary storage of excavated material will be in assigned areas, in habitats of low ecological value. Upon completion of the works at each section of the proposed development, there will be a site clean-up, where the site will be returned to its pre-construction condition or better.
- To ensure biosecurity measures are implemented, an Invasive Species Management Plan will be prepared and incorporated into the CEMP, prior to the commencement of development. The Invasive Species Management Plan will incorporate measures set out

in 'The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads' by NRA (2010).

A summary of the impacts on key habitats and flora receptors and the associated mitigation measures that will be implemented are outlined in Table 2.1.

Table 2.1 Summary of impacts and mitigation on key habitats and flora receptors

Ecological Receptors	Potential Impacts	Mitigation
Eroding / Upland Rivers (FW1)	Riparian Disturbance, Water Quality Pollution	• Water quality protection minimise works area near streams, biosecurity.
Poor Fen and Flush (PF2)	Disturbance, Water Quality Pollution	• Minimise works footprint, water quality protection, biosecurity.
Mixed Broadleaved Woodland (WD1)	Minor Habitat Loss	• Minimise works footprint, biosecurity.
Scrub (WS1)	Minor Habitat Loss	• Minimise works footprint, biosecurity.
Wet Grassland (GS4)	Minor Habitat Loss	• Minimise works footprint, biosecurity.
Hedgerows (WL1)	Minor Habitat Loss	• Minimise works footprint, biosecurity, replanting.
Treelines (WL2)	Minor Habitat Loss	• Minimise works footprint, biosecurity, replanting.

2.1.3 Fauna

Desktop studies and the following field surveys were used to record data for the fauna within the development footprint and assess potential impacts:

- Non-volant mammal survey
- Bat survey
- Bird survey
- Aquatic ecology survey
- Walkover and habitat survey included – reptiles, amphibians and macroinvertebrates

2.1.3.1 Mitigation Measures

Non-volant Mammals

- Temporary fencing will be erected around the required site works to delineate the works area and to minimise the likelihood for disturbance impacts outside of the works area. As no mammal dwellings were identified within the impact area of the proposed development, there is no specific mitigation required for the protection of mammals in relation to relocation / construction of artificial dwellings. However, it is noted that pre-construction surveys should be undertaken on the site to ensure no active mammal dwellings have been created prior to construction.
- The retention of areas of habitats and linear features such as treelines and hedgerows will reduce impacts on many common mammal species within the site. It is recommended that hedgerow removal, if required will be carried out slowly to ensure that any mammals present can escape, such as hares.
- For the protection of mammals, works will only be undertaken during daylight hours only to avoid disturbance impacts.

Bats

- Bats are most active, particularly in relation to foraging, at night-time and therefore construction works will only be undertaken during daylight hours with no works being carried out between dusk and dawn (except in exceptional circumstances). Furthermore, there will be no illumination of hedgerows / treelines / scrub habitats as these are likely to be used by commuting / foraging bats and any such illumination may interrupt normal behaviour. Any mature trees required to be felled will be checked in advance for usage by bats by a suitably qualified bat ecologist. The NRA (2006) 'Guidelines for the Treatment of Bats during the construction of road schemes' will also be followed as relevant.
- Where required, hedgerows and treelines will be removed to ensure a minimum distance of 50m between hedgerows/treelines and the turbine blade tips is provided. Any hedgerow which is removed will be replanted elsewhere within the site but will be carefully located (locations to be selected by the ECoW) so as not to attract commuting or foraging bats towards turbine locations.
- Regarding grid connection Options G1 and G2, polesets will be set back from hedgerows and treelines as much as possible so as to reduce the likely impact of foraging habitat loss during the construction phase.

Birds

- No hedgerows or treelines on the site will be cleared during the bird nesting season which runs from 1st March to the 31st of August. Hedgerow and treeline clearance will be kept to a minimum as

required.

Aquatic Ecology

- The water quality and invasive species mitigation listed above will be implemented.
- The mitigation measures listed above for impacts on habitats and flora during the construction phase will be implemented.

Reptiles & Amphibians

- The water quality mitigation listed above will be implemented.
- Pre-construction surveys are recommended for Smooth Newt and Common Frog in any of the drainage ditches affected by the proposed development. A derogation licence may be required from NPWS if any of these species are found on the site. Biosecurity mitigation is provided above which will also ensure there are no likely significant invasive species impacts which may affect amphibians.
- Pre-construction surveys will also be undertaken at specified locations should either grid connection Option G1 or G2 be constructed.

Terrestrial Macroinvertebrates

- The mitigation measures provided above for the protection of habitats and flora during the construction phase will be implemented.

Summary of Impacts

A summary of impacts to key fauna receptors and the associated mitigation measures that will be implemented are outlined in Table 2.2.

Table 2.2 Summary of impacts and mitigation impacts on key fauna receptors

Ecological Receptors	Potential Impacts	Mitigation
Pine Marten	Minor habitat loss, disturbance and noise	• No mitigation required.
Bats	Minor habitat loss and fragmentation, disturbance, collisions, barotrauma	• Minimise works footprint, check trees, replanting.
Birds	Minor habitat loss and	• Minimise works footprint, avoid bird nesting season for vegetation clearance, site will not be managed in a way that would attract raptors.

Ecological Receptors	Potential Impacts	Mitigation
	fragmentation, disturbance, collisions, displacement	

2.2 LAND & SOILS

The development of the wind farm site will typically involve removal of soil and subsoil (bedrock unlikely) for the emplacement of access tracks, turbine foundations, and crane hardstandings and underground electrical cabling. Crushed rock for construction will be sourced from local quarries.

The excavation for each pole, associated with grid connection options G1 and G2, will be carried out using a tracked excavator. Excavations will be to a depth of approximately 2.3m. Excavated material will be side cast and used for the reinstatement/backfilling of the pole.

The trench, within which the UGL sections will be placed, will be typically 0.6m wide by 1.2m deep. The trench will be reinstated to ESB specifications and backfilled with subsoil and finished with topsoil as appropriate.

Excess overburden/spoil that remains after landscaping and reinstatement will be accommodated within the on-site spoil deposition areas. However, material that has the potential to cause contamination (e.g. road cutting) will be removed off-site and disposed of at a licensed waste facility. As waste license permits are subject to renewal, it is not currently possible to confirm the precise location for the disposal of excess spoil; however, having reviewed the National Waste Collection Permit Office (NWCPO) database, there are a number of facilities within County Monaghan which currently accept soil and rock arising from construction projects.

The estimated volumes of topsoil and subsoil generated from excavation works are shown in Table 2.2. The overburden will be re-used on site where possible and any material that cannot be reused will be removed off-site to a licensed waste facility. **Table 2.3** Estimated volumes (m^3) of Topsoil and Subsoil generated from grid connection construction elements.

Table 2.3: Summary Excavation Volumes

Element	Estimated Total Excavation Volume (m^3)	Estimated Total Reinstatement Volume (m^3)	Estimated Volume for On-site and Off-site Storage (m^3)
Wind farm	59,803m^3	32,331m^3	27,472m^3 in spoil deposition area
Clones Grid Connection Option (incl. substation)*	300m^3	30m^3	270m^3 in spoil deposition area
Shankill Grid Connection Option (incl. substation)*	600m^3	60m^3	270m^3 in spoil deposition area and 270m^3 to licensed waste disposal facility
110kV Grid Connection Option (incl. substation)*	14,132m^3	-	14,132m^3 in spoil deposition area
Haul Route Works	1,000m^3	300m^3	700m^3 to licensed waste disposal facility

* Only one grid connection option will be constructed.

2.2.1 Erosion of Exposed Soil and Subsoil at Excavation and Storage Areas

Mitigation by Design

- Excavated soil will be side cast and stored temporarily adjacent to excavation areas for reuse during reinstatement and landscaping.
- Silt fences will be installed around all temporary stockpiles to limit movement of entrained sediment in surface water runoff. All slopes will be sealed with the bucket of an excavator.
- At the designated spoil deposition areas, material will be placed in layers to ensure stability is maintained and works will be undertaken in accordance with best practice construction methodologies. Works at the spoil deposition areas will be monitored, on a weekly basis during the construction phase and monthly for a 6 no. month period thereafter, by an appropriately qualified Geotechnical Engineer. In the event that any ground stability issues arise, the Engineer will have the power to cease works until such time as remedial works have been completed to his/her satisfaction.
- In order to minimise runoff during the construction phase, works will not take place during periods of intense or prolonged rainfall (to prevent increased silt laden runoff). Drainage control systems, as outlined in Chapter 7, will be implemented to limit runoff effects during the construction phase.
- Bog mats will be used, as necessary, to support construction plant and machinery on soft ground, thus reducing the likelihood for soil and subsoil erosion and avoiding the formation of rutted areas. This will substantially reduce the likelihood for surface water ponding to occur.

- Permanently mounded soils and subsoils; for example berms surrounding turbines and hardstands, berms located along access tracks and at the spoil deposition areas; will be seeded and grassed over at the earliest opportunity to prevent erosion.
- In respect of the proposed grid connection options; excavated material at the respective substation locations will be utilised for reinstatement and landscaping purposes. At UGL locations, the trench will be reinstated and graded in accordance with the specifications of the local authority or landowner as appropriate. The ground around the OHL pole locations will be reinstated back to its natural level and profile to the satisfaction of the landowner and reseeded or allowed to vegetate naturally.

2.2.2 Contamination of Soils and Subsoils by leakages, spillages of hydrocarbons or other chemicals

Mitigation by Design

- The volume of fuels or oils stored on site will be minimised. All fuel and oil will be stored in an appropriately bunded area within the temporary construction compound. Only an appropriate volume of fuel will be stored at any given time. The bunded area will be roofed to avoid the ingress of rainfall and will be fitted with a storm drainage system and an appropriate oil interceptor.
- All bunded areas will have 110% capacity of the volume to be stored.
- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled at the temporary compound and will be towed around the site by a 4x4 jeep to where plant and machinery is located. The 4x4 jeep will also be fully stocked with fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations to avoid any accidental leakages.
- All plant and machinery used during construction will be regularly inspected for leaks and fitness for purpose.
- Spill kits will be available to deal with and accidental spillage in and outside the re-fuelling area;
- All waste tar material arising from road cuttings (from trenching in public roads) will be removed off-site and taken to licenced waste facility. Due to the potential for contamination of soils and subsoils, it is not proposed to utilise this material for any reinstatement works.

- An outline emergency plan for the construction phase to deal with accidental spillages (CEMP, Management Plan 1). This emergency plan will be further developed by the contractor prior to the commencement of construction.

2.3 WATER

2.3.1 Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Water

Mitigation by Avoidance

Except for the arterial access track, the access track between T1 and T5, the southern corner of the 110kV substation and the watercourse crossing locations, a 50m hydrological buffer will be maintained on site.

Mitigation by Design

To ensure that surface water features are protected from the release of silt or sediment and to ensure that all surface water runoff is fully attenuated to avoid the discharge of dirty water the following mitigation measures will be implemented:

- Source controls to limit the likelihood for 'dirty water' to occur:
    - Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with clean washed gravel, filter fabrics, and other similar/equivalent or appropriate systems.
    - Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.

- In-Line controls to ensure appropriate management of silt laden water:
    - Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.

- Treatment systems to fully attenuate silt laden waters prior to discharge:

- Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems.

It should be noted for this site that an extensive network of land drains already exists, and these will be integrated and enhanced as required and used within the wind farm development drainage system. The integration of the existing land drainage network and the proposed wind farm network is common practice in wind energy developments and will also result in benefits to surrounding agricultural lands.

- The main elements of interaction with existing drains will be as follows:
  - Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction, and attenuation for flow management) of runoff from the proposed wind farm drainage into the existing site drainage network. This will reduce the likelihood for any increased risk of downstream flooding or sediment transport/erosion.
  - Silt traps will be placed in the existing drains upstream of any streams where construction works is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area.
  - During the operational phase of the wind farm, runoff from individual turbine hardstanding areas will be not discharged into the existing drain network but discharged locally at each turbine location through stilling ponds and buffered outfalls onto vegetated surfaces.
  - Buffered outfalls which will be numerous over the site will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site.
  - Drains running parallel to the existing roads that requiring widening will be upgraded. Velocity and silt control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles and silt fences will be used during the upgrade works. Regular buffered outfalls will also be added to these drains to protect downstream surface waters.

Water Treatment Train

A final line of defence can be provided by a water treatment train such as a “Siltbuster” if required. If the discharge water from construction areas fails to be of a high quality then a filtration treatment system (such as a ‘Siltbuster’ or similar equivalent treatment train (sequence of water treatment

processes) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This water treatment train will apply for the entirety of the construction phase.

Silt Fences

Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to watercourses of sand and gravel sized sediment released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. Double silt fences will be emplaced within drains down-gradient of all construction areas inside the hydrological buffer zones to provide an additional layer of protection in these areas.

Silt Bags

Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats (sediment entrapment mats, consisting of coir or jute matting) placed at the silt bag location to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.

Management of Runoff from Soil Deposition Areas

It is proposed that excavated soil and subsoil will be used for reinstatement and landscaping throughout the site and any excess material will be placed in 2 no. spoil deposition areas at the wind farm site.

Both proposed spoil deposition areas are located outside the 50m stream buffer zone and outline in the Spoil Management Plan (Management Plan 4).

During the initial placement of spoil in the deposition areas, silt fences, straw bales and biodegradable matting will be used to control surface water runoff. Drainage from overburden deposition areas will ultimately be routed to an oversized swale and a number of settlement ponds and a 'Siltbuster' with appropriate storage and settlement capacity, designed for a 1 in 100-year 6-hour return period, before being discharged to the on-site drains.

Spoil deposition areas will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. Once re-vegetated and stabilised, soil/subsoil deposition areas will no longer be a likely source of silt laden runoff. Settlement ponds will be left in place until the areas have stabilised.

Overhead Line (OHL) Installation Works

Silt fences will be placed down-gradient of the proposed OHL pole locations during construction work within 50m of a stream/river. All material at the pole locations will be backfilled and reinstated at the pole locations. The bare ground will be re-seeded immediately after the works to prevent erosion. If required the silt fencing will be left in place until the ground has re-vegetated and the established root structure will prevent erosion.

Underground Line (UGL) Installation Works

Temporary silt fencing/silt trap arrangements will be placed within existing roadside/field drainage features along the route to remove any suspended sediments from the works area. The trapped sediment will be removed and disposed at an appropriate licenced facility. The bare ground re-seeded/reinstated immediately and silt fencing temporally left in place if necessary.

Pre-emptive Site Drainage Management

The works programme for the initial construction stage of the development will also take account of weather forecasts, and predicted rainfall in particular. Large excavations and movements of soil/subsoil or vegetation stripping will be suspended or scaled back if prolonged or intense rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

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

- General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates;
- Meteo Alarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale;

- Hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events;
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and,
- Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.

Using the safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of an impending high rainfall intensity event. Works will be suspended if forecasting suggests either of the following is likely to occur:

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

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

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

Timing of Site Construction Works

The Construction of the site drainage system will be carried out, at the respective location, prior to other activities being commenced. The construction of the drainage system will only be carried out during periods of low rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and functional for all subsequent construction works.

Monitoring

Prior to the commencement of development, a detailed Site Drainage Plan (SDP) and Surface Water Management Plan (SWMP) will be prepared to detail the siting and composition of the surface water management measures. The respective Plans, which will form part of the detailed Construction Environmental Management Plan (CEMP), will be agreed in writing with the Planning Authority. An outline SWMP is attached to this document as Management Plan 2.

The SWMP will also include a programme for the monitoring of surface waters in the vicinity of the construction site by a designated Environmental Manager. The monitoring programme will comprise field testing and laboratory analysis of a range of agreed parameters. The civil works contractor, who will be responsible for the construction of the site drainage system, and Environmental Manager will undertake regular inspections of the drainage system to ensure that all measures are functioning effectively. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended. Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed and disposed of in an appropriate manner.

2.3.2 Excavation Dewatering and Potential Impacts on Surface Water Quality

The management of excavation dewatering (pumping) and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

- Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations, will be put in place.
- The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters.
- If required, pumping of excavation inflows will prevent build up of water in the excavation.
- The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a Siltbuster unit.
- There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur.

- Daily monitoring of wind farm excavations by the Environmental Manager will occur during the construction phase. If high levels of seepage inflow occur, excavation work at this location will cease immediately and a geotechnical assessment undertaken.
- A mobile 'Siltbuster' or similar equivalent specialist treatment system will be available on-site for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if needed.

2.3.3 Potential Release of Hydrocarbons during Construction and Storage

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- The volume of fuels or oils stored on site will be minimised. All fuel and oil will be stored in an appropriately bunded area within the temporary construction compound. Only an appropriate volume of fuel will be stored at any given time. The bunded area will be roofed to avoid the ingress of rainfall and will be fitted with a storm drainage system and an appropriate oil interceptor;
- All bunded areas will have 110% capacity of the volume to be stored;
- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled at the temporary compound and will be towed around the site by a 4x4 jeep to where plant and machinery is located. No refuelling will be permitted at works locations within the 50m hydrological buffer. The 4x4 jeep will also be fully stocked with fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations to avoid any accidental leakages;
- All plant and machinery used during construction will be regularly inspected for leaks and fitness for purpose;
- Spill kits will be readily available to deal with and accidental spillage in;
- All waste tar material arising from road cuttings (from trenching or other works in public roads) will be removed off-site and taken to a licensed waste facility. Due to the potential for contamination of soils and subsoils, it is not proposed to utilise this material for any reinstatement works; and

- An outline emergency plan (Management Plan 1) has been developed for the construction phase. It details how to deal with accidental spillages. This emergency plan will be further developed prior to the commencement of development, and will be agreed with the Planning Authority as part of the detailed CEMP.

2.3.4 Groundwater and Surface Water Contamination from Wastewater Disposal

Measures to avoid contamination of ground and surface waters by wastewaters will comprise:

- The provision of self-contained port-a-loos (chemical toilets) with an integrated waste holding tank will be installed at the site compound, maintained by the providing contractor, and removed from site on completion of the construction works.
- Water supply for the site office and other sanitation will be brought to site and removed after use to be discharged at a suitable off-site treatment location.
- No water will be sourced on the site, nor will any wastewater be discharged to the site.

2.3.5 Release of Cement-Based Products

The following mitigation measures are proposed to ensure that the release of cement-based products is avoided:

- No batching of wet-cement products will occur on site. Ready-mixed concrete will be brought to site as required and, where possible, pre-cast products, will be utilised.
- All watercourse crossings will utilise pre-cast products and the use of wet-cement products within the hydrological buffer will be avoided insofar as possible.
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. Chute cleaning will be undertaken at lined cement washout ponds with waters being tankered and stored in the temporary construction compound, removed off site and disposed of at an approved licensed facility. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.
- Weather forecasting will be used to ensure that prolonged or intense rainfall is not predicted during concrete pouring activities.
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

2.3.6 Morphological Changes to Surface Water Courses & Drainage Patterns

The following mitigation measures are proposed:

- Where possible, all proposed new stream crossings will be clear span bridges (bottomless culverts) and the stream beds will remain undisturbed. There will be no in-stream excavation works at the crossing locations.
- Where wind farm electrical cabling connecting to the 110kV substation follows the public road, the cable will pass above or below the existing culvert and will not directly interfere with the culvert;
- At the time of construction, all guidance/best practice requirements of the Office of Public Works (OPW) or Inland Fisheries Ireland will be incorporated into the design/construction of the proposed watercourse/culvert crossings;
- As a further precaution, in-stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites", i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);
- During the near stream construction works, double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase;
- All new river crossings and watercourse diversions (watercourses mapped on OSI mapping) will require a Section 50 license application to the OPW in accordance with the Arterial Drainage Act 1945. The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent; and,
- All drain diversion work will be carried out during periods of low flow in order to reduce sedimentation effects on downstream watercourses. Where diversions are required, the revised routing of drainage channels will be constructed prior to the disturbance of the existing channel. The revised channel will be constructed to replicate the hydraulic capacity of the existing channel. Appropriate control measures will be implemented along the revised channel to ensure that any sediment entrained along the channel is treated.

2.5 AIR QUALITY AND CLIMATE

The proposed development may result in a temporary negative impact on local air quality during the construction phase, as a result of localised emissions from construction traffic and dust emissions during dry weather periods.

Mitigation Measures

A detailed Dust Minimisation Plan will be formulated prior to the construction phase of the project Measures to be included within the Dust Minimisation Plan will include:

- Access tracks and public roads in the vicinity of the site shall be regularly cleaned to remove mud, aggregates and debris and maintained as appropriate. All road sweepers shall be water assisted;
- Any road that has the potential to give rise to fugitive dust shall be regularly watered, as appropriate, during dry and/or windy conditions;
- Vehicles delivering material with dust potential shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;
- Public roads in the vicinity of the site shall be regularly inspected for cleanliness and cleaned as necessary;
- In the event of dust nuisance occurring outside the site boundary, movement of materials will be immediately terminated, and satisfactory procedures implemented to rectify the problem before the resumption of operations;
- If issues persist and the above measures are not satisfactorily control dust emissions, a wheel washing system with rumble grids to dislodge accumulated dust and mud prior to leaving the site should be installed; and
- The dust minimisation plan shall be reviewed at regular intervals during the construction phase to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures.

2.6 LANDSCAPE

The proposed Drumlins Park Wind Farm has been assessed to determine the likely landscape and visual impacts of the scheme on the receiving environment. The landscape and visual impacts of the proposed development are discussed in detail in the EIAR.

Mitigation Measures

Aside from construction stage mitigation measures to minimise land and vegetation disturbance and dust emissions, there are no specific mitigation measures to be implemented. The appropriate management and reinstatement of excavations, in a timely manner, will ensure that any adverse effects caused, for example at site entrances or road upgrade locations, are minimised insofar as possible. Similarly, the progressive reinstatement and landscaping of the site will remediate any short term adverse effects on the local landscape.

The proposed development has embedded landscape and visual mitigation measures and thus, the appraisal of potential landscape and visual effects is equivalent to any appraisal of residual effects in this instance.

Some of the general mitigation measures that will be implemented to make the development less intrusive and less eye catching on a localised level include:

- The colour will be industry standard off-white/light grey semi-matt non-reflective finish
- Transmission lines between individual turbines and the substation will be placed underground
- Special care will be taken to preserve any features, insofar as possible, which contribute to the landscape character of the study area
- Counter rotation of blade sets will be avoided

2.7 ARCHAEOLOGY AND CULTURAL HERITAGE

- Post-consent pre-construction test trenching shall be carried out in areas of the development footprint in close proximity to the three Recorded Monuments located within 100m of proposed wind turbines T4, T6 and T7. Test trenching will be carried out under licence to the Department of Culture, Heritage and the Gaeltacht and the National Museum of Ireland. Provision will be made for the full excavation and recording of any archaeological features or deposits that may be exposed during test trenching;
- Archaeological monitoring of all excavations associated with construction of the wind farm shall be carried out. Monitoring will be carried out under licence to the Department of Culture, Heritage and the Gaeltacht and the National Museum of Ireland. Provision will be made for the full excavation and recording of any archaeological features or deposits that may be exposed during monitoring;
- Archaeological monitoring of all excavations in the vicinity of Recorded Monuments located within 100m of the grid connection options shall be carried out. Monitoring will be carried out under licence to the Department of Culture, Heritage and the Gaeltacht and the National Museum of Ireland. Provision will be made for the full excavation and recording of any archaeological features or deposits that may be exposed during monitoring;
- Archaeological monitoring of all excavations associated with installation of UGL elements of the grid connection options shall be carried out. Monitoring will be carried out under licence to the Department of Culture, Heritage and the Gaeltacht and the National Museum of Ireland. Provision will be made for the full excavation and recording of any archaeological features or deposits that may be exposed during monitoring;

- Intermittent archaeological monitoring of all excavations associated with construction of the OHL elements of the grid connection options shall be carried out. Monitoring will be carried out under licence to the Department of Culture, Heritage and the Gaeltacht and the National Museum of Ireland. Provision will be made for the full excavation and recording of any archaeological features or deposits that may be exposed during monitoring;
- Archaeological monitoring of all excavations at townland, parish, barony or county boundaries shall be carried out. Monitoring will be carried out under licence to the Department of Culture, Heritage and the Gaeltacht and the National Museum of Ireland. Provision will be made for the full excavation and recording of any archaeological features or deposits that may be exposed during monitoring;
- Written and photographic records will be created of any townland, parish, barony or county boundaries that may be impacted on. The written and photographic records will be created in advance of excavations commencing on site; and
- Given their proximity to existing heritage features, it is recommended that micrositing should not be considered in respect of turbines T4, T6 or T7 should it result in turbines being located within 50m of the Recorded Monuments in these three areas. In addition, it is recommended that micrositing should not be considered in respect of turbines T4, T6 or T7 should it result in associated infrastructure being located within 10m of the Recorded Monuments in these three areas.

2.8 NOISE & VIBRATION

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and may consider noise limits at their discretion.

In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise. Chapter 11 of the EIAR sets out the values which, when exceeded, potentially signify a significant effect at the facades of residential receptors as recommended by BS5228-1. These levels related to construction noise only.

For the appropriate period (e.g. daytime) the ambient noise level is determined and rounded to the nearest 5 dB. In this instance, with the rural nature of the site, properties near the development have

daytime ambient noise levels that typically range from 45 to 55 dB $L_{Aeq,1hr}$. Therefore, all properties will be afforded a Category A designation. This assessment method is only valid for residential properties.

Table 2.4: Example Threshold of Potential Significant Effect at Dwellings

Assessment category and threshold value period (T)	Threshold values, $L_{Aeq,T}$ dB		
	Category A Note A	Category B Note B	Category C Note C
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and weekends Note D	55	60	65
Daytime (07:00 – 19:00hrs) and Saturdays (07:00 – 13:00hrs)	65	70	75

Note A *Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.*

Note B *Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.*

Note C *Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.*

Note D *19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.*

Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- BS 7385 – Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration (1993); and
- BS 5228 – Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration (2009+A1:2014).

BS 7385 states that there should typically be no cosmetic damage if transient vibration does not exceed 15 mm/s at low frequencies rising to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above. These guidelines relate to relatively modern buildings and should be reduced to 50% or less for more critical or sensitive buildings.

BS 5228 recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak particle velocity of 15 mm/s for transient vibration at frequencies below 15 Hz and 20 mm/s at frequencies greater than 15 Hz.

2.8.1 Mitigation Measures

Construction Phase

A detailed suite of construction phase mitigation measures is located within the EIAR**.**

Construction activities will be completed in accordance with the provisions, where relevant, of BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise which offers detailed guidance on the control of noise & vibration from demolition and construction activities. The following practices will be adopted during construction:

- 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.
- Monitoring typical levels of noise and vibration during critical periods and at sensitive locations.
- Keeping site access tracks even to mitigate the potential for vibration from HGVs.

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.
- Placing of noisy/vibratory plant as far away from sensitive properties as permitted by site constraints.
- Regular maintenance and servicing of plant items.

Noise Mitigation Measures

The following list of measures will be implemented, as relevant, to ensure compliance with the relevant construction noise criteria:

- No plant or machinery will be permitted to cause a public nuisance due to noise.
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.

- Any plant, such as generators or pumps, which may be required to operate outside of general construction hours will be surrounded by an acoustic enclosure or portable screen.
- During the course of the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Table 11.4 using methods outlined in BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise.
- The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 07:30hrs and 20:00hrs Monday to Friday and between 07:30hrs and 18:00hrs on Saturdays, with no operations on Sundays or public holidays. However, to ensure that optimal use is made of good weather periods, at occasional critical periods within the construction programme (i.e. concrete pours, rotor/tower deliveries and turbine erection) or in the event of an emergency; activities may be necessary outside out of these hours.

In the unlikely event that rock breaking is required, the following measures will be implemented, where necessary, to mitigate noise emissions:

- Fit suitably designed muffler or sound reduction equipment to the rock breaking tool to reduce noise without impairing machine efficiency.
- Ensure all air lines are sealed.
- Use a dampened bit to eliminate a 'ringing' sound.
- Erect an acoustic screen between compressors or generators and noise sensitive area. When possible, line of sight between top of machine and reception point will be obscured.

2.9 SHADOW FLICKER

No likely significant effects are likely to occur during the construction phase. Therefore, no specific mitigation measures are proposed.

2.10 MATERIAL ASSETS

2.10.1 Transport & Access

The construction period of the proposed development is estimated to take approximately 12-18 months, with the majority of traffic movements being associated with the construction of access tracks, hardstands and turbine foundations. During this period, there will be trips associated with the arrival and departure of construction staff and with the delivery of aggregates, reinforcing steel and

ready-mix concrete. Staff trips will mainly be made using cars and vans, while deliveries of steel, concrete, and rock and other general construction materials will be made by HGV.

The following mitigation measures will be implemented:

- Traffic movements will be limited to 07:30 - 20:00 Monday to Friday and 07:30 – 18:00 on Saturdays with no movements on Sundays or public holidays. It may be occasionally necessary to undertake works outside of these hours to avail of favourable weather conditions or during extended concrete pours. Where construction activities are necessary outside of the normal working hours, local residents and the Planning Authority will receive prior notification.
- Wheel washing equipment will be used, as necessary, to prevent any debris being transferred from site to the adjacent public roads. All drivers will be required to ensure that their vehicle is free from dirt and stones prior to departure from the construction site. Where conditions exist for dust to become friable, techniques such as damping down of the affected areas will be employed and vehicles/loads will be covered to reduce dust emissions.
- A Traffic Management Plan shall be developed and agreed as part of the detailed Construction Environmental Management Plan (CEMP) with the Local Authority prior to the commencement of development.
- All works to the public road shall be undertaken in consultation with, and agreed in advance with, the Local Authority.
- All reasonable steps shall be taken to ensure that only national and regional routes are used to transport all materials to the site, in so far as is possible.
- Prior to and post construction, pavement and bridge surveys will be undertaken along access routes.
- Adequate signage shall be provided at entrances providing access, safety and warning information.
- Traffic restrictions shall be kept to minimum duration and extent.
- Appropriate traffic management; including maintenance of local access, pedestrian access (where safe to do so) and diversions shall be implemented to facilitate continued public use of roads where temporary traffic restrictions have to be put in place.
- The timing of oversized loads shall be agreed with the relevant local authorities and An Garda Síochána.
- A designated contact point and coordinator will be put in place to manage all access arrangement and to interface with the public and the Local Authority.

- No hedgerows or potential breeding habitats to be removed during the summer breeding season.
- The site shall be closed to the public during the construction phase.

2.10.2 Aviation

Due to the absence of likely impacts, there are no specific mitigation measures proposed. As is best practice, warning lights to be fitted to cranes during the installation of the proposed wind turbines.

Prior to the commencement of construction, and as requested by the IAA in their consultation response, a scheme of aeronautical warning lighting for the proposed development will be agreed with the Planning Authority. The 'to be constructed' turbine coordinates, ground and tip height elevations will be provided to the IAA a minimum of thirty days prior to commencement of development.

2.10.3 Telecommunications

No significant effects are assessed as likely to occur during the construction phase. As no likely significant effects are assessed as likely to occur during the construction phase, no specific mitigation measures are proposed.

2.10.4 Resources & Utility Infrastructure

No likely significant effects are likely to occur during the construction phase. Therefore, no specific mitigation measures are proposed.

2.11 CONSTRUCTION WORKS

The Contractor's proposed sequence of works will take due cognisance of the requirements of any stipulated Planning Conditions and by the Contractors Contractual obligations.

2.11.1 Phasing of Works

Prior to the commencement of construction, the contractor will prepare method statements and work programmes that outline a detailed phasing of works. Due to the nature of the development, it is likely that a number of construction crews will be working on the site at any one time. The developer's Project Manager and contractor's Project Manager will ensure that the phasing of work is undertaken in accordance with the prepared method statements and in accordance with a detailed works programme to be prepared and agreed with the Local Authority prior to the commencement of development.

The construction phase will consist of the following sequence:

- The construction of the site entrances, ensuring that requisite traffic visibility splays are provided
- Upgrade works to the L62012 and L62013 will be commenced.
- Progressive construction of internal on-site access tracks
- Construction of the temporary construction compound for off-loading materials and equipment, and to accommodate temporary site offices
- Construction of bunded areas for oil, fuel and lubricant storage tanks
- As the internal access tracks progress to each turbine location, foundation excavations for the turbines will commence and foundations laid. The hardstand areas will be constructed as track construction advances.
- The selected substation and grid connection option will be commenced.
- Upgrade works along the turbine component haul route will be commenced.
- Once the on-site access tracks are completed, the trenching and laying of underground cabling will begin.
- Installation of turbines will commence once the on-site access tracks, hardstands, foundations and drainage measures are in place and the road upgrade works are complete. It is anticipated that each turbine will take 2 to 3 days to install. Two cranes will be used for this operation. As each turbine is completed, the electrical connections will be made.
- Decommissioning of the temporary meteorological mast and installation of the permanent meteorological mast will then take place.
- Progressive site reinstatement, restoration and landscaping including removal of temporary construction compound and turbine storage areas; erection of post-and-wire fencing around turbines, access tracks and at site entrances; and erection of gates and vegetation at site entrances.

Once the turbines are installed, the substation and electrical system completed, the turbines will be tested and commissioned.

2.11.2 Working Hours

The construction phase of the development will comprise a 6no. day week with normal working hours from 07.30 to 20.00 Monday to Friday and 07.30 to 18.00 on Saturdays. It may be necessary to undertake works outside of these hours to avail of favourable weather conditions (e.g. during time of low wind speed to facilitate turbine erection) or during extended concrete pours (e.g. turbine foundation pours must be completed in 1 no. day). Where construction activities are necessary

outside of the normal working hours, local residents and the Local Authority will receive prior notification.

2.11.3 Site Management Procedures and Methodologies

The contractor will be required to prepare targeted method statements for proposed activities on site which demonstrate how the management requirements set out in this CEMP are to be achieved on site. The following sections outline the construction activities which are proposed during the construction of the proposed grid connection. Further details of these activities are discussed in the EIAR.

2.11.4 Site Entrances

Given the pre-existing extensive local road network in the vicinity of the proposed development site, 11 no. site entrances are proposed, 3 no. of which are already in existence and will be upgraded. The 8 no. proposed entrances and 3 no. entrances to be upgraded will be of sufficient width to facilitate turbine delivery and to provide adequate traffic visibility splays and may involve the removal of short sections of road boundaries and hedgerows. At the site entrance adjacent to the proposed temporary compound, in the townland of Drumacreeve, it is proposed to 1 no. small abandoned agricultural building to ensure visibility splays can be provided.

All drains will be appropriately culverted to ensure there is no likely significant impact on any existing drainage features. Following the delivery of turbine components, the scale of site entrances will be reduced but will be reinstated such that they remain capable of accommodating abnormal loads in the event of a major component change-out during the operational phase of development. The reinstatement of site entrances will comprise the erection of post and rail fencing, gates and the planting of hedgerows. Hedgerows will be appropriately located to allow for future growth while ensuring, at all times, that appropriate visibility splays are maintained during the operational phase.

2.11.5 On-Site Access Tracks and Hardstand Areas

The areas of hardstanding for crane operations and on-site access tracks will generally be constructed as follows:

- Topsoil and subsoil will be removed and stored in separate mounds in appropriate areas adjacent to the crane site/access tracks.
- Crushed stone will be laid on a geo-textile mat (where required) and compacted in layers to an appropriate depth.
- Where access tracks are required to cross any drainage ditches, these will be piped and

spanned with an appropriate bridging structure. Where access tracks cross a watercourse, bottomless culverts will be installed (where possible) to prevent any interference with the hydraulic capacity of the watercourse.

- Areas of temporary hardstanding (for turbine component storage and crane assembly) will be reinstated following the construction phase by removing aggregates, replacing the excavated spoil and reseeding. The crane hardstandings and on-site access tracks will be retained during the operational phase to facilitate access for maintenance personnel and in the event of a major component change-out.

2.11.6 Temporary Construction Compound

Topsoil will be removed from the required area and side cast for temporary storage adjacent to the compound area. The compound base will be made up of well graded aggregates, compacted as necessary. A designated waste management area and fuels and chemicals storage area will be provided along with site offices, parking, staff welfare facilities and equipment storage areas. The compound will be fenced with temporary security fencing to restrict access. Following the completion of the construction phase, the temporary construction compound will be fully removed, and the compound will be reinstated with excavated material and reseeded.

2.11.7 Construction Drainage Management and Disposal

Construction works will be carried out in accordance with the mitigation measures outlined in the 'Land & Soil' and 'Water' Chapters in the EIAR, in this CEMP and CEMP Management Plan 2 – Surface Water Management Plan.

The precise implementation and siting of these measures will be determined, subject to planning permission being granted, following the post-consent detailed design process and will be included within the CEMP to be agreed with the Planning Authority prior to the commencement of construction.

2.11.8 Chemical Storage and Refuelling

Storage areas for oils, chemicals and fuels will comprise bunded areas of hardstand of sufficient capacity within the temporary construction compound. Bunds will have a watertight roof structure and will be supplied by a licensed manufacturer to enable adequate safe storage for the quantities of material required. An adequate supply of spill kits will be readily available in order to clean up any minor spillages should they occur. A hydrocarbon interceptor will be installed within the surface water drainage system during the construction phase to trap any hydrocarbons that may be

present. A 50m buffer will be observed around all surface water features and no fuel/chemicals shall be handled or stored within this zone.

From the construction compound, fuel will be transported to works area by a 4x4 in a double skinned bowser with drip trays under a strict protocol and carried out by suitably trained personnel. The bowser/4x4 will be fully stocked with spill kits and absorbent material, with delivery personnel being fully trained to deal with any accidental spills. The bowser will be bunded appropriately for its carrying capacity. As above, a 50m buffer will be observed around all surface water features and no refuelling will be permitted within this zone.

2.11.9 Substation & Grid Connection options

Three options have been included in this EIAR in accordance with the O'Grianna Judgement. All three options will remain open until such time as direction is provided by Eirgrid/ESB. The final selected grid connection option will be subject to a separate future planning application. The three options are as follows:

- **Option G1:** Construction of a 38kV substation on the proposed development site and installation of a 38kV part overhead electricity line (OHL) and part underground electricity line (UGL) to the existing Clones 38kV substation on the national grid, which lies approximately 5km to the northwest
- **Option G2:** Construction of a 38kV substation on the proposed development site and installation of a 38kV OHL to the existing Shankill 110kV substation on the national grid, which is located approximately 16km to the southwest; and
- **Option G3:** Construction of a 110kV substation approximately 500m to the south of the nearest turbine and connection to the existing Lisdrum to Shankill 110kV overhead line by way of approximately 500m of UGL and the erection of 2 no. strain towers.

Option G1

The 38kV substation, located in the townland of Crossbane, will contain connection points and associated equipment such as incoming and outgoing circuit breakers, earth fault, protection devices, the grid transformer, metering equipment, computer and server. For safety and security reasons, the substation would be enclosed by a steel palisade fence of up to 3m in height and screened with landscaping.

The proposed substation (switchroom & compound) would extend to an area of c. 1,058m^2. The switchroom would comprise a single storey building, constructed of blockwork and finished in sand and cement render, slate roof covering and steel doors. The substation would also require the installation of a short section of underground cabling to connect to the proposed wind farm underground electricity cables.

The switchroom will also contain welfare facilities for staff during the operational phase of proposed development. The substation will not require a dedicated water source due to infrequent use and the low volumes that will be required (toilet facilities and hand washing). Accordingly, the switchroom design will incorporate a rainwater harvesting system. Wastewater from the switchroom will be stored in a sealed tank and will be tankered off-site as required by a local licensed waste collector. Water supply and wastewater management proposals of this nature are common practice for wind farm developments.

The proposed electricity grid connection will comprise a predominately overhead line (OHL) over a distance of c. 5km to the Clones substation, with short sections of underground line (UGL) at either end to facilitate connection to the respective substations. OHL infrastructure of this nature comprises a simple 'pole and wire' arrangement with 3 no. electrical lines suspended from wooden poles.

Various pole designs, which are commonplace in the Irish landscape, will be used in the construction of the OHL. The construction methodology requires a c. 2.5m deep excavation, by mechanical digger, which will be reinstated with excavated material following the erection of the poles. The locations of poles are highly flexible and can be microsited to account for the presence of any localised issues along the route.

Option G2

The proposed 38kV substation, to be located in the townland of Lislongfield, will be of an identical design and scale as that outlined for Option G1 above. The design of the electricity line (both OHL and UGL) will also be similar to that described above, requiring similar structures, and will extend to a distance of c. 16km.

Option G3

The existing Lisdrum to Shankill 110kV OHL is located c. 1km to the south of proposed turbine T7. This grid connection option would involve the construction of a 110kV 'loop in-loop out' substation in the townlands of Cornawall and Drumanan. The substation would be connected to the proposed wind farm via low-voltage underground cabling located within the carriageway of the L62013 public road.

The proposed 110kV substation (including 1 no. switchroom, 1 no. control building and compound) will extend to an area of c. 14,100m2. The switchroom building would be c. 95m2 with an overall height of up to 5m; while the control building would extend to c. 375m2 with an overall height of up to 5m. The substation would contain connection points and associated equipment such as incoming and outgoing circuit breakers, earth fault, protection devices, the grid transformer, metering equipment, computer and server. The switchroom and control buildings would be constructed of blockwork and finished in sand and cement render, blue/black slate roof covering and galvanised steel doors.

The switchroom will also contain welfare facilities for staff during the operational phase of development. The substation will not require a dedicated water source due to infrequent use and the low volumes that will be required (toilet facilities and hand washing) and thus the switchroom design will incorporate a rainwater harvesting system. Wastewater from the switchroom will be stored in a sealed tank and will be tankered off-site as required by a local licensed waste collector. Water supply and wastewater management proposals of this nature are common practice for wind farm developments. For safety and security reasons, the substation would be enclosed by a steel palisade fence of up to 3m in height and screened with landscaping to reduce visual impact.

From the substation, a 110kV UGL will be located within the carriageway of the L62013 and across private lands to the existing 110kV OHL. At this location, the OHL will be 'broken into' and the UGL will connect. This connection will be facilitated by 2 no. strain towers of up to 16m in height. Once the connection has been made, electricity being transmitted on the existing OHL will loop through the 110kV substation thus facilitating the export of electricity from the wind farm to the national network.

2.11.10 Overhead Line

The OHL will require the erection of a number of wooden poles (up to a maximum height of 16m) along the proposed route from which the transmission line will be suspended. The proposed line will require three (3) separate cables being suspended from the poles. Various pole designs, which are commonplace in the Irish Landscape, will be used in the construction of the OHL. The full suite of pole sets which could be used are described in detail in the EIAR and outlined below:

- **Single Intermediate Pole**

This structure consists of a single wooden pole with a 4m cross-arm holding conductors horizontally 2m apart. Pole lengths range from 12 to 16m and are buried to a depth of 2.3m. The precise pole height will be dependent of ground conditions and terrain but will not exceed 16m.

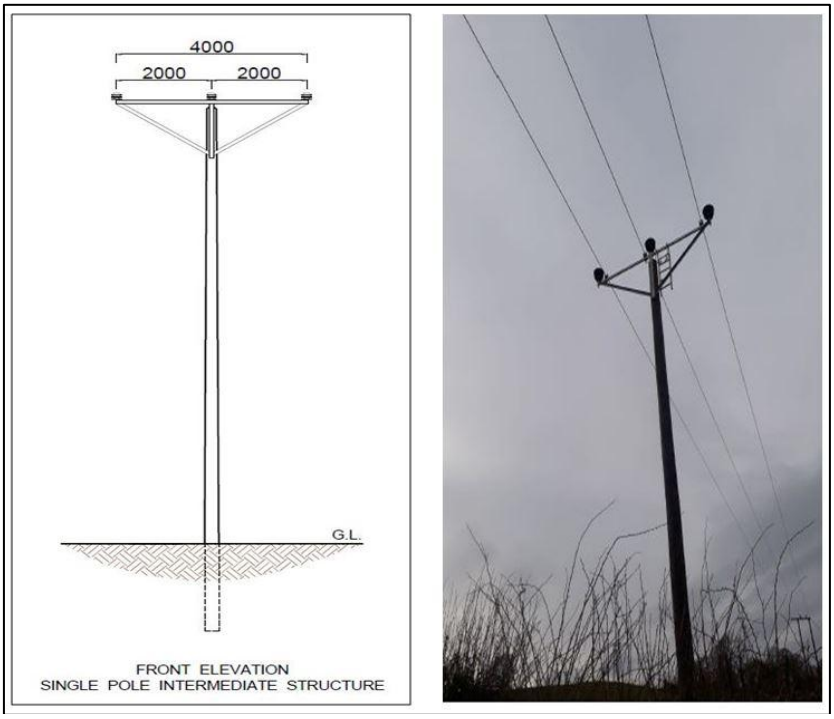

Figure 2.2 Single Intermediate Pole (IMP)

- **Intermediate Portal Suspension Structure & Portal Strain Structure**

  This structure consists of 2 no. wooden poles 2m apart with a 4m cross-arm holding conductors horizontally 2m apart. Pole lengths range from 12m to 16m and are buried to a depth of 2.3m. The precise pole height will be dependent of ground conditions and terrain but will not exceed 16m.

- **Light Angle Suspension Structure & Light Angle Strain Structure**

  This structure consists of 2 no. wooden poles 2m apart with a 4m cross-arm holding conductors horizontally 2m apart. Pole lengths range from 12m to 16m and are buried to a depth of 2.3m. The OHL route can be deviated by up to 20° using these structures. The precise pole height will be dependent of ground conditions and terrain but will not exceed 16m.

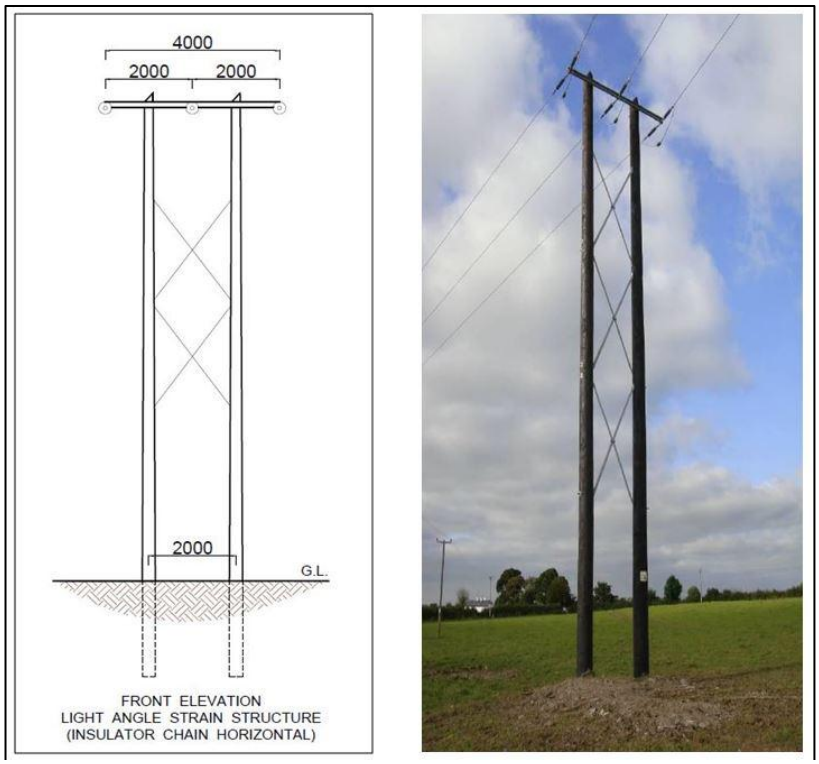

Figure 2.3 Light Angle Strain (LAP)

- **Heavy Angle Portal Structure**

  This structure consists of 2 no. wooden poles 2.5m apart with a 4m cross-arm structure holding conductors 2m apart. Pole lengths range from 12m to 16m and are buried to a depth of 2.3m. This structure also includes 2 no. stay wires extending from the cross-arm at 45° to facilitate deviations in the OHL route of up to 60°. The precise pole height will be dependent of ground conditions and terrain but will not exceed 16m.

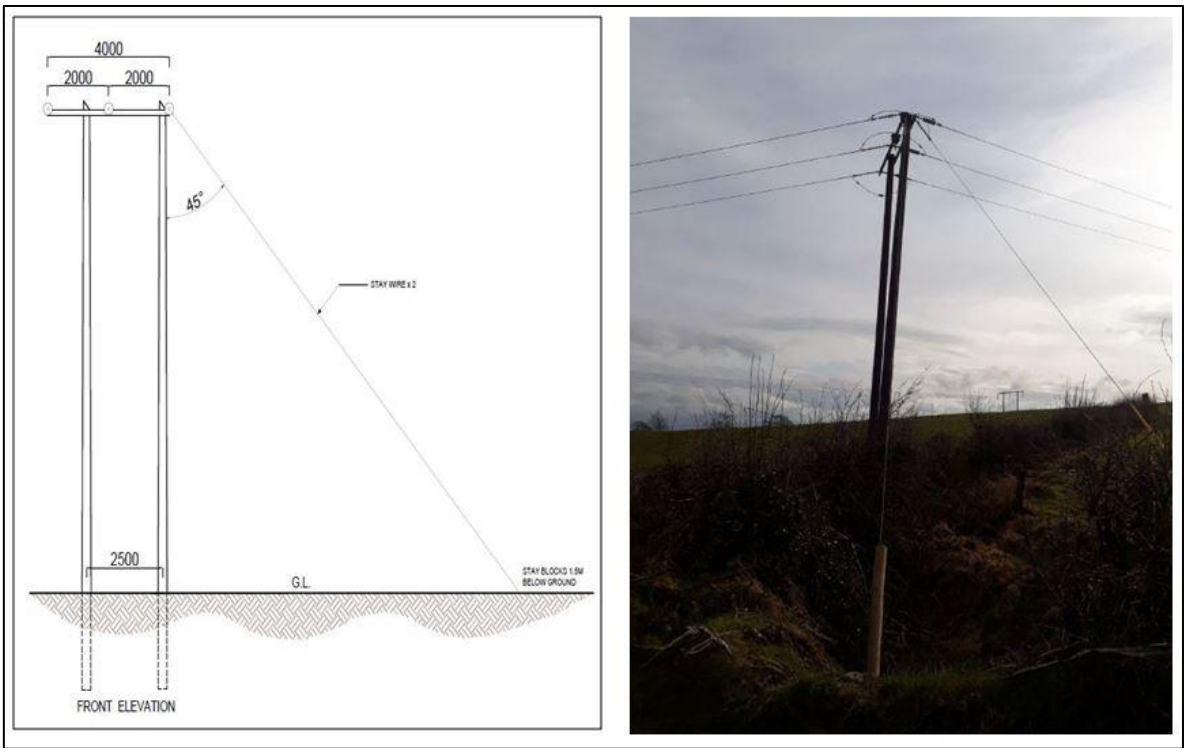

Figure 2.4 Heavy Angle Portal Structure (HAP)

- **Three-Pole Structure**

  This structure consists of 3 no. wooden poles 2m apart with a 4m cross-arm holding conductors horizontally 2m apart. Pole lengths range from 12m to 16m and are buried to a depth of 2.3m. This structure facilitates the transfer of the transmission line from UGL to OHL. The structure also includes 3 no. stay wires (1 no. per pole) extending from each pole at 45°. The precise pole height will be dependent of ground conditions and terrain but will not exceed 16m.

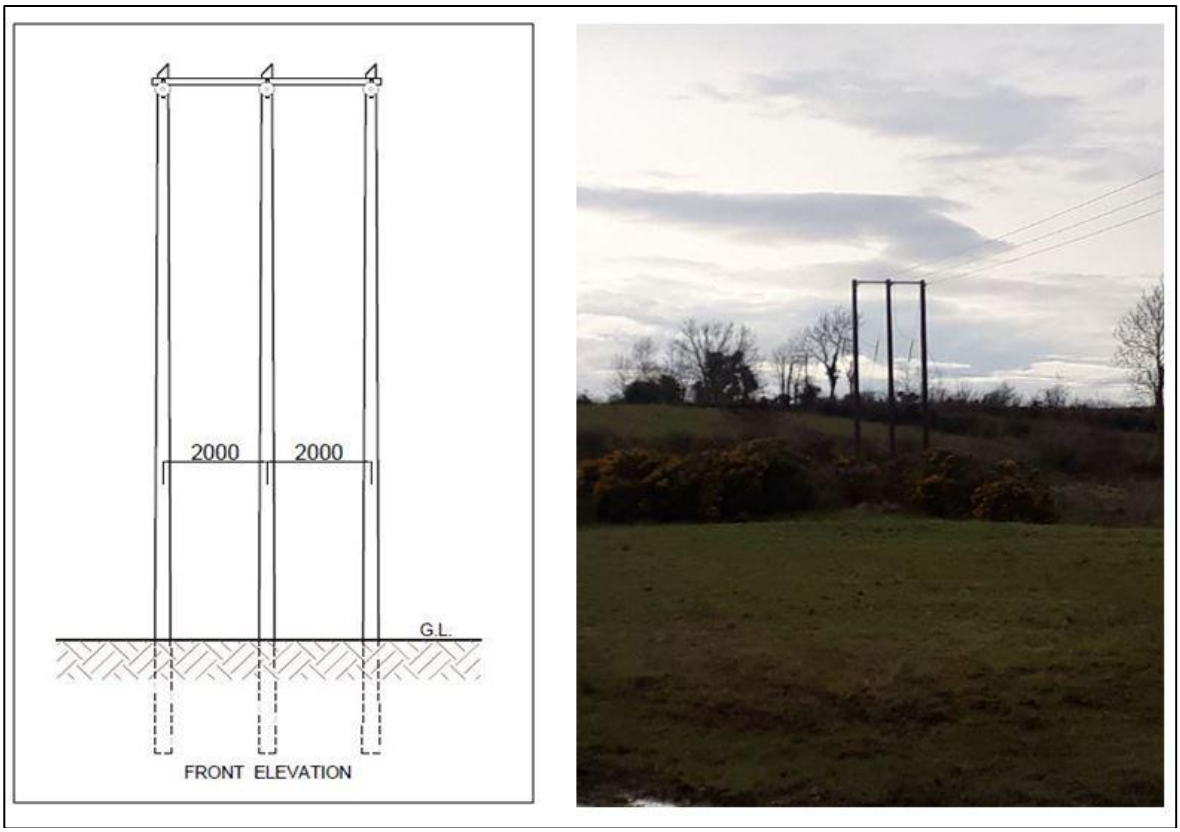

Figure 2.5 Three Pole Structure (TPS)

2.11.11 Underground Line

'Off Road' Works

Although the grid connection route has yet to be decided, the following will apply to the installation of underground "off-road". Cable ducts will be placed within a trench approximately 1.2m deep and 0.6m wide. All trenching works will be undertaken to ensure that only short sections of trench are open at any one time. Excavated materials (topsoil, subsoil) will be stored separately for use during the reinstatement of the trench or disposal to an appropriate licensed facility as necessary. The trench will then be reinstated with excavated materials. The proposed sequence of works is as follows:

- Excavate the trench to the required dimensions, approximately 1.2m deep and 0.6m wide.
- Place a 65mm blinding layer at the base of the trench.
- Place and joint the cable trefoil 110mm HDPE power ducts using cable ties at 3m intervals.
- Lay in and compact a 280mm layer of leanmix concrete CBM4 around and above ducts; and place a 400mm wide red marker strip above.
- Install a single 110mm HDPE communications cable duct.
- Lay in and compact an additional 200mm of CBM4 and place another 400mm wide red marker strip above.

- Final backfill layer (excavated material if suitable) to include 500mm wide yellow warning tape 300mm below the finished surface.
- Appropriate reinstatement as discussed above.

Joint bays and communication bays will be provided approximately every 700m along the UGL route to facilitate the joining of electrical cables and fibre optic communications cables. These bays/chambers consist of precast concrete structures which will be set into an excavated area and surrounded by appropriate fill. The bays will be finished to below road level and reinstated in accordance with the Local Authority requirements. The communications bay will also include an access cover to facilitate access should it be required.

In accordance with ESB Networks' specifications, underground cables located 'off-road' must be accompanied by an access track to facilitate access for maintenance or in the case of an emergency. The proposed development provides for an up to 4m wide access track along all sections of UGL located within private lands. The nature of these tracks will be similar to those discussed above save for a lesser overall running width.

A detailed method statement will be provided by the contractor outlining the precise methodology to be put in place during the ducting phase. This method statement will be reviewed by the Environmental Manager (to be appointed by the contractor) and Ecological Clerk of Works (ECoW) to ensure that the environmental protective measures to be implemented are suitable and to the required standard.

'In Road' Works

Although the grid connection route has yet to be decided, the following will apply to the installation of underground "in-road". The proposed methodology for this section of the UGL will be generally similar to that implemented for the 'open country' works, except for minor modifications owing to different reinstatement requirements. In addition, where there are short distance of UGL to be located within public roads, it is unlikely that joint bays, communication bays or earth sheath link chambers will be required along these sections.

Power ducts shall be placed in accordance with ESBN specification in a trench approximately 1.2m wide and 0.6m deep. ESBN specification dictates that there must be a minimum cover of 950mm from the top of the trefoil group of ducts. Communication ducts must be placed with a minimum

cover of 750mm. All trenching works shall be undertaken to ensure that only short sections (approximately 100m) are open at any one time.

A detailed method statement will be provided by the contractor outlining the precise methodology to be put in place during the ducting phase. This method statement will be reviewed by the Environmental Manager and ECoW to ensure that the environmental protective measures to be implemented are suitable and to the required standard.

Plates 1 & 2: Typical Trench Construction (Note: Proposed works within public road network relate to road crossings)

2.11.12 Access Track

A total of approximately 5.5km of on-site access tracks will be required for construction purposes and for site access during the operational phase. The access tracks proposed shall be similar to normal agricultural tracks but with a slightly wider typical running width of approximately 5m. Good quality agricultural access tracks already exist within the site and DPL have sought to utilise these tracks where possible. These existing tracks will be upgraded and new tracks constructed, where necessary, to provide access to the proposed turbine locations.

Access tracks will be unsealed and constructed of crushed stone material. While initial site investigations do not indicate the presence of rock on site; any material arsing from the excavation of foundations etc. will, where possible, be utilise in the construction of access tracks.

A textile layer may be needed in some locations to avoid any subsequent vehicle access problems. Some cut/fill in the construction of the access tracks may be necessary to ensure that horizontal and vertical alignments are suitable to accommodate abnormal HGV loads and adequate drainage. The selected wind turbine manufacturer shall be consulted during the detailed post-consent design process to ensure that the access tracks are suitable to accommodate turbine components. This may necessitate some immaterial deviations in the precise alignment of the access tracks.

Passing bays and turning heads shall also be provided along the access tracks to accommodate turning of long loads and passing traffic, as required. Additional excavated strips will be required alongside the access tracks to accommodate drainage and cable trenches. Where excess material arises from the construction phase, it will be utilised in the construction of trackside berms.

A total of 11 no. site entrances will be required to facilitate access throughout the site. 3 no. existing agricultural access points will be upgraded to accommodate construction traffic and abnormal HGV loads while a further 8 no. new site entrances will be constructed. All site entrances will be constructed/upgraded in accordance with the requirements of the Local Authority, particularly regarding the provision of appropriate site visibility splays to ensure traffic safety.

2.12 PLANNING CONDITIONS AND OUTLINE CONSTRUCTION MANAGEMENT PLANS

This CEMP and its future versions/revisions will form part of the Contract for Drumlins Park Wind Farm. It will therefore be updated and revised during the different stages of the Grid Connection development. Table 2.5 will list all the planning conditions associated with the planning permission should it be granted.

The Contractor will consider all of the mitigation measures and best practice construction methods detailed within the above consents in his design and in any detailed environmental plans as required by this CEMP or the Contract.

Where any mitigation measures or construction methods described in other documents deviate in any way from those contained within this CEMP, the Contractor will abide by whichever is the most onerous and stringent in terms of environmental protection.

TABLE 2.5 RELEVANT PLANNING CONDITIONS AND RELATED DOCUMENTATION

Condition No.	**Planning Condition**	
1.		
2.		
3.		
4.		
5.		
6.		

2.13 SCHEME AMENDMENTS

Scheme Amendments will be recorded in Table 2.6. These amendments do not include changes to the scheme design which are completed in accordance with the existing planning consent; instead, this refers to changes in the design for which additional approvals and / or consents may be required from Monaghan County Council.

The purpose of recording Scheme Amendments here is to provide a record of any changes in the design and siting of the proposed development such that any associated environmental impacts and mitigation measures may be appropriately instigated through this CEMP.

TABLE 2.6 SCHEME OF AMENDMENTS			
Reference	**Date**	**Scheme Amendment Description**	**Environmental Sensitivities Potentially Impacted by Scheme Amendment.**

2.14 REGISTER OF VARIATIONS

Where any amendments and variations to the Management Plans and CEMP are required (either as a result of Scheme Amendments or through corrective actions or improvements noted and undertaken on site) these will be recorded in Table 2.7, Register of Variations. Furthermore, all changes to construction methods, design, mitigation and the implications of these changes and authorising personnel will be recorded in Table 2.7.

TABLE 2.7 REGISTER OF VARIATIONS			
No.	**Variation Description**	**Authorising Personnel**	**Completion Date**

3 COMMUNICATION PLAN

3.1 INTRODUCTION

Both the Contractor and the Client will appoint Project Managers to the project. These Project Managers will be the main points of contact between the two parties. The Contractor's team will report directly to the Construction Project Manager, who reporting directly to the client's Project Manager.

It is envisaged that main project communications will take the form of structured reporting arrangements and meetings.

All issues in relation to environmental management/monitoring will be reported to the Site Environmental Manager/Engineer. The Site Environmental Manager/Engineer shall report to the Contractor and Drumlins Park Ltd. on a regular basis.

3.2 COMMUNICATIONS CONSULTANT

Drumlins Park Limited has appointed a Community Liaison Officer (CLO) who will be responsible for advising local residents of impending works, road closures, traffic diversions, and any other queries which may be forthcoming from local residents, landowners or businesses.

It is proposed that the CLO will conduct house-to-house calls at all dwellings within 1.8km of a proposed wind turbine to inform residents of traffic diversions, if necessary. Signage will be erected during the works to inform the general public that works are ongoing. These signs/posters will include information about the project and the CLO's contact details to ensure that any queries from the public can be responded to in an appropriate manner.

All staff will be advised to direct any queries from the public to the CLO or developer's Project Manager and to ensure that all interactions are recorded on the site register.

Relevant departments, including the Environment Section, Roads Department and Planning Department, within Monaghan County Council will be contacted in advance of the commencement of works and will be consulted throughout the duration of construction activities. In addition, where

it is deemed necessary to consult with statutory consultees (e.g. Inland Fisheries Ireland), such consultations will take place in advance of and throughout the duration of construction.

3.3 CONTACT SHEETS

Table 3.1 provides a list of all Drumlins Park Ltd., Contractor and relevant third party contact details. This table will be updated prior to construction and kept current by the Contractor for the duration of the Contract.

TABLE 3.1 CONTACT SHEETS

Company	Position	Name	Telephone
Drumlins Park Ltd.	Client Project Manager		
Contractor	Site Manager / Environmental Manager		
Contractor	Contracts Manager		
Contractor	General Manager		
Contractor	Foreman		
Contractor	Ecological Clerk of Works		
Contractor	Environmental Clerk of Works		
TBC	Construction Project Manager		
Drumlins Park Limited	Community Liaison Officer		

3.4 MEETINGS REPORTS AND CONSULTATIONS

Table 3.2 lists all meetings and consultations as required by the Contract. The table also provides details on the schedule/frequency, scope & objectives and attendees / responsibility for each meeting.

All Contractors and their appointed Environmental Manager (EM) /Resident Engineer (RE) and the ECoW shall coordinate and collaborate fully with all other Contractors and their appointed EM/RE for the duration of the works.

3.5 ROLES & RESPONSIBILITIES

Roles and responsibilities for environmental management, monitoring and reporting are detailed in Table 3.3.

The Contractors Site EM/RE will be responsible for the delivery of all elements of the Environmental Management Plan.

The Site EM/RE will retain all responsibility for issuing, changing and monitoring the Environmental Management Plan.

TABLE 3.2 - MEETINGS, REPORTS AND CONSULTATIONS			
Meeting/Report	**Schedule/Frequency**	**Scope & Objective**	**Attendees/Responsibilities**
A Record of all meetings, checks, permissions and licenses will be retained within Section 4 of this CEMP			
Site Inductions	All new site personnel and visitors	To provide that all entrants to the site are aware of safety, environmental and managerial requirements and procedure.	Contractor to organise and maintain records
Weekly Environmental meetings	Weekly	To provide updates on environmental mitigation measures and performance and identify actions for improvement. The EM is required to maintain a Pollution Prevention Measures Register (PPMR) in which mitigation measures put into place will be listed and checked weekly to assess the requirement for maintenance. The results of these checks will be discussed at the meeting and corrective actions agreed as required.	Attendance required: ECoW, EM, Site Manager, and any other relevant personnel or statutory consultees where necessary.
Monthly Environmental Report & Monthly Environmental Management Group Meeting	Monthly	To provide a compiled record of weekly meeting minutes and environmental performance and monitoring results (e.g. air, noise or water quality monitoring as appropriate). To identify any areas / action for improvement.	To be prepared by EM. Report to be issued to the Contractor and Construction Project Manager before the end of each calendar month. Report to be discussed at the monthly meeting with recommendations for improvement passed to the Contractor in written format.
Final Environmental Report	Upon completion of construction works	The final report will document the environmental and ecological effects of the construction period. The evidence for effects will be based on findings included in the minutes of weekly meetings and monthly meetings, together with other recording information maintained by the EM. The report will relate results to residual effects predicted in the EIAR.	The Final Report will be prepared by the EM. The report will be made available to the Contractor, Construction Project Manager and Planning Authority, if required.
Environmental Checks and Monitoring of Mitigation Works	As required in advance of construction works regular checks should also be made at least every 14	Environmental Checks are to be carried out in advance of construction works. This will comprise an on-site meeting / inspection to confirm the appropriate use of identified mitigation measures and highlight any further issues /	Environmental checks will be undertaken by the Contractor, supervised by the ECoW and EM where appropriate. The ECoW/EM may also undertake regular checks, either independently or

TABLE 3.2 - MEETINGS, REPORTS AND CONSULTATIONS			
Meeting/Report	**Schedule/Frequency**	**Scope & Objective**	**Attendees/Responsibilities**
	days	measures which may be relevant prior to commencement of works in any area. As a minimum, Environmental Checks will be completed at each main piece of site infrastructure (construction compounds, sub-station, control room) prior to works commencing in that area. Advance checks will be undertaken no less than every 100m of constructed or upgraded access track. Environmental Checks will include: • Checks for visual evidence of contamination / sediment alongside watercourses, nearby working areas and in areas of surface water discharge. • Regular checks of all plant and equipment to identify any oil or fuel leaks to confirm the condition of the plant. • Inspection of drainage and erosion and sediment control measures. Additional checks should be made before, during (where safe to do so) and immediately following anticipated storm events or periods of continuous or heavy intermittent rainfall over one or more days. • Environmental checks will also encompass a review of – Waste management procedures – General site tidiness –Temporary materials storage (extracted materials stockpiles) and restoration works and – Land stability – Signs of any mammal activity on site –Buffer zones (if any) are being maintained	in conjunction with the Contractor's checks as required. The Contractor and ECoW/EM will retain a record of all inspections / findings of Environmental Checks within Section 4 of this CEMP. All records will be made available for audit / review. All records will also be made available for discussion during regular meetings as scheduled herein.

TABLE 3.2 - MEETINGS, REPORTS AND CONSULTATIONS			
Meeting/Report	**Schedule/Frequency**	**Scope & Objective**	**Attendees/Responsibilities**
		– Monitoring of any new Third Schedule Part 1or 2 species within the entire site.	
Environmental Audit	At least once every month		Environmental Audits may be carried out by the Contractor, Drumlins Park Ltd. at any time during the works. Audit procedures and forms are included within Section 4 and 1. These will be followed / completed by the Employer when undertaking environmental audits and may also be adopted by the Contractor, unless alternative procedures and forms are submitted and approved as part of the Contractor's detailed CEMP.
Liaison with regulator / Statutory Consultees	As Required	Provide regular updates to relevant authority on environmental performance and maintain good working relationships with the regulatory bodies.	Contractor and ECoW/EM where required. Meetings will be initiated as required by Planning Condition, Management Plans or as agreed throughout the duration of the construction phase. The Contractor is responsible for obtaining all relevant permissions, consents, licenses and permits. Some permits may require application and implementation by an appropriately qualified person. In these instances, the Contractor will consult with the ECoW, or other specialist Environmental Consultants where required.

TABLE 3.3 - ROLES AND RESPONSIBILITIES	
Position	**Roles and Responsibilities**
Construction Project Manager	The Construction Project Manager will: See that the Contractor has obtained the relevant approvals and licenses and consents from regulatory bodies and statutory consultees where required. Ensure that the Contractor has submitted all relevant documentation to the ECoW and Project Environmental Manager, liaise with the Site Manager and the ECoW/EM and ensure that corrective actions and variations to the CEMP have been instigated.
Project Site Manager/Engineer	The Site Manager will provide liaison between the ECoW/EM and the Contractor where environmental sensitivities, instruction for environmental performance improvements or corrective actions are requested by the ECoW, EM or other appropriate person(s) as a result of environmental checks or audits conducted by these person(s). The Site Manager will see that all notifications of environmental sensitivities and incidents as well as other general observations on environmental performance are reported back to the Construction Project Manager. The Project Site Manager is responsible for review and further development of the CEMP.
Environmental Manager	The Environmental Manager will work alongside the ECoW and will be a member of the Environmental Management group and will work with the Contractor to ensure compliance with best practice and with all environmental mitigation and monitoring requirements as detailed within the relevant planning conditions, compliance documents and CEMP during both the pre-construction and construction phases. The main roles of the EM are as follows: • Organise start-up meeting / Toolbox talks with the Contractor to agree working methods, specifically including communications; schedules; monitoring of data storage; and preparation of plans indicating location of key features including mitigation measures, monitoring points and sensitive habitats (where not previously highlighted and approaches agreed). • Give tool box talks as agreed with the site contractor to address key areas, including water pollution prevention, protected species management, and on-site biodiversity. Highlight to staff the requirement for compliance with planning conditions. • Undertake a pre-construction walkover with the Site Engineer / Site Manager to confirm that access routes remain appropriate to the conditions present at the time of construction • Delineate any sensitive habitats or features with wooden stakes and high visibility tape • Undertake or delegate to an appropriately qualified person, a pre-construction Invasive Alien Species survey along the works route • Monitor the installation of poles and infrastructure • Inspect pollution control measures during the works • Maintain a presence on site during the pre-construction and construction works, including setting out of access routes. • Organise a minimum of weekly meetings with the Site Environmental Supervisor and / or Foreman, to allow briefing on the programme of works on site and to provide on-site guidance during construction. • Identify environmentally sensitive areas and ecological hazards for demarcation by the Contractor. • Develop written reports / audits and submit to the Contractor and present findings at meetings as required. Prepare updated reports and a final report on mitigation measures, procedures and monitoring. • Monitor potential environmental impacts and the successful implementation of all mitigation as detailed in the NIS and this CEMP. The Contractor will provide comprehensive information on all proposed works and all scheduling to the EM in advance, in order to

TABLE 3.3 - ROLES AND RESPONSIBILITIES	
Position	**Roles and Responsibilities**
	anticipate and address any issues, especially access to new areas including areas where Invasive Alien Species (IASs) may occur, vegetation clearance, setting out of buffer zones, excavation and silt mitigation measures, temporary compound works, watercourse crossings and vegetation reinstatement. **Note:** If failures occur and actions are taken which contravene legislation then the Project Ecologist has the power to stop works in the affected area with immediate effect. These actions will only be taken where appropriate. Notification to stop works will be by verbal means, followed up with written confirmation recording the time and date of the instruction, personnel involved and reasons for the instruction. Upon recommencement of works, details of any corrective actions and / or remedial measures implemented will be recorded within Section 4.
ECoW: Ecological Clerk of Works and/ or Water Quality Specialist	The ECoW will work with Drumlins Park Ltd., the Contractor and the EM to see that compliance is achieved with best practice and with all environmental mitigation and monitoring requirements as detailed within the NIS and CEMP, relevant planning conditions, FEI and CEMP. The EM will delegate and oversee the work of the ECoW to ensure competency of tasks achieved. Where a particular ecological concern exists at the site, or specific habitat management activities are to be undertaken in conjunction with the main civils construction works, a Specialist Ecologist / Environmental Consultant may also be required unless the ECoW is suitably qualified to undertake the particular ecological responsibilities. The main roles of the ECoW are as follows: • Maintain a weekly presence on site during the main construction works • Prepare a pre-construction Invasive Alien Species survey along the works route • Identify environmentally sensitive areas and ecological hazards for demarcation by the Contractor. • Produce written reports to the Contractor following site visits and meetings. This includes monthly reports and a final report.
Specialist Ecologist/ Environmental Consultant	Where a Specialist Ecologist / Environmental Consultant is employed, this person(s) will: • Provide advice and maintain regular liaison with the Project Site Manager, Project Manager, ECoW, EM, and Contractor and / or other specialist Environmental Consultant as and when required. • Undertake specific monitoring activities and reporting as defined in agreed documentation prepared as part of the planning process. • The ECoW or a Water Quality Specialist will be appointed and report to the EM. They will have responsibility for fulfilling the requirements of the Water Quality monitoring Plan, including: • Daily visual inspection of: access tracks for signs of ground damage or solids escape to nearby watercourses in vicinity of construction works •The ground between the structure under construction and the nearest downslope watercourse for signs of solids escape or ground damage • Surface water features in vicinity of construction works

TABLE 3.3 - ROLES AND RESPONSIBILITIES	
Position	**Roles and Responsibilities**
	• Any pollution control measures at structures and along access tracks (e.g. silt fences, drain or stream crossings etc.) for evidence of contaminated run-off or mitigation failure • Attendance at the critical work phases including, access track construction, foundation excavation, watercourse crossings, concrete pouring and back-filling. • Collection and analysis of water samples at a number of monitoring locations (i.e. upstream & downstream of the 5 no. instream work locations) before, during (if potential pollution visually identified) and after construction works at that location • EPA Q Value Biological Monitoring at 5 no. monitoring locations (i.e. upstream & downstream of instream construction work locations) before and after construction works.
ACoW Archaeological Clerk of Works	The main roles of the ACoW (licenced) are as follows: • Maintain regular liaison with the Project Site Manager, Project Manager, Ecologist and Environmental Manager as appropriate. • Maintain liaison with officers of the Local Planning Authority, specifically the Council Archaeologist and Planning Officers as appropriate. • Where applicable apply for licence application; the Minister for Dept of Culture Heritage and Gaeltacht can approve and issue a licence under Section 26 of the National Monuments Act 1930. • Facilitate compliance with planning conditions and agreed Archaeological Programme of Works. • Demarcate any archaeologically-sensitive areas and set up exclusion zones as required on site. • Immediately notify the relevant authorities in the event of the discovery of archaeological finds or remains and suspend works in the immediate area pending consultation. Allowance should also be made for full archaeological excavation if required; • Complete a full report for submission to the Planning Authority and the Department of Arts, Heritage and the Gaeltacht on completion of the works.
GCoW Geotechnical Clerk of Works or Appointed Geotechnical Consultant	The GCoW will be responsible for preparation and monitoring of a geotechnical risk register as well as specific duties relating to geotechnical issues as they may arise during site construction works. Soil instability and the potential for slide even can have a significant impact on environmental receptors. In completing the geotechnical risk register, the GCoW will work with the Contractor to identify suitable mitigation and monitoring methods. Where possible, construction works will avoid causing change to local hydrological and hydrogeological flow patterns and water levels.

Contractor Appointments	
Construction Manager	[The Contractor is required to specify roles and responsibilities for each individual below]
Site Agent	[To Be Confirmed]
Foreman	[To Be Confirmed]
Environmental Manager	[To Be Confirmed]
Other Nominated Person(s)	[To Be Confirmed]

3.6 TRAINING, AWARENESS AND COMPETENCE

All site personnel will receive environmental awareness information as part of their initial site briefing. The detail of the information should be tailored to the scope of their work on site. This will ensure that personnel are familiar with the environmental aspects and impacts associated with their activities, the procedures in place to control these impacts and the consequences of departure from these procedures.

The CEMP will be posted on the main site notice board during the project. The environmental performance at the site will be on the agenda of the monthly project management meetings for the project. Elements of the CEMP will be discussed at these meetings including objectives and targets, the effectiveness of environmental procedures etc. Two-way communication will be encouraged by inviting all personnel to offer their comments on environmental performance at the site.

3.7 EMERGENCY PREPAREDNESS AND RESPONSE

An emergency preparedness and response procedure is required to prevent environmental pollution incidents. Suitable spill kits and absorbent material for dealing with oil spills will be maintained on site. In the event of pollution or potential risk of pollution, Monaghan County Council and Inland Fisheries Ireland will be informed immediately. In the case of water pollution, in addition to the above the Environmental Protection Agency will also be informed immediately. In the case of new developments in relation to badgers on site, the Department of Culture, Heritage and the Gaeltacht will be informed by the local NPWS ranger.

4 CORRESPONDENCE, RECORDS & REPORT

4.1 REQUIREMENTS

The Contractor will insert / file all communication records and reports associated with Environmental Management and implementation of this CEMP under this Section 4. As a guide, the following sub-sections of filed information will be required (at a minimum):

4-A) Meeting minutes and attendance record

4-B) Weekly Environmental Reports

4-C) Monthly Environmental Reports

4-D) Environmental Checks

4-E) Audit Reports

4-F) Ecology documentation and monitoring records

4-G) Pollution Prevention, including a Pollution Prevention Measures Register

4-H) Water Quality documentation and monitoring records

4-I) Archaeology documentation and monitoring records

4-J) Ground Risk, including a Geotechnical Risk Register

4-K) Waste Management documentation

4-L) Licensing and Consents: copies of all permissions, consents, licenses and permits and related correspondence. A summary record of all such documents shall also be provided as per Table 4.1 of this CEMP.

4-M) General Correspondence: all other relevant internal and external communication records relating to environmental management issues and implementation of the CEMP.

4-N) Training Records

4-O) Toolbox Talk Records

4-P) Environmental Manager Reports

4-Q) Weekly report for daily haul route inspections

All of these documents and records will be made available for inspection in the site office. The documentation will be maintained and will be reviewed on a regular basis with revisions controlled in accordance with the site quality plan.

TABLE 4.1 RECORD OF ENVIRONMENTAL CONSENTS, LICENSES AND PERMITS ISSUED		
Consents, Licenses & Permits	Governing Legislation	Licensed Activity
Pollution Control & Hydrology		

Biodiversity		
Waste Management / Contaminated Land		
Noise / Vibration		
Archaeology		
Transport		
Other		

4.2 ENVIRONMENTAL AUDITS

The Contractor's EM will consult and assist with the Client EM in evaluating compliance with applicable legislation by means of a monthly Environmental Audit.

A blank Environmental Audit Report form is included in Management Plan 1 – Emergency Response Plan (ERP).

All completed audit report forms and records of corrective actions (and close outs) must be filed within this Section of the CEMP.

4.3 ENVIRONMENTAL CONSENTS, LICENSES & PERMITS

The Contractor's EM (or otherwise nominated responsible person(s), in conjunction with the ECoW and ACoW, will complete the summary record for all applicable permissions, consents, licenses and permits obtained for the site. This record will follow the format provided in Table 4.1.

4.4 ENVIRONMENTAL MONITORING AND MEASURING

The Contractor will put in place a program of environmental monitoring for dust, noise, vibration and water sampling in accordance with the requirements of the CEMP.

Copies of all records will be maintained in the site office and will be reviewed by the Contractor.

4.5 NON-CONFORMANCE, CORRECTIVE AND PREVENTATIVE ACTION

Non-Conformance Notices will be issued where there is a situation where limits associated with activities on the project are exceeded, or in the case of an internal/external complaint associated with environmental performance.

Non-Conformance is the situation where essential components of the Environmental Impact Assessment Report (EIAR) and Construction Environmental Management Plan (CEMP) are absent or dysfunctional, or where there is insufficient information on or control of the activities and processes to the extent that the functionality of the EIAR and CEMP, in terms of the policy, objectives and management programmes, is compromised.

Correction will be required in order to improve the identified non-conformance. The EIAR and CEMP and all components must conform to Management Plans, objectives and targets and the requirements of the ISO 14001 management standard. In the event of non-conformance with any of the above, the following must be undertaken:

- Cause of the non-compliance
- Develop a plan for correction of the non-compliance
- Determine preventive measures and ensure they are effective
- Verify the effectiveness of the correction of the non-compliance
- See that any procedures affected by the corrective action taken are revised accordingly.

Responsibility must be designated for the investigation, correction, mitigation and prevention of non-conformance.

5 MANAGEMENT PLANS & AVAILABLE INFORMATION

5.1 MANAGEMENT PLANS

Various Management Plans have been prepared as listed in Table 5.1 and attached to this CEMP. These are intended to provide a benchmark for best practice and to define minimum requirements for environmental management and mitigation.

5.2 CONTRACTOR REQUIREMENTS

The Contractor is required to further develop the Management Plans into detailed site and works specific environmental plans, method statements and procedural documents. Table 5.1 provides a summary of the content of the Management Plans and the Contractor's obligations for their further development.

TABLE 5.1 - LIST OF MANAGEMENT PLANS

Management Plan 1	Emergency Response Plan (ERP)	The Contractor will prepare a detailed Emergency Response Plan. This will include procedures for dealing with containment of accidental chemical or fuel spills, potential overload of the drainage system by silt during unforeseen adverse weather conditions. *The Contractor will also prepare an Emergency Communication Plan for emergency response in the event of a pollution spillage.
Management Plan 2	Surface Water Management Plan (SWMP)	The Contractor will further develop the Water Quality Management Plan outlining measures to prevent run-off of silt or any other pollutants from the site to watercourses. The proper storage and bunding of any oils/hydrocarbons will be outlined and buffer zones from watercourses. *The Contractor will carry out a detailed survey of all five watercourse crossings at the detailed design stage and prepare a detailed Watercourse Crossing Plan. The Contractor is responsible for liaison with the OPW and IFI to determine all authorisations required. *The Contractor will develop detailed method statements for the protection of waters at each precise location within this development. *Detailed method statements will also be prepared for each of the overground and underground line crossings for each watercourse in this development. *Detailed method statements will be prepared for the proposed instream works in this development.
Management Plan 3	Water Quality Inspection and Monitoring Plan (WQIMP)	The Contractor is required to produce a detailed version of the WQIMP which shall be submitted to Inland Fisheries Ireland for approval prior to

TABLE 5.1 - LIST OF MANAGEMENT PLANS		
		commencement of construction. The Contractor will carry out a detailed survey of all watercourse crossings at the detailed design stage and prepare a detailed Method Statements for each crossing. The Contractor is responsible for liaison with IFI to determine all authorisations required.
Management Plan 4	Spoil Management Plan (SMP)	The Contractor will further develop the SMP. It will include the details of all spoil to be excavated, monitoring during construction, storage, disposal and reinstatement methods to avoid water pollution. * An Invasive Alien Species (IAS) survey should be carried out by the ECoW or appropriately qualified invasive species personnel on the footprint of the entire site, inclusive of all access tracks and areas where vegetative disturbance will occur, prior to works commencing. Where IAS are encountered, a follow-up IAS Management Plan will follow.
Management Plan 5	Waste Management Plan (WMP)	A WMP is intended to implement reduction and effective management of resources and waste during the early design stages of the Grid Connection construction, through to completion, such that legal compliance is met; project build costs are minimized; a framework for continuous improvement and best practice is implemented and maintained; and carbon emissions and other negative environmental impacts associated with the production and management of waste materials are minimized. The WMP provides an outline of the minimum requirements to be contained within the Contractor's detailed WMP. It also provides an outline of the anticipated waste management procedures and routes that may apply during construction. In preparation of the detailed WMP, the Contractor will liaise with Monaghan County Council to determine requirements for, and to obtain, licenses and consents associated with waste management and foul water discharge from the site where appropriate.

MANAGEMENT PLAN 1

Emergency Response Plan

DRUMLINS PARK LIMITED

DRUMLINS PARK WIND FARM

CO. MONAGHAN

OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

Emergency Response Plan (ERP)

October 2019

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DOCUMENT APPROVAL

PROJECT	Drumlins Park Wind Farm	
CLIENT / JOB NO	Drumlins Park Ltd.	5870
DOCUMENT TITLE	Construction Environmental Management Plan (CEMP) Emergency Response Plan (ERP)	

	Prepared by	**Reviewed/Approved by**
Document Final	Name Sarah Moore	Name David Kiely
Date October 2019	Signature Sal Moore	Signature David Kiely

CONTENTS

1. INTRODUCTION

1.1 Why have an Environmental (Incident & Emergency) Response Plan?

Many construction and industrial sites intrinsically have the potential to cause significant environmental harm which could threaten water supplies, public health and wildlife in the event of an environmental incident. The aim of this plan is to see that in the event of an emergency, quick action will limit any impacts on humans and the local environment.

This emergency response plan forms part of the conditions of work for staff, and for every contractor or sub-contractor at the site.

1.2 Outline of this Environmental (Incident & Emergency) Response Plan

The information contained in this plan forms the Environmental Incident & Emergency Response Plan (ERP), part of the Outline/Preliminary[1] Construction Environmental Management Plan (CEMP) for Drumlins Park Wind Farm.

It contains details of:

- Who should be contacted in an emergency?
- Procedures to be followed in an emergency
- Staff responsibilities in an emergency

1.3 What is an Environmental Incident?

This plan should be instigated once there has been an emergency or environmental incident on site or elsewhere linked to the construction of Drumlins Park Wind Farm. Such an incident is a discharge to air, land or water that could cause environmental damage. Causes of environmental incidents on site include:

- Leaking plant or equipment
- Containment Failure
- Fire
- Land Slide
- Vandalism
- Overfilling of containment vessels
- Flooding on site
- Leaking Portaloo
- Discharge of raw or partially treated effluent

[1] The terms 'Preliminary' and 'Outline' are used interchangeably throughout this report.

- Wind-blown waste, litter or dust
- Fuel drips or spills during refuelling
- Leak from fuel or chemical containers
- Contaminated water or sediment/silt entering a water course or drain
- Failure of pumps and pipelines

Any of these incidents could affect drainage systems, surface waters, aquatic ecosystems, groundwater and soil. These incidents could also affect air quality by producing toxic fumes and airborne pollutants which may damage human health, wild and domestic animals and ecosystems.

1.4 Reference Documents

Current legislation has been taken into account into the production of this Plan and will be accounted for in the further development of the Contractor's Construction Management Plan.

This plan has been developed alongside other Management Plans that form part of the preliminary Construction Environmental Management Plan (CEMP) including a:

- Surface Water Management Plan (SWMP)
- Water Quality Inspection and Monitoring Plan (WQIMP)
- Spoil Management Plan (SMP) and a
- Waste Management Plan (WMP)

2. GENERAL REQUIREMENTS OF AN ERP

As mentioned, environmental incidents may include flooding, spillages (oil and chemicals), contaminated run-off, riverbed disturbance, damage to underground services, damage to habitats, poor waste disposal and storage.

This ERP provides:

- An outline of the construction works and references to relevant existing environmental plans
- Summarises local environmental sensitivities
- Identifies key mapping reference points for the site
- Identifies key staff and 24-hour contact details to be contacted in the event of an emergency

- Identifies key external bodies and emergency response numbers who should be contacted in the event of an emergency
- Details an Inventory of Chemical Products and Waste Inventory on Site*
- Details an Inventory of Pollution Prevention Equipment
- Provides details of staff trained in the use of spill kits and booms etc.
- Provides details of reporting requirements
- Provides detailed procedures to be followed in the event of an emergency and details staff responsible for re-positioning and moving of plant
- Provides a summary sheet for operatives outlining key actions in the event of an emergency. This will be available to all operatives on site.

***Because of the nature of wind farm construction operations and the nature of works on site, the potential pollutants will vary. Therefore sections 4 and 5 will be continually updated at the site office*.

3. CONSTRUCTION WORKS AT DRUMLINS PARK WIND FARM

Drumlins Park Wind Farm development will comprise eight (8) no. wind turbines with a maximum tip height of up to 180m and all associated site development and ancillary works, including foundations, hardstands, cabling, access tracks, meteorological mast and grid connection.

In addition to the reference documents listed in Section 1.4 of this document, various site investigation reports have been prepared as part of the Environmental Impact Assessment Report (EIAR) and include:

- Land & Soils
- Water
- Air Quality & Climate
- Cultural Heritage

Detailed geotechnical site investigation will be carried out at pre-construction stage and will be referred to in this plan.

4. INCIDENT & HAZARD REPORTING

A reporting system has been developed for reporting environmental incidents or hazards for the site. These reports will be logged so that they can be regularly revised and form part of the response plan procedural review.

The last page on this report has attached a blank environmental incident report that should be completed in the event of an accident/incident. This includes details of all non-compliance and corrective actions carried out as a result of any incidents.

5. WASTE DISPOSAL AFTER ENVIRONMENTAL INCIDENCES

If spill kits etc. are used in the event of a pollution incident, operatives need to carefully dispose of used equipment by carefully placing them in a sealed bag or container. They should then be removed from site by a licensed waste contractor as per the Waste Management Plan (WMP).

6. SITE INDUCTION AND TOOLBOX TALKS

It is imperative that all contractors, sub-contractors and staff on site are fully familiar with this ERP and it will be detailed regularly in Toolbox Talks. During these talks, they will also receive regular reminders of the importance of the local environment and of the necessary environmental controls that are in place on site.

7. SUMMARY SHEET FOR MACHINERY & PLANT OPERATORS

This summary sheet is for all site personnel. A laminated copy will be kept on all site vehicles/ machinery.

7.1 Procedures to be followed in the event of an incident:

The following procedures are intended as a guide in dealing with incidents. Health & Safety guidance should be followed at all times applying common sense and ensuring the health & safety of yourself and others:

1. Identify the source of the spillage and cut off source if possible, e.g. by closing valve, righting container etc.
2. Work on site will cease and all operatives will assist in placing spill mats on the affected area. Site Manager/ Main Contact should be notified.
3. Identify where spillage may go. If spillage is near a watercourse (drainage/ditch/ river) divert spillage away from the watercourse through the use of absorbent materials from the spill kit.
4. Suspended Solids Contamination of Watercourse.

   If watercourse is at risk of contamination from suspended solids from a slope failure, do as follows:

   a) Place straw bales wrapped in geotextile or sand/gravel bags with geotextile curtains **immediately** in the watercourse(s) at regular intervals downstream from the incident. These sand bags and/or straw bales will be removed and replaced with stone filters once water quality is stabilised.

   b) Stone check dams faced with a layer of geotextile will be constructed at critical points along the watercourse.

   c) Small sumps will be formed intermittently between the check dams to reduce the amount of suspended solids contained in the water.
5. Oil Spill in Watercourse.

   If spill has reached the watercourse, do as follows:

   a) Place flexible absorbent booms across watercourse, ahead of the contamination within a quiet stretch of water.

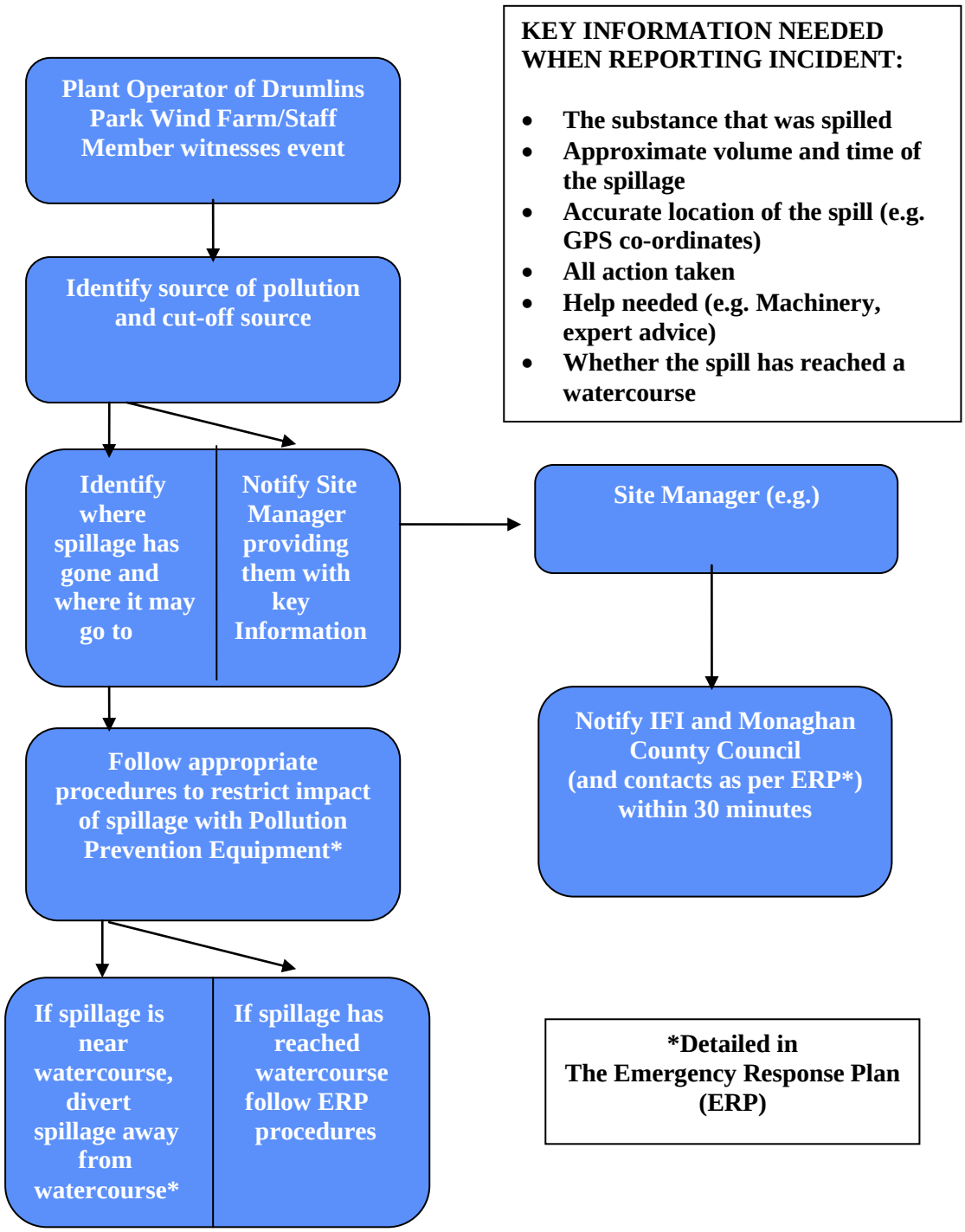
   b) Place absorbent cushions in the water immediately upstream of these booms as well as downstream of the booms.

   c) Remove and replace saturated absorbent material as required. Please ensure removed cushions are placed in sealed polythene bags/containers and disposed of by the principal waste contractor.

6. Notify all parties in the order listed overleaf. Notification should be made by one member of staff whilst remainder of staff present deal with the spill.
7. Dig up all contaminated ground as soon as possible/immediately. All contaminated materials should be placed in sealed polythene bags/containers and disposed of appropriately by an appropriate licensed waste contractor.
8. Complete required record of incident and response into reporting system

7.2 Communication Plan

A Communication Plan (to be followed in the event of a spillage) will be provided by the Contactor, in liaison with relevant stakeholders and will be included in the updated ERP prior to commencement of site development works. An outline Communication Plan is proposed below:



7.3 Environmental Response Plan for Drumlins Park Wind Farm

INCIDENT RESPONSE PLAN FOR DRUMLINS PARK WIND FARM

Based on template provided in PPG 21 – Pollution Prevention Guidelines.

Site Address: Corlougharoe, Correvan, Drumlina, Tullyard, Drumacreeve, Drumanan, Cornawall, Drumgramph, Closdaw, Killyleg, Crossbane, Lislongfield and Drumcrow, County Monaghan. **Official Company Address:** Drumlins Park Limited Greaghgcrotta, Tullyco, Cootehill, Co. Cavan. **KEY HOLDERS FOR SITE – NAME & CONTACT NUMBERS:**	**NGR:** 254231 E, 321137 N **Map references:** OS MN 17 & MN18 **Link to Map: See EIAR Annex 3.1**
Overview of the activities on site: **Include number of employees at different time of the day:** Daylight Hours: Dusk to Dawn: Weekend Dusk to Dawn: Bank Holidays:	
Date & Version of the plan:	**Name & position of person responsible for compiling/approving the plan:**
Review Date	**Date of next exercise:**
Objectives of the plan: To limit any potential harmful impact to the local environment through swift and appropriate actions in the event of an emergency.	
List of external organisations consulted in the preparation of this plan with contact details	
Distribution list of who has received this plan and which version. *Please note that it is recommended that you review and revise this plan regularly:*	

7.4 External Contacts

Contact	Office Hours	Out of Office
Emergency Services (Fire/Police/Ambulance)	999 or 112	999 or 112
Local Garda Station	+353 (0) 4777200	
Local Hospital. Monaghan Hospital	+353(0) 4738800	
Monaghan County Council The Environmental Section, Carrickmacross Civic Offices, Riverside Road, Carrickmacross, Co. Monaghan.	042 9661240	
EPA	053-916 0600	1850 365 121
Inland Fisheries Ireland	01 8842600	**1890 347 424 (24 hours a day)**
Roads Service (Blocked/Flooded Roads)	0300 2000 100	0300 2000 100
ESB- Electricity Company	01 8529534	
Telecommunications – Eircom	1800475475	

7.5 Internal Contacts

Names and position of staff authorised and trainers to activate and co-ordinate the plan. Staff to be contacted if need to move or evacuate the site		
Other Staff:		
Managing Director		
Site Manager		
Environmental Manager		
Health & Safety Manager		

7.6 Chemical Product & Waste Inventory

Trade name/ substance	Solid/liquid/ gas or powder	UN number	Max amount	Location marked on site plan	Type of Containment	Relevant health & Environmental properties

7.7 Pollution Prevention Equipment Inventory (On/Off-Site Resources)			
Type	**Location**	**Amount**	**Staff contact**

For example:

- *Personal protective Equipment (PPE) available that should be worn*
- *absorbents*
- *drain mats/covers*
- *pipe blockers*
- *booms*
- *pumps*
- *sandbags*
- *silt fencing*
- *over drums*

IF ANY OF THIS EQUIPMENT REQUIRES SPECIALIST TRAINING – STATE WHO HAS BEEN TRAINED IN ITS USE AND DATE OF TRAINING (attach evidence where possible).

7.8 Site Environmental Incident Report Form

Site		Date	
Time		Weather:	
Report By:		Position:	
Drumlins Park Wind Farm personnel present:		Position:	
Contractor Personnel Present:		Position:	

Description of Incident

Item Spilled	
Estimate of Volume of Spillage	

List of actions followed once incident was noted	Time	Corrective Action By	
		Action	By
Who first observed incident?			
First action			
Next Action			
Time Pollution Hotline was contacted			
Other			

Details of Clean-Up contractor or how contamination was removed from site:

Details of how this could be avoided in future:	
Details of review of internal procedures as result of this incident:	

DATE REPORT COMPLETED_____

7.9 Site Environmental Audit Form

Site:		**Date**:	
Time:		**Weather conditions:**	
Report by:		**Position**:	
Drumlins Park Wind Farm personnel present:		**Position:**	
Contractor personnel present:		**Position:**	

Item	**Questions**	**Yes**	**No**	**Corrective Action Required**	
				Action	**By**
1. Miscellaneous					
1.01	Does the contractor carry out regular internal environment audits on the site? Are recommendations recorded and is corrective action monitored?				
1.02	Have any environment incidents occurred and have these been reported as per on site procedure?				
1.03	Does the site induction contain a section on environmental requirements, including spill procedures, and is this communicated effectively?				
2. Land					
2.01	Are areas of hard standing (excluding bunded and refuelling areas) appropriately drained?				
2.02	Have local roads been inspected and cleaned where necessary?				
2.03	Has all test pitting and soil stripping been monitored by an archaeologist?				
2.04	Have all site clearance works been checked by an ecologist prior to works?				

Item	Questions	Yes	No	Corrective Action Required	
				Action	By
3. Material and equipment					
3.01	Is there knowledge of the IFI |Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016) and OPW Environmental Guidance: Drainage Maintenance & Construction (2019)				
3.02	Are transformers/ generators located in secondary containment bunds?				
3.03	Are all bunds capable of containing 110% of the volume of the largest container?				
3.04	Is refuelling carried out in a designated refuelling bay?				
3.05	Does all site drainage on hard standing drain to an oil interceptor?				
3.06	Is the designated area for oil, fuel and chemical storage appropriately sited (i.e. on hard standing at least 10m from a watercourse)?				
3.07	Are there procedures in place to monitor bund integrity and mange bund rainwater levels? Are these followed and recorded?				
3.08	Is there awareness that oil or residue from contaminated water removed from bunds should be disposed of as special waste and not discharged to land or the water environment? (oil absorbent materials (pads etc.) should be used first)				
3.09	Are all drums and mobile plant (e.g. generators) placed on drip trays more than 10m from any watercourse?				
3.10	Is all plant maintained in a good state of leaks? Are there records of this?				
3.11	Are there adequate spill kits available and stored in close proximity to potential risks?				
3.12	Are all refuelling browsers double skinned, locked when not in use, and in a good state of repair?				

Item	Questions	Yes	No	Corrective Action Required	
				Action	By
3.13	Is there evidence of unmanaged/ unrecorded fuel / oil spillages on site?				
3.14	Are dry or wet wheel washing facilities fully operational and effective?				
3.15	If wet wheel washing facilities are required, are these closed systems with no discharge to the water environment?				
3.16	Are there laboratory certificates (accredited by the Irish National Accreditation Board) to confirm that imported material stone aggregate brought onto site is free from any contamination?				
4. Noise, Dust and Light					
4.01	Are there facilities to dampen stockpiles and site working areas/roads to suppress dust?				
4.02	Are vehicles carrying loose material sheeted at all times?				
4.03	Are construction works, or deliveries of materials to and from the development, audible at noise sensitive premises?				
4.04	Has all external construction lighting received the approval of the planning authority?				
5. Waste					
5.01	Is the site tidy and free from litter?				
5.02	Is there evidence of waste beyond the site boundary?				
5.03	Is waste segregated and kept securely in containers in clearly designated areas?				
5.04	Does all waste leaving the site have the appropriate duty of care paperwork?				
5.05	Is all waste leaving the site being taken to an appropriately licenced site?				
5.06	Does all special/ hazardous waste (e.g. oil contaminated soils, waste oil) have the appropriate Special Waste Consignment Note?				
5.07	Is material re-used/recycled on site where possible?				
5.08	Are waste management practices in line with the site waste management plan?				
5.09	Are relevant Waste Management Exemptions in place for use of waste on site (e.g. use of waste concrete to create foundation sub-base)?				

Item	Questions	Yes	No	Corrective Action Required	
				Action	By
5.10	Is there any evidence of burning on site?				
5.11	Is there any evidence of unlicensed burial of waste?				
6. Water					
6.01	Do all discharges to land or watercourses have appropriate authorisation from Local Authorities /IFI?				
6.02	Does all watercourse engineering (bank protection, crossing etc.) have the appropriate authorization from Local Authorities / IFI?				
6.03	Do any abstractions from a watercourse or groundwater body have the appropriate authorization from Local Authority / IFI?				
6.04	Has confirmation for the SUDS design for access roads been gained from Local Authority / IFI?				
6.05	Are cut-off ditches installed on the uphill side of the working area to avoid contaminated surface water run-off?				
6.06	Have field drain been diverted where necessary?				
6.07	Is adequate treatment (e.g. settlement tank/lagoons/discharge to land) provided to prevent silt contaminated water entering watercourses and groundwater?				
6.08	Has vegetation removal/ clearance of the site been minimised to avoid unnecessary areas of bare ground?				
6.09	Have buffer-strips been left between working area and watercourses?				
6.10	Is plant operating in the watercourse?				
6.11	Have all culverts been installed at the base of stockpiles situated within close proximity to watercourses?				
6.12	Have silt fences been installed at the base of stockpiles situated within close proximity to watercourses?				
6.13	Are there adequate controls on site construction roads to minimize sediment runoff into watercourses (in particular, are there adequate flow attenuation measures within surface drain)?				
6.14	Are there any sign of decaying straw bales in water courses? (this could lead to organic pollution of the water course)				
6.15	Are silt traps regularly maintained?				

Item	Questions	Yes	No	Corrective Action Required	
				Action	By
6.16	Has ease of maintenance been considered in the design of permanent drainage features?				
6.17	Is there evidence of contamination of any watercourse (e.g. with oil, sediment, concrete, waste) in the vicinity of the works?				
6.18	Is monitoring of potential impacts on watercourses carried out on a regular basis and fully recorded?				
6.19	Are dewatering operations being carried out in such a way to minimise sediment contamination?				
6.20	Is drainage and run off in concrete batching areas adequate?				
6.21	Are adequate pollution prevention measures considered and put in place during concrete pours?				
7. Landscape					
7.01	Have earthworks been designed to promote successful re- instatement of vegetation?				
7.02	Are reinstatement and restoration works being implemented in a timely manner as per the requirements of the Contract?				
8. Ecology					
8.01	Have storage sites (soil, plant etc.) been sited on areas of lower quality habitat where possible?				
8.02	Is the ECoW a member of the institute of Ecology and /or Environmental management as required by planning conditions?				
8.03	Have buffer zones been constructed and maintained around designated protected species exclusion areas (e.g. red squirrel dreys, water vole habitats, otter holts, badger holts etc.)?				
8.04	Have toolbox talks on the subject of ecology and environmental responsibilities on site been delivered? Have attendance record been maintained for these?				
Item	**Questions**	**Yes**	**No**	**Corrective Action**	

				Required	
				Action	**By**
9. Documentation Check					
9.01	Start-up meeting record				
9.02	Full contacts list in Section 3, Table 3.0 of CEMP				
9.03	Induction records				
9.04	Pollution Prevention Measures Register				
9.05	Geotechnical Risk Register				
9.06	Weekly meeting minutes				
9.07	Records of environmental checks and routine monitoring of mitigation measures				
9.10	Water Quality Monitoring Results				
9.11	Safety and Environmental Awareness Reports (SEARs). Filed and entered on database?				
9.12	Safety and Environmental Audit Reports for the site. (If yes, insert date of last audit_____)				
9.13	Contractor's Environmental Plans (or Construction Method Statements):				

MANAGEMENT PLAN 2

Surface Water Management Plan

DRUMLINS PARK LIMITED

DRUMLINS PARK WIND FARM

CO. MONAGHAN

OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

SURFACE WATER MANAGEMENT PLAN

OCTOBER 2019

Drumlins Park Limited,
c/o Galetech Energy Services,
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Stradone,
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DOCUMENT APPROVAL

PROJECT	Drumlins Park Wind Farm	
CLIENT / JOB NO	Drumlins Park Ltd.	5870
DOCUMENT TITLE	Construction Environmental Management Plan (CEMP) Surface Water Management Plan (SWMP)	

	Prepared by	**Reviewed/Approved by**
Document Final	Name Sarah Moore	Name David Kiely
Date October 2019	Signature Sal Moore	Signature David Kiely

CONTENTS

1 INTRODUCTION

This document concerns the proposed operations required for the protection of surface water during the construction of the proposed Drumlins Park Wind Farm (the Site). The information contained herein will be used by the Contractor in developing the detailed Surface Water Management Plan (SWMP) for the Site. The detailed SWMP will also incorporate any specific planning conditions relating to the development, Section 50 consent and the requirements of the Construction Method Statement (to be prepared prior to construction), notably those relating to protection of water quality and fisheries. This outline SWMP details the mitigation measures put forward to ensure that the hydrological environment is not adversely affected by surface water runoff which may contain pollutants and to ensure that surface water is appropriately attenuated prior to discharge. This document will also be used, in addition to a detailed drainage design report/statement to be prepared post-consent, to confirm the precise nature and siting of surface water management measures during the construction phase.

2 PROPOSED DEVELOPMENT

The proposed development comprises a wind farm, including all associated development works to accommodate its construction, installation, operation, maintenance and the export of electrical power to the national grid. This will include:

- 8 no. wind turbines with a maximum tip height of up to 180m.
- All associated foundations and crane hardstanding areas.
- All associated underground electrical and communications cabling.
- Provision of new internal wind farm site access tracks and associated site entrances to local public roads.
- 1 no. temporary construction compound.
- 1 no. meteorological mast of up to 101m in height.
- Occasional upgrade works to public roads along the turbine component haul route.
- 3 no. grid connection and substation options.
- All associated site development and reinstatement works including provision of drainage infrastructure.

The proposed development will comprise a substation and attendant electricity line to connect the proposed wind farm to the national grid. However, as the point of connection is not precisely known at this time, 3 no. off-site grid connection options have been assessed.

2.1 Turbines

The proposed wind turbines will have a maximum overall tip height of up to 180 metres (m). The turbines will each consist of a three-bladed rotor attached to a nacelle (hub) which contains the mechanical drive train and electrical generation mechanisms, mounted on a steel tower of tubular construction.

The blades will be constructed of glass reinforced plastic. The colour of the proposed turbines and blades will be white, off-white or light grey in accordance with the Wind Energy Development Guidelines for Planning Authorities 2006, or as determined by the Planning Authority.

The turbines will be geared to ensure that all turbines rotate in the same direction and will typically have a cut-in wind speed of 3 metres-per-second (m/s) and a cut-out speed of 25 m/s. At the cut-out speed the turbine will automatically shut down.

2.2 Turbine Foundations

Once the turbine foundation has been excavated and the base fill emplaced, the bottom section of the tower or 'can' is installed. Reinforced steel rebar is built around and through the can before concrete is poured into the foundation in accordance with the turbine manufacturer's specifications.

The size of turbine foundations will be dictated by the turbine model ultimately installed on the subject site. However, the typical foundation depth for each turbine will be c.3m. This depth may immaterially vary depending on the specific geotechnical conditions at each turbine location.

2.3 Turbine Hardstands

Hardstand areas shall be established adjacent to each turbine to facilitate crane operations for turbine erection and, occasionally, for maintenance and final decommissioning. Each hardstand area shall typically be 50m x 30m for the construction phase and will consist of levelled and compacted (unsealed) hardcore.

2.4 Access Track

A total of approximately 5.5km of on-site access tracks will be required for construction purposes and for site access during the operational phase. The access tracks shall be similar to

normal agricultural tracks but with a slightly wider typical running width of approximately 5m.

Access tracks will be unsealed and constructed of crushed stone material on compacted sand to allow for permeability. While initial site investigations do not indicate the presence of any rock on site, any material arising from the excavation of foundations etc. will, where possible, be reused in the construction of access tracks. However, it is likely that the majority of material will be imported to the proposed development site from local quarries.

A textile layer may be needed in some locations to avoid any subsequent vehicle access problems. Some cut/fill in the construction of the access tracks may be necessary to ensure that horizontal and vertical alignments are suitable to accommodate abnormal HGV loads and adequate drainage.

2.5 Earthworks

Where possible excavated material will be re-used on site for reinstatement, road-side berms, landscaping etc. It is proposed to develop 2 no. spoil deposition areas where excess soil and subsoil, which cannot be utilised for reinstatement or is unsuitable for landscaping purposes on site, will be stored permanently, see Spoil Management Plan (CEMP, Management Plan 4) for more detail. The locations of the deposition areas have been selected due to the absence of any environmental constraints, separation distance to watercourses and generally flat or gently sloping gradient. Spoil will be transported to these locations where is will be placed in layers in accordance with best-practice methods. Appropriate drainage management measures will be implemented to ensure that the deposited spoil does not become waterlogged.

Following the completion of construction, the deposition areas will be graded to match the profile of surrounding land and will be reseeded. In the event that excess material arises which cannot be accommodated within the deposition area, this shall be removed from site and disposed of at a licensed waste disposal facility. Works at the spoil deposition areas will be monitored, on a weekly basis during the construction phase and monthly for a six month period thereafter, by an appropriately qualified geotechnical engineer.

2.6 Transformers & Cables

Each turbine will utilise its own transformer, which will be located either inside the nacelle or immediately adjacent to the base of the turbine tower (outside). Depending on the final turbine model selected, transformers will either be oil-filled (and bunded to prevent spillage)

or of a solid cast resin type, which is effectively non-polluting should a spillage occur. The transformers will increase the electrical voltage on site and on-site electrical cables will connect the turbines to the wind farm substation for onward connection to the national grid.

All on-site electrical cables will be placed underground and be of a solid polymeric construction with either aluminium or copper conductors. All electrical cables will follow the alignment of the on-site access tracks, insofar as is practical. Trenching will be by a mechanical digger. The proposed depth of the cable trench is approximately 1m with a width of approximately 0.5m. The excavated material from the excavation of trenches will be side-cast alongside the trench and reinstated following the laying of cables.

2.7 Meteorological Mast

The proposed permanent mast to be installed on the subject site will be up to 101m in height and will consist of a steel guy-wired lattice structure to which various measurement instruments will be attached. The purpose of the mast is to monitor wind speeds and climate conditions for the efficient operation of the proposed development. The recorded meteorological data is sent remotely to a computer system located off-site so that the data can be analysed to extrapolate the long-term wind resource at the site. The mast is also required to carry out power curve performance tests, a typical condition of the wind turbine warranty.
Some ground works, including the construction of concrete foundations will be required to erect the mast. The mast will remain on-site during the operational phase of the development (permanent as per the life span of the wind farm). Mast components will be brought to site using 4x4 vehicles and thus no specific site entrance or access track construction works are required.

2.8 Temporary Construction Compound

During the construction period, a temporary construction compound will be required. The compound will be located along the proposed main arterial access track in the townland of Drumacreeve (see planning application drawings) and will have an approximate area of 4,750m^2 (0.47 hectares) comprising:

- Temporary cabins to be used for the site office, the monitoring of incoming vehicles and temporary welfare facilities for the construction staff, including temporary toilets and potable water;
- Parking for construction staff, visitors and construction vehicles;
- Secure storage for tools, plant and small parts;

- Waste management area where waste will be sorted and collected by a licensed service provider;
- Safe bunded storage of components and materials including fuels, lubricants and oils; and
- Security fencing around the compound.

Temporary portaloo chemical toilets to be provided for construction staff will be sealed units to ensure that no discharges escape into the local environment. These will be supplied and maintained by a licensed supplier. Potable water (for drinking, food preparation, hand washing etc.) will be supplied on-site by water dispensers and this will also be sourced and maintained by a licensed supplier.

The construction compound will be marked out and fenced to prevent encroachment onto non-designated areas. Following the completion of all construction activities, the compound will be decommissioned with all structures removed and fully re-instated. Reinstatement will involve removing crushed stone and underlying geotextile, covering with topsoil and reseeding.

2.9 Substation & Grid Connection

The point of connection to the national grid will ultimately be decided by Eirgrid or ESB Networks, as the independent electricity Transmission System Operator (TSO) with statutory competent responsibility. The precise means of connection will be dependent on a range of factors and at the discretion of the TSO. Three (3) grid connection alternatives have been identified as follows:

- **Option G1:** Construction of a 38kV substation on the proposed development site and installation of a 38kV part overhead electricity line (OHL) and part underground electricity line (UGL) to the existing Clones 38kV substation on the national grid, which lies approximately 5km to the northwest;
- **Option G2:** Construction of a 38kV substation on the proposed development site and installation of a 38kV OHL to the existing Shankill 110kV substation on the national grid, which is located approximately 16km to the southwest; and
- **Option G3:** Construction of a 110kV substation approximately 500m to the south of the nearest turbine and connection to the existing Lisdrum to Shankill 110kV overhead line by way of approximately 500m of UGL and the erection of 2 no. strain towers.

3 SITE HYDROLOGY

On a regional scale, the proposed Drumlins Park Wind Farm site, grid connection route options (3 no.) and haul route works are located in the Lough Erne surface water catchment within the North Western International River Basin District (NWIRBD) in Hydrometric Area 36.

On a more local scale, the majority of the wind farm site (including all of the proposed turbine locations), the Shankill grid connection route option, the proposed 110kV substation grid connection option and 4 of the 5 no. permanent haul route works areas are located in the Annalee River surface water catchment. The vast majority of the Clones grid connection route option and 1 of the 5 no. haul route works areas are located in the Finn River surface water catchment (approximately 500m of underground cable section of the grid route is located in the Annalee River surface water catchment).

Elements of the wind farm site inside the Finn River surface water catchment include the main site entrance (Site Entrance 1) and approximately 1.3km of proposed wind farm access track.

The Finn River and the Annalee River drain into Upper Lough Erne which is located some 20km northwest of the wind farm site.

The Finn River flows in a south-westerly direction approximately 3km north of the wind farm site. The Clones grid connection route option crosses the Finn River channel by OHL. The Annalee River, which is crossed by the Shankill grid connection route option, flows in a westerly direction approximately 7km south of the site (the wind farm site itself drains into the Annalee River via the local Bunnoe River which flows approximately 1km to the southeast of the wind farm site and c. 0.7km southeast of the 110kV substation (grid connection option)).

Further details on site hydrology are contained within Chapter 7 of the EIAR.

3.1 Surface Water Buffer Zones

Prior to works commencing, a Water Quality Specialist will be retained by Drumlins Park Wind Limited with a responsibility to implement the Water Quality Inspection and Monitoring Plan. Among other requirements, the latter requires a full baseline survey to be

undertaken prior to the commencement of construction and requires the contractor to provide a 'schedule of work' to the water quality specialist at the beginning of each week.

The Environmental Manager (EM) or the Ecological Clerk of Works (ECoW) will ensure that a 50m watercourse buffer zone will be implemented on site to ensure the protection of watercourses.

3.2 Earthworks (Removal of Vegetation Cover, Excavations and Stock Piling) Resulting in Suspended Solids Entrainment in Surface Water

Mitigation by Design

To ensure that surface water features are protected from the release of silt or sediment and to ensure that all surface water runoff is fully attenuated to avoid the discharge of dirty water the following mitigation measures will be implemented:

- Source controls to limit the likelihood for 'dirty water' to occur:
  - Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with clean washed gravel, filter fabrics, and other similar/equivalent or appropriate systems.
  - Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.

- In-Line controls to ensure appropriate management of silt laden water:
  - Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.

- Treatment systems to fully attenuate silt laden waters prior to discharge:
  - Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems.

It should be noted for this site that an extensive network of land drains already exists, and these will be integrated and enhanced as required and used within the wind farm development drainage system. The integration of the existing land drainage network and the proposed wind farm network is common practice in wind energy developments and will also result in benefits to surrounding agricultural lands.

- The main elements of interaction with existing drains will be as follows:
    - Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction, and attenuation for flow management) of runoff from the proposed wind farm drainage into the existing site drainage network. This will reduce the likelihood for any increased risk of downstream flooding or sediment transport/erosion.
    - Silt traps will be placed in the existing drains upstream of any streams where construction works is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area.
    - During the operational phase of the wind farm, runoff from individual turbine hardstanding areas will be not discharged into the existing drain network but discharged locally at each turbine location through stilling ponds and buffered outfalls onto vegetated surfaces.
    - Buffered outfalls which will be numerous over the site will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site.
    - Drains running parallel to the existing roads that require widening will be upgraded. Velocity and silt control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles and silt fences will be used during the upgrade works. Regular buffered outfalls will also be added to these drains to protect downstream surface waters.

Water Treatment Train

A final line of defence can be provided by a water treatment train such as a "Siltbuster" if required. If the discharge water from construction areas fails to be of a high quality then a filtration treatment system (such as a 'Siltbuster' or similar equivalent treatment train (sequence of water treatment processes) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This water treatment train will apply for the entirety of the construction phase.

Silt Fences

Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to watercourses of sand and gravel sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin, and entrained in surface water runoff. Inspection and maintenance of these of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. Double silt fences will be emplaced within drains down-gradient of all construction areas inside the hydrological buffer zones to provide an additional layer of protection in these areas.

Silt Bags

Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats (sediment entrapment mats, consisting of coir or jute matting) placed at the silt bag location to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.

Management of Runoff from Soil Deposition Areas

It is proposed that excavated soil and subsoil will be used for reinstatement and landscaping throughout the site and any excess material will be placed in 2 no. spoil deposition areas at the wind farm site. Both proposed spoil deposition areas are located outside the 50m stream buffer zone. The procedure for managing excavated material is outlined in the Spoil Management Plan (CEMP, Management Plan 4).

During the initial placement of spoil in the deposition areas, silt fences, straw bales and biodegradable matting will be used to control surface water runoff. Drainage from overburden deposition areas will ultimately be routed to an oversized swale and a number of settlement ponds and a ‘Siltbuster’ with appropriate storage and settlement capacity, designed for a 1 in 100-year 6-hour return period, before being discharged to the on-site drains.

Spoil deposition areas will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. Once re-vegetated and stabilised, soil/subsoil

deposition areas will no longer be a likely source of silt laden runoff. Settlement ponds will be left in place until the areas have stabilised.

OHL Installation Works

Silt fences will be placed down-gradient of the proposed OHL pole locations during construction work within 50m of a stream/river. All material at the pole locations will be backfilled and reinstated at the pole locations. The bare ground will be re-seeded immediately after the works to prevent erosion. Where required, the silt fencing will be left in place until the ground has re-vegetated and the established root structure will prevent erosion.

UGL Installation Works

Temporary silt fencing/silt trap arrangements will be placed within existing roadside/field drainage features along the route to remove any suspended sediments from the works area. The trapped sediment will be removed and disposed at an appropriate licenced facility. The bare ground re-seeded/reinstated immediately and silt fencing temporally left in place if necessary.

Pre-emptive Site Drainage Management

The works programme for the initial construction stage of the development will also take account of weather forecasts and predicted rainfall in particular. Large excavations and movements of soil/subsoil or vegetation stripping will be suspended or scaled back if prolonged or intense rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

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

- General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates.
- Meteo Alarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale;
- Hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events.
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a

composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3 hour record is given and is updated every 15 minutes. Radar images are not predictive.

- Consultancy Service: Met Eireann provide a 24 hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.

Using the safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of an impending high rainfall intensity event. Works will be suspended if forecasting suggests either of the following is likely to occur:

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

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

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

Timing of Site Construction Works

The construction of the site drainage system will be carried out, at the respective location, prior to other activities being commenced. The construction of the drainage system will only be carried out during periods of low rainfall, and therefore at minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and functional for all subsequent construction works.

3.3 Excavation Dewatering and Potential Impacts on Surface Water Quality

The management of excavation dewatering (pumping) and subsequent treatment prior to discharge into the drainage network will be undertaken as follows:

- Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations, will be put in place.

- The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters.
- If required, pumping of excavation inflows will prevent build up of water in the excavation.
- The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a Siltbuster unit.
- There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur.
- Daily monitoring of wind farm excavations by the Environmental Manager will occur during the construction phase. If high levels of seepage inflow occur, excavation work at this location will cease immediately and a geotechnical assessment undertaken.
- A mobile 'Siltbuster' or similar equivalent specialist treatment system will be available on-site for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if needed.

3.4 Potential Release of Hydrocarbons during Construction and Storage

Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:

- The volume of fuels or oils stored on site will be minimised. All fuel and oil will be stored in an appropriately bunded area within the temporary construction compound. Only an appropriate volume of fuel will be stored at any given time. The bunded area will be roofed to avoid the ingress of rainfall and will be fitted with a storm drainage system and an appropriate oil interceptor.
- All bunded areas will have 110% capacity of the volume to be stored.
- On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled at the temporary compound and will be towed around the site by a 4x4 jeep to where plant and machinery is located. No refuelling will be permitted at works locations within the 50m hydrological buffer. The 4x4 jeep will also be fully stocked with fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such

as drip trays and fuel absorbent mats will be used during all refuelling operations to avoid any accidental leakages.

- All plant and machinery used during construction will be regularly inspected for leaks and fitness for purpose.
- Spill kits will be readily available to deal with any accidental spillages.
- All waste tar material arising from road cuttings (from trenching or other works in public roads) will be removed off-site and taken to a licensed waste facility. Due to the potential for contamination of soils and subsoils, it is not proposed to utilise this material for any reinstatement works.
- An outline emergency plan (CEMP, Management Plan 1) has been developed for the construction phase. It details how to deal with accidental spillages. This emergency plan will be further developed prior to the commencement of development and will be agreed with the Planning Authority as part of the detailed CEMP.

3.5 Groundwater and Surface Water Contamination from Wastewater Disposal

Measures to avoid contamination of ground and surface waters by wastewaters will include:

- Self-contained port-a-loos (chemical toilets) with an integrated waste holding tank will be installed at the site compound, maintained by the providing contractor, and removed from site on completion of the construction works.
- Water supply for the site office and other sanitation will be brought to site and removed after use to be discharged at a suitable off-site treatment location.
- No water will be sourced on the site, nor will any wastewater be discharged to the site.

3.6 Release of Cement-Based Products

The following mitigation measures are proposed to ensure that the release of cement-based products is avoided:

- No batching of wet-cement products will occur on site. Ready-mixed concrete will be brought to site as required and, where possible, pre-cast products, will be utilised.
- All watercourse crossings will utilise pre-cast products and the use of wet-cement products within the hydrological buffer will be avoided insofar as possible.
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. Chute cleaning will be undertaken at lined cement washout ponds with waters being tankered and stored in the temporary construction compound, removed off site and disposed of at an approved licensed facility. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed.

- Weather forecasting will be used to ensure concrete pouring activities are not undertaken during prolonged or intense rainfall.
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

3.7 Morphological Changes to Surface Water Courses & Drainage Patterns

There are six (6) likely watercourse crossings required within the wind farm site; 5 no. are in the Annalee River catchment and 1 no. is in the Finn River catchment. All watercourse crossings along the Clones and Shankill grid connection route will be via OHL. The locations of watercourse crossings within the wind farm site are provided at Chapter 7 of the EIAR.

The following mitigation measures are proposed:

- Where possible, all proposed new stream crossings will be clear span bridges (bottomless culverts) and the stream beds will remain undisturbed. There will be no in-stream excavation works at the crossing locations.
- Where wind farm electrical cabling connecting to the 110kV substation follows the public road, the cable will pass above or below the existing culvert and will not directly interfere with the culvert.
- At the time of construction, all guidance/best practice requirements of the Office of Public Works (OPW) or Inland Fisheries Ireland will be incorporated into the design/construction of the proposed watercourse/culvert crossings.
- As a further precaution, in-stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites", i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI).
- During the near stream construction works, double row silt fences will be placed immediately down-gradient of the construction area for the duration of the construction phase.
- All new river crossings and watercourse diversions (watercourses mapped on OSI mapping) will require a Section 50 license application to the OPW in accordance with

the Arterial Drainage Act 1945. The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.

- All drain diversion work will be carried out during periods of low flow in order to reduce sedimentation effects on downstream watercourses. Where diversions are required, the revised routing of drainage channels will be constructed prior to the disturbance of the existing channel. The revised channel will be constructed to replicate the hydraulic capacity of the existing channel. Appropriate control measures will be implemented along the revised channel to ensure that any sediment entrained along the channel is treated.

3.8 Pollution Contingency Plans

An Emergency Response Plan is attached as Management Plan 1 of the outline CEMP.

4 REFERENCE DOCUMENTS

All construction works on the site, and specifically design and construction works to be undertaken within and in the vicinity of any watercourses, will be completed in compliance with current legislation and best practice as detailed within the EIAR, CEMP and associated Management Plans, Construction Method Statements (to be prepared prior to construction), , current legislation and published guidance, including (non-exhaustive list):

- CEMP Management Plan 1: Emergency Response Plan. This provides information on best practice to be implemented in the event of a pollution incident.
- CEMP Management Plan 3: Water Inspection and Monitoring Plan outlines a monitoring programme for relevant watercourses within the development footprint.
- CEMP Management Plan 4: Spoil Management Plan. This provides information on best practice spoil management on site to prevent water pollution.
- CEMP Management Plan 5: Site Waste Management Plan. This provides information on best practice for mitigation of risks to watercourses from storage and handling of waste materials.
- Water Framework Directive (2000/60/EC)
- Groundwater Daughter Directive (2006/118/EC)
- Environmental Liability Directive (2004/35/EC)
- Local Government (Water Pollution) Acts 1977-1990
- S.I. No. 77 of 2019 European Union Environmental Objectives (Surface Waters) (Amendment) Regulations 2019
- S.I. No. 9 of 2010 EC Environmental Objectives (Groundwater) Regulations 2010

- S.I. No. 722 of 2003 EC Water Policy Regulations 2003
- Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes, NRA, 2008.
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters, IFI, 2016.
- CIRIA (Construction Industry Research & Information Association) Report C502 Environmental Good Practice on Site
- CIRIA Report C532 Control of Water Pollution from Construction Sites
- CIRIA Report C648 Control of Water Pollution from Linear Construction Projects: Technical Guidance
- CIRIA Handbook C650 Environmental Good Practice on Site
- CIRIA Handbook C651 Environmental Good Practice on Site Checklist
- Engineering in the Water Environment, Good Practice Guide, Construction of River Crossings, First edition, SEPA, April 2008.
- Culvert Design Guide, Report 168, CIRIA, 1997.

5 CONSTRUCTION REQUIREMENTS

The Contractor will be required to produce a detailed Method Statement for each Watercourse Crossing Plan prior to commencement of the works. The Crossing Plans and Method Statements will take into account all relevant documents, guidelines and best practice manuals outlined in Section 4 above as well as any further information that may be obtained during subsequent surveys that may be undertaken prior to construction works commencing (for example further ground investigations, ecological baseline studies etc.).

Specifications of bridging structures to be used in the crossings must comply with the Schedule 50 and agreed with Inland Fisheries Ireland (IFI) subsequent to the application being made in advance of works on site.

The Contractor's Watercourse Crossing Plan will be submitted to the Drumlins Park Ltd., EM and IFI for review and approval where appropriate.

The Ecological Clerk of Works (ECoW) will be consulted with regard to all watercourse crossing works. Surveys by the ECoW and EM will be carried out immediately prior to construction so that adequate mitigation is built into the design in respect to fish passage and avoiding impact on downstream ecology.

MANAGEMENT PLAN 3

Water Quality Inspection and Monitoring Plan

DRUMLINS PARK LIMITED

DRUMLINS PARK WIND FARM

CO. MONAGHAN

OUTLINE
CONSTUCTION ENVIRONMENTAL MANAGEMENT PLAN
(CEMP)

WATER QUALITY INSPECTION AND MONITORING PLAN

OCTOBER 2019

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DOCUMENT APPROVAL

PROJECT	Drumlins Park Wind Farm	
CLIENT / JOB NO	Drumlins Park Ltd.	5870
DOCUMENT TITLE	Construction Environmental Management Plan (CEMP) Water Quality Inspection and Monitoring Plan (WQIMP)	

	Prepared by	**Reviewed/Approved by**
Document Final	Name Sarah Moore	Name David Kiely
Date October 2019	Signature Sal Moore	Signature David Kiely

CONTENTS

1. INTRODUCTION

1.1 Scope and Requirements

1.1.1 The *Contractor* is solely responsible for pollution prevention for the duration of the contract and until such time as permanent measures, such as permanent drainage and silt mitigation controls, are deemed to be adequate and appropriately constructed.

1.1.2 In order to verify the efficacy of pollution prevention and mitigation works during construction, Water Quality Monitoring is required to be undertaken by a suitably qualified Environmental Manager(s), prior to, during and post completion of construction works. This will include all watercourses within the catchment of the construction area. The monitoring will comprise visual, hydrochemistry and grab sample monitoring.

1.1.3 The details of the monitoring will be contained within a detailed Water Quality Inspection and Monitoring Plan (WQIMP) (i.e. Rev 2 of this plan) to be prepared by the Contractor and submitted to the Local Authority for approval prior to commencement of construction. The approved plan will be coordinated and implemented on site by the Environmental Manager.

1.2 Reference Documentation

1.2.1 Construction works have the potential to cause pollution of the water environment. All construction works on site, and specifically construction works to be undertaken within and in the vicinity of any watercourses, will be completed in compliance with current legislation and best practice as detailed within the CEMP and in particular the Waste Management Plan and the Surface Water Management Plan.

1.2.2 The following reports (along with any further surveys conducted) will be used to inform the scope of the construction phase WQIMP.

- Environmental Impact Assessment Report (EIAR)
- Natura Impact Statement (NIS)
- CEMP

2. RESPONSIBILITIES

2.1 General

2.1.1 Responsibility for the water quality monitoring programme, and coordination thereof, will lie with the independent Environmental Manager appointed at the start of the programme.

2.1.2 Prior to works commencing, a Water Quality Specialist (WQS) will be retained by Drumlins Park Limited with a responsibility to implement this WQIMP. Among other requirements, the WQIMP requires a full baseline survey to be undertaken prior to the commencement of construction and requires the contractor to provide a 'schedule of work' to the water quality specialist at the beginning of each week.

2.1.3 The WQS will prepare and deliver site induction and training to all construction personnel, in liaison with the Site Engineer and Environmental Manager (EM)/ Ecological Clerk of Works (ECoW).

2.1.4 As outlined in the Section 3.5, Table 3.3 of the outline CEMP, the Water Quality Specialist will:

- Undertake specific monitoring activities and reporting as defined in agreed documentation prepared as part of the planning process.
- The WQS will be appointed and report to the EM. They will have responsibility for fulfilling the requirements of the WQIMP, including:
- Daily visual inspection of: access tracks for signs of ground damage or solids escape to nearby watercourses in vicinity of construction works
- The ground between the structure under construction and the nearest downslope watercourse for signs of solids escape or ground damage
- Surface water features in vicinity of construction works
- Any pollution control measures at structures and along access tracks (e.g. silt fences, drain or stream crossings etc.) for evidence of contaminated run-off or mitigation failure
- Attendance at the critical work phases including: access track construction, foundation excavation, watercourse crossings, concrete pouring and back-filling.

- Collection and analysis of water samples at a number of monitoring locations (i.e. upstream & downstream of the 6 no. instream locations) before, during (if potential pollution visually identified) and after construction works at that location
- EPA Q Value Biological Monitoring at 4 no. monitoring locations (i.e. upstream & downstream of instream construction work locations) before and after construction works. The proposed monitoring locations will be agreed with the Local Authority prior to the commencement of development.

2.1.5 Collection and analysis of water samples at a number of monitoring locations (i.e. upstream & downstream of construction work locations) before, during (if potential pollution visually identified) and after construction works.

2.2 Hydrochemistry Monitoring

2.2.1 Field Monitoring

Field monitoring of water quality parameters and collection of samples will be undertaken by the WQS. The WQS will be appropriately qualified on the required monitoring methods and the use, calibration and maintenance of all monitoring equipment used.

2.2.2 Laboratory Analysis

Laboratory analysis of water samples will also be undertaken as part of the monitoring programme by an independent and appropriately certified laboratory to be appointed by the Environmental Manager.

2.2.3 Coordination of the laboratory sampling and analytical programme will be undertaken by the WQS/EM. Samples will be dispatched for analysis under chain of custody procedures. Laboratory analytical results will be sent directly to the EM.

2.2.4 Interpretation and reporting of both the field and laboratory data will be the responsibility of the Environmental Manager.

2.3 Reporting

2.3.1 Monthly Water Quality Reporting

Results of water quality monitoring shall assist in determining requirements for improvements in drainage and pollution prevention measures implemented on site. A monthly report on water quality will be prepared by the EM.

2.3.2 It will be the responsibility of the EM to present the ongoing results of water quality and weather monitoring at site meetings and with outside bodies. This shall be done at weekly meetings and reported within the overall Monthly Environmental Report to be prepared by the EM.

2.3.3 The monthly reports on water quality will consider all visual, field monitoring and results of laboratory analysis received that month. Reports will describe how the results compare with baseline data as well as previous monthly reports on water quality. The reports will also describe whether any deterioration or improvement in water quality has been observed and whether any effects are attributable to construction activities and what remedial measures or corrective actions have been implemented.

2.3.4 Monthly reports on water quality will be provided to the Client Project Manager and will be made available to the Local Authority.

2.3.6 Final Report on Water Quality

Upon completion of all post-construction monitoring, the EM in collaboration with the Water Quality Specialist will prepare a final report on water quality. This final report will cover the overall performance against baseline data, details on any impacts attributed to construction works and recommendations for remedial works if required.

2.3.7 The final report will be provided to the Local Authority and Inland Fisheries Ireland.

2.4 Contingency Sampling & Emergency Response

2.4.1 In the event that a pollution incident arises from the construction works, such as that resulting from a spill or accidental release of chemicals, oils and fuels or concrete effluent, threatens to enter, or has entered a watercourse, additional sampling and analysis of surface water samples will be undertaken to determine the level of impact to the surface water receptor and remedial requirements, where necessary.

2.4.2 Where a pollution incident has occurred as a result of construction works, the Water Quality Specialist, EM and Local Authority shall be consulted to determine sampling requirements and any additional survey requirements where potentially significant impacts are identified. Where it is demonstrated that the pollution occurred as a result of non-compliance with this CEMP, the costs of any additional sampling or survey requirements shall be borne by the Contractor.

2.4.3 The results of any monitoring or survey work undertaken by the Contractor shall be made available to the EM and the Local Authority and copies of all correspondence and test certificates shall be retained on site.

3. WATER QUALITY MONITORING: OUTLINE SCOPE

3.1 General

3.1.1 The full scope of monitoring and precise monitoring locations will be agreed with the Local Authority prior to commencement of construction works.

3.1.2 Water Quality Monitoring locations will be identified through grid reference, photographic record and indicated on a plan. For repeat sampling locations, each location will also be marked on the ground (stake/post) to ensure that the correct location is sampled each time.

3.1.3 Sample locations shall be labelled consistently for the duration of the monitoring period. Where any additional locations are sampled during the works, the location (grid reference) of the sampling point will be recorded and a photograph will be taken at time of sampling.

3.1.4 'Control' sample locations may also be included in the scope of any monitoring.

3.1.5 A water sampling location map will be developed and included in the detailed method statements for precise locations at water crossings within this development.

3.2 Hydrochemistry Monitoring

3.2.1 The detailed scope will be determined and agreed with the Local Authority prior to commencement of construction.

3.2.2 Sample locations, monitoring frequency and precise hydrochemistry parameters will be specified and agreed with the Local Authority.

3.2.3 As a minimum, the monitoring programme will include:

- At least one baseline monitoring visit at each monitoring location.
- Daily visual observation in areas of high construction activity or during high rainfall periods to identify any evidence of siltation, oil or silt. Visual inspections will include details of the color of the water at the time of inspection.
- Weekly visual inspections and monthly field hydrochemistry monitoring.
- One round of post construction monitoring, to be agreed with the Local Authority. Post construction will be defined as when the reinstatement phase is completed.

3.2.4 Analytical determinants (including limits of detection and frequency of analysis) will be specified and agreed with the Local Authority for each sample location. The agreed suite of grab sample determinants may include the following:

Parameters for hydrochemistry analysis

- pH
- Temperature
- Total Suspended Solids (TSS)
- Dissolved Organic Carbon (DOC)
- Conductivity
- Dissolved Oxygen (DO)
- Total Oxidized Nitrogen (TON)
- Ammoniacal Nitrogen
- Ammonia
- Potassium
- Phosphate
- Biological Oxygen Demand (BOD)
- Chemical Oxygen Demand (COD)
- Total Petroleum Hydrocarbons (TPH) (Only during construction phase)

MANAGEMENT PLAN 4

Spoil Management Plan

DRUMLINS PARK LIMITED

DRUMLINS PARK WIND FARM

CO. MONAGHAN

OUTLINE CONSTUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

SPOIL MANAGEMENT PLAN

OCTOBER 2019

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DOCUMENT APPROVAL

PROJECT	Drumlins Park Wind Farm	
CLIENT / JOB NO	Drumlins Park Ltd.	5870
DOCUMENT TITLE	Spoil Management Plan	

	Prepared by	**Reviewed/Approved by**
Document Final	Name Sarah Moore	Name David Kiely
Date October 2019	Signature 	Signature 

DRUMLINS PARK WIND FARM

SPOIL MANAGEMENT PLAN

CONTENTS

1 INTRODUCTION

This Spoil Management Plan (SMP) provides an assessment of handling surplus excavated material for the Drumlins Park Wind Farm (Proposed Development).

The plan provides an assessment of the management of surplus excavated material at the Proposed Development (site). The measures outlined in this plan will be monitored on site by the appointed Environmental Manager (EM) and will be discussed with the Contractor before works commence on site. This plan should be read in conjunction with the Construction Environmental Management Plan (CEMP) and associated Appendices.

1.1 Site Description

The Proposed Development includes the following works:

- 8 no. wind turbines with a maximum tip height of up to 180m;
- All associated foundations and crane hardstanding areas;
- All associated underground electrical and communications cabling;
- Provision of new internal wind farm site access tracks and associated site entrances;
- 1 no. temporary construction compound;
- 1 no. meteorological mast of up to 101m in height;
- Upgrade works along the turbine component haul route;
- 3no. grid connection and substation options (The project will also comprise an attendant substation and grid connection; however, as the point of connection is entirely beyond the control of DPL, it is not possible to confirm the precise nature or location of the grid connection. Therefore, three grid connection options have been assessed); and
- All associated site development and reinstatement works including provision of drainage infrastructure.

It must be noted that some details within this SMP can only be finalised with appropriate input from the Contractor who will carry out the main construction works and as such, this SMP will be further developed prior to construction.

1.2 Site Investigations

A detailed site walkover and geological mapping exercise was undertaken by HES on 25th and 26th of July and on the 15th August 2019. Intrusive site investigations were undertaken on 14th and 15th August 2019 and included the following:

- Soil cores and probing were undertaken along the proposed access tracks to investigate soil subsoil type and lithology.
- A trial pit (~3.5 - 4m depth) was undertaken at each of the turbine locations and at the location of the 110kV substation (9 no. trial pits in total) to investigate subsoil depth and lithology.

Ground conditions generally comprised topsoil sandstone and shale tills dominating in the area of the wind farm site and each of the grid connection route options. Pockets of cutover bog were mapped close to the wind farm site and along the grid connection route options.

Due to the drumlin landscape (with large overburden depths), bedrock is at depth and any exposures are limited to some of the main watercourse routes. Bedrock was not intercepted at any location during the wind farm trial pit investigation. Bedrock depths at the proposed turbine locations are expected to be in excess of 15m, most likely between 15m and 30m.

1.3 General Aims and Principals of the Spoil Management Plan

The purpose of this Plan is to ensure that any adverse effects on terrestrial habitats, watercourses and/or the landscape are minimised as a result of development construction and the generation, movement and storage of spoil. Reinstatement proposals will consider and mitigate against all identified significant risks to environmental receptors.

The SMP will form part of the Employer's Requirements within the Civil Construction Contract and its implementation will be monitored by the Owner's Engineer, Geotechnical Engineer and the Environmental Manager (EM). To follow compliance with the requirements of the Plan, all of the actions under the Plan shall be monitored by the appointed EM. Earthworks shall be monitored by a suitably qualified Geotechnical Engineer.

1.4 Management of Excavated Material

Where possible excavated material will be reused on site. Any surplus excavated materials, which cannot be utilised for reinstatement or landscaping purposes, during the construction phase shall be stored on site at two designated storage areas, located between T1 and T2 (see planning application drawings) in an environmentally safe manner that will not result in the pollution of waters. Excavated material may be temporarily stored adjacent to excavations for reuse in reinstatement or landscaping activities.

2 ESTIMATED EXCAVATION QUANTITIES

The estimated quantities of spoil generated during construction are shown in Table 2.1.

Table 2.1 Estimated volume (m^3) of soil generated from the construction of the proposed development.

Element	**Estimated Total Excavation Volume (m^3)**	**Estimated Reuse for Reinstatement or Landscaping (m^3)**	**On-site Storage (Spoil Deposition Areas) (m^3)**	**Estimated Off-site Disposal at a Licensed Waste Facility (m^3)**
Wind Farm				
Wind Farm	59,803	32,331	27,472	
Grid Connection, Substation & Haul Route*				
Clones Grid Connection Option (incl. substation)	300	30	270	
Shankill Grid Connection Option (incl. substation)	600	60	270	270
110kV Grid Connection Option (incl. substation)	14,132	-	14,132	
Haul Route Works	1,000	300		700

* Only one grid connection and substation option will be selected

Current land use within the wind farm site is exclusively agricultural, with small pockets of commercial forestry within the wider landscape. Each of the proposed turbine locations and access roads are situated in grassland. Ground conditions are generally dry and firm with the exception of some wet/boggy ground on the lower-lying lands between drumlins where a number of small to medium sized watercourses are present. Generally, the soils and subsoils at the site are naturally poorly draining and therefore numerous manmade drains are present within the site, typically located along field boundaries and hedges.

2.1 Re-use of Excavated Material

The volume of excavated material outlined in Table 2.1 is an estimate and could change following detailed site investigation works. Where possible the majority of excavated material will be reused on site. Where excavated material cannot be reused on site it will be stored in two designated soil storage areas, located between T1 and T2.

2.1.1 Access Tracks

It is proposed that low, shaped and vegetated berms be provided at access track edges (both sides) where possible. The total length of access tracks is 5,500m (11,000m of potential berms in total). However, when junctions, turning areas are discounted, the length available for berms is c. 9000m.

Each beam should have a cross-sectional area of 1.95m^2. Sub-soil will be used for the core of each berm which will be finished in topsoil. Roadside berms will have side slopes no greater than 45^o or 1 in 1. Berms will be seeded and grassed over at the earliest opportunity to prevent erosion

2.1.2 Hardstands

It is also proposed to deposit subsoils to the perimeter of each hardstand area where appropriate.

2.1.3 Turbine Foundation Ballast

The concrete foundation of each turbine will be 24m diameter. Excavated subsoil material will be used as backfill to provide ballast. Excess material will be used for reinstatement or landscaping or will be stored at the spoil deposition areas.

2.1.4 Temporary Compound

Spoil from the construction of the temporary compound will be stored temporarily at the site compound area and, on completion of the project, will be used to reinstate the area.

2.1.5 Meteorological Mast

Some ground works, including the construction of concrete foundations and anchors, will be required to erect the mast. The mast will remain on-site during the operational phase of the development (permanent as per the life span of the wind farm). Any excavated material will be used to reinstate mast foundations and anchors.

2.1.6 Haul Route

In order to facilitate the delivery of turbine components, upgrade works will be required at various locations between Dublin Port and the main site entrance on the R189. A total of 18 no. locations

have been identified where works to the public road will be required, 13 no. temporary works and 5 no. permanent works. It is estimated 1,000m3 of spoil will be generated during these works. It is estimated 300m3 of the material can be reused and 700m3 will be disposed of at a licensed waste facility.

2.1.7 Grid Connection and Substation

There are three potential grid connection and substation options. The excavation volumes have been estimated for each option and they are as follows:

Option 1 Clones Grid Connection Option (incl. substation): 300m^3 in total will be generated, 30m3 can be reused on site and 270m^3 will be deposited in the designated soil storage area.

Option 2 Shankill Grid Connection Option (incl. substation): 600m^3 in total will be generated, 60m^3 can be reused on site, 270m^3 will be deposited in the designated soil storage area and 270m^3 will be disposed of at a licensed waste facility.

Option 3 110kV Grid Connection Option (incl. substation): 14,132m^3 in total will be generated, and the total volume will be deposited in the designated soil storage area.

2.2 Soil Storage Areas

There are two proposed spoil storage areas located between turbine T1 and T2. Where material cannot be reused on site, it will be deposited in these areas.

2.3 Reinstatement

Reinstatement works can commence at an early stage of the construction works. Such reinstatement can occur following the completion of individual sections of work such as the completion of, say, a turbine foundation or hardstand. Reinstatement would include grading of any slopes left by the construction works, followed by the careful placement of topsoil which had been previously excavated from this area and temporarily stored on site.

Natural revegetation is the preferred method of recovery. However, if required, bare material and/or reinstated soil can be secured using vegetation blankets such as Greenfix Embankment Mat2, Geojute2 or similar approved product. An appropriately pre-seeded Coir-Mesh2 may also be suitable, if required.

2.4 Monitoring and Maintenance

The appointed civil contractor will be responsible for implementing, managing, and monitoring the Plan throughout the construction stage to see that it conforms to the requirements herein. The appointed EM and Geotechnical Engineer shall also monitor all works associated with this Plan, and the civil contractor will be obliged to act immediately on any instruction relating to this Plan given by either the EM or the Geotechnical Engineer. The EM shall report on compliance with the relevant mitigation measures as outlined in this Plan. The EM shall also be empowered to halt works where he/she considers that continuation of the works are likely to result in a significant pollution or siltation incident.

MANAGEMENT PLAN 5

Waste Management Plan

DRUMLINS PARK LIMITED

DRUMLINS PARK WIND FARM

COUNTY MONAGHAN

OUTLINE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

WASTE MANAGEMENT PLAN

OCTOBER 2019

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DOCUMENT APPROVAL

PROJECT	Drumlins Park Wind Farm	
CLIENT / JOB NO	Drumlins Park Ltd.	5870
DOCUMENT TITLE	Construction Environmental Management Plan (CEMP)	

	Prepared by	**Reviewed/Approved by**
Document Final	Name Sarah Moore	Name David Kiely
Date October 2019	Signature 	Signature 

CONTENTS

1. INTRODUCTION

1.1 Scope and Requirements

This Management Plan is a 'live' document that can be reviewed and updated at regular intervals throughout the project life cycle. The Contractor will be required to develop and adapt this document in line with the activities of the project being undertaken at the Drumlins Park Wind Farm. The contractor will approve this Plan (and any future amendments of the document) with the Environmental Manager (EM) prior to any work commencing.

The information in this document forms part of the Construction Environmental Management Plan (CEMP) and is the Site Waste Management Plan (WMP) for the Drumlins Park Wind Farm.

The CEMP and the measures detailed in this WMP are part of the main requirements for consents for planning permissions. As such, the contractor (and all sub-contractors) on site are obligated to incorporate these waste requirements (contained herein) in all operations.

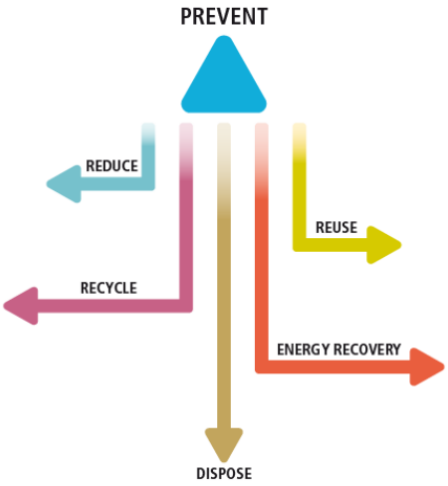
The general methods and principles detailed within this document will be adhered to by the contractor as they are committed to reduce the resources it uses in the construction work of the Drumlins Park Wind Farm.

1.2 Waste Prevention & Waste Regulations:

In 2012, the Department of the Environment, Community and Local Government published the Waste Management Policy in Ireland (DoECLG, 2012). One of its guiding principles is to minimise waste. It is therefore important that the Contractor has an efficient time management plan in place, so that where possible, excavated materials can be reused immediately elsewhere on site.

S.I. No. 315/2016 - European Union (Waste Directive) (Amendment) Regulations 2016 infers a duty on all waste producers to take measures to apply the waste hierarchy priority order. In these Regulations, the "Act of 1996" means the Waste Management Act 1996 (No. 10 of 1996) and "Principal Regulations" means the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011). The "Waste Directive" means Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste.

The Waste Management Priority Hierarchy which contractors are obligated to apply: (Source: EPA):



The Waste Hierarchy

The waste management hierarchy applies to all waste, including hazardous waste. The top of the hierarchy indicates that the priority should be in preventing waste being produced in the first place.

The PCB/PCT Directive (Directive 96/59/EC on the disposal of polychlorinated biphenyls and polychlorinated terphenyls) deals with the disposal of certain hazardous chemicals that represent a particular threat to the environment and to human health.

The European Communities (Carriage of Dangerous Goods By Road and Use of Transportable Pressure Equipment) (Amendment) (No. 2) Regulations 2017 (S.I. No. 282 of 2017) shall be adhered to in the case of transportation to and from the site of any dangerous goods.

The Contractor under the above mentioned Directives is legally required to:

- Ensure that the disposal and recovery of waste does not present a risk to water, air, soil, plants and animals
- Not allow waste disposal to constitute a public nuisance through excessive noise levels or unpleasant odours, or to degrade places of special natural interest
- Prohibit the dumping or uncontrolled disposal of waste
- Prepare WMPs
- Ensure that waste treatment operations are licensed
- Require waste collectors to have special authorization and to keep records

- Ensure that the waste which cannot be prevented or recovered is disposed of without causing environmental pollution.

The EU Integrated Pollution Prevention and Control (IPPC) Directive (Directive 96/61/EC) provides for a permit system for activities including waste management. In adherence with this Directive the Contractor must:

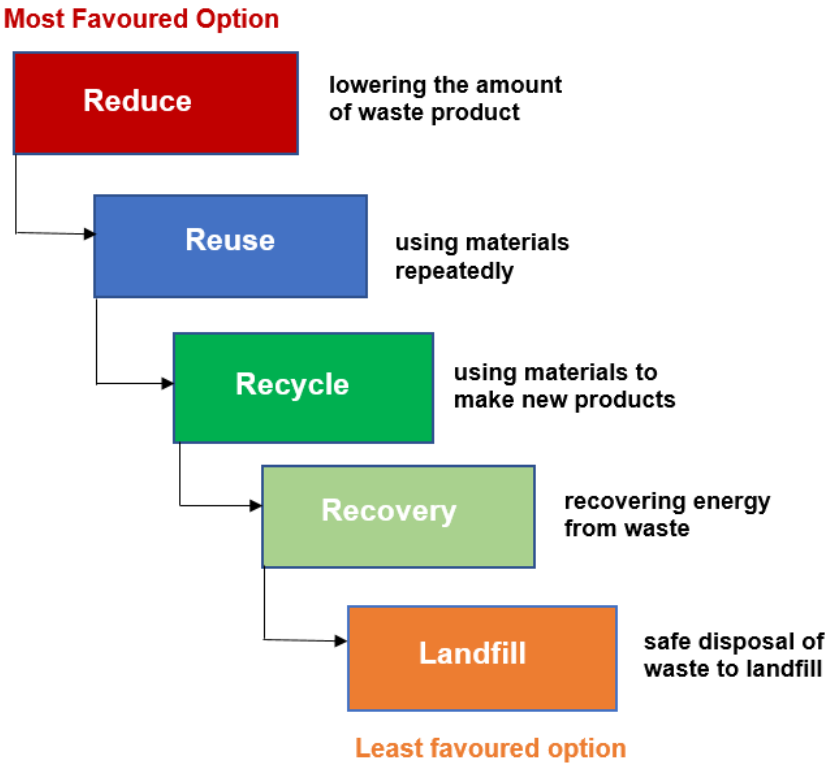
- Be in possession of a waste permit for waste disposal and
- Be prepared at all times for inspection regarding monitoring of waste activities.

1.3 Benefits of Waste Prevention

The contractor must be committed to preventing waste through implementing reduction and effectively managing resources from the design stage of construction to the completion of the construction of the project. This will ensure that:

- Legal obligations are met
- Waste production is minimised
- Build costs are minimised
- A framework for continuous assessment and best practice is implemented
- Carbon emissions and negative environmental impacts of and from waste materials are reduced

The following image explains this in more detail. The least favoured option is to dispose of waste to landfill where embodied energy is not recovered. The Waste Hierarchy (EU Waste Framework Directive, 2008) is outlined below:



1.4 Reference Documentation

As well as the Waste Management Act 1996-2008 other guidance documents have been used to develop this plan. These include:

Pollution Prevention Guidelines:

Best Practice Guidelines on the Preparation of WMPs for Construction and Demolition Projects, Dept. of Environment, Heritage & Local Government, July 2006.

EU Directive:

Article 4 of Waste Framework Directive (Directive 2008/98/EC)

This sets out the five steps for dealing with waste.

2. WMP MINIMUM REQUIREMENTS

A Site WMP involves the following stages:

- Planning & Design
- Implementation
- Monitor
- Review

2.1 Planning & Design

The planning & design stage of the Drumlins Park Wind Farm and grid connection has taken into account the nature of the site, design of the development, environmental considerations and construction methods to minimise the quantity of waste produced on site during its construction.

2.2 Implementation

This WMP will include:

1. An inventory of waste type expected to be produced in the course of the project.
2. Estimates of each type of waste that will be produced in the construction of this wind farm and grid connection.
3. A statement showing how the contractor will minimise each type of waste to be produced prior to any activity generating this waste.
4. Procedures for identification of the waste management actions proposed for each different waste type, including re-using, recycling, recovery and disposal (as per the waste hierarchy priorities).

2.2 Monitoring

2.2.1 Checks and Records

All stores on site of oil, fuel, chemicals etc should be regularly checked (in particular in extreme weather conditions) for evidence of leaks or spills. The timing of each of these checks is detailed in Section 3. These checks will be visual inspections to look for evidence of contamination.

Records of all visual checks must be maintained and be available for inspection on request. Waste Management will be a regular item on team meetings as required by the CEMP. Waste Management Practices should be revised at these meetings. There should be a Site Waste Audit is carried out every six months (Section 2.3.3).

2.2.2 Waste Inventory

A waste inventory should be maintained and kept up to date. It will include an inventory of all waste materials leaving the site for disposal and the name of the licensed operator and intended disposal facility. A Waste Inventory Spreadsheet should be added to this plan by the Contractor.

2.2.3 Monitoring of Site Waste Management Plan

The contractor will appoint a person to implement and monitor the WMP. This will be the Environmental Manager (EM).

As stated, the WMP should include an inventory of the types and estimates of the waste to be produced on site. The aim will be to keep volumes of waste produced below the estimates of waste to be produced. The appointed person should ensure that a Site Waste Audit is carried out every six months.

2.3 Completion, Audit and Review

Upon completion of construction works but before the end of the defects correction period, a Waste Management Review should be undertaken. The aim of this is to identify project progress, measure compliance with licenses and to consider lessons learnt. A Waste Management Review will be carried out at the end of construction.

2.4 Site Waste Management as Part of Site Induction process

All workers on-site should be fully briefed with the WMP. All site visitors will be briefed on appropriate waste storage and disposal units. Littering on site will not be tolerated. All personnel have a Duty of Care to challenge others noted littering on site.

3. GENERAL WASTE MANAGEMENT PRINCIPLES

3.1 The contractor will avoid or minimise the volume of waste generated.

3.2 Waste including spoil, will be stored a minimum of 50m from nearby watercourses or drains at the site insofar as is possible. It is noted that the dedicated spoil deposition areas have been located 50m from nearby watercourses.

3.3 Waste storage and disposal will be carried out in a manner which prevents pollution in compliance with legislation.

3.4 All waste to be transported off-site to a licensed disposal site. Duty of Care Waste Control dockets must be produced and filed on site with each load. These **MUST** detail:

- An adequate description of the waste
- Where the waste came from
- The appropriate code from the List of Wastes Regulations for the waste (commonly referred to as the EWC code)
- Information on the quantity and nature of the waste and how it is contained
- Names and addresses of the transferor at Drumlins Park Wind Farm (the person currently in control of the waste) and the transferee (usually either a registered waste carrier or a waste management licence holder (waste manager)
- The Standard Industry Classification (SIC) code (2007 or 2003 for hazardous waste only) of the business from where the waste was received
- Where applicable, indicate that the Waste Hierarchy has been complied with
- The place, date and time of transfer of the waste. If using a season ticket, the period for which it is valid (i.e. valid from dd/mm/yyyy to dd/mm/yyyy)
- If the waste is being taken to landfill the transfer note **must** also contain details of any treatments or processes that have already been applied

3.5 Only trained operatives should handle hazardous substances. All stored hazardous waste will be clearly labelled.

3.6 All oil storage facilities of over 200 litres need secondary containment facilities of 110% storage capacity (e.g. bund, enclosure, drip tray). All of these will be regularly inspected for visual signs of leaks or something that would impact on their capacity – e.g. a drip tray full of rainwater.

3.7 Waste storage areas will be clearly located and signed. If space allows, key waste streams will be separated.

3.8 All waste should be transported from site at appropriate frequency by a registered waste contractor to prevent over-filling of waste containers.

3.9 Frequency of Checks. The contractor will ensure that all storage facilities are checked on a weekly basis. The checklist for completion is attached below.

VISUAL WASTE STORAGE CHECKLIST

Waste Area Checked	Date Checked	Initials of Checker
GENERAL OFFICE WASTE		
BOWSER		
PORTALOO		
EXCAVATED SOIL		
WASHINGS		
CONCRETE		
OIL		
HAZARDOUS WASTE		

4. ANTICIPATED CONSTRUCTION WASTE STREAMS

As stated previously, the contractor will outline prior to commencement of construction all anticipated waste streams to be produced at the construction site at the Drumlins Park Wind Farm.

4.1. Waste from Staff Facilities

4.1.1 General Waste Generate at Staff facilities.

There will be the typical waste generated in an office such as left-over food and sandwich wrappers. All such waste should be stored appropriately and safely from wind, rain and wild animals that often tear apart rubbish bags. Provision for separation of waste streams will be provided so that e.g. paper and cardboard waste and bottles may be recycled.

4.1.2 Sewage

In addition, the facility will comprise self-contained port-a-loo units which will be managed and serviced regularly (by removal of the contents by tanker to a designated sewage treatment plant as necessary) and removed off site on completion of construction.

4.2 Concrete

4.2.1 Concrete Waste and wash-out water

Methods for dealing with/avoiding concrete waste and wash out water are provided in the CEMP Surface Water Management Plan (SWMP).

4.3 Chemicals, Fuel and Oils

Engine and hydraulic waste oil will be stored on site in compliance with the Surface Water Management Plan (CEMP, Appendix 2). All storage containers of over 200 litres will have a secondary containment of 110% capacity to ensure that any leaking oil is contained and does not enter the aquatic environment.

As part of this WMP there will be a **Chemical and Waste Inventory kept**. This inventory will include:

- List of all substances stored on-site (volume and description);
- Procedures and location details for storage of all materials listed; and
- Waste disposal records, including copies of all Waste Transfer Notes (WTN) detailing disposal routes and waste carriers used.

- Any tap or valve permanently fixed to the mobile unit through which oil can be discharged to the open or when delivered through a flexible pipe which is fitted permanently to the mobile unit, must be fitted with a lock and locked shut when not in use.
- Sight gauges must be fitted with a valve or tap, which must be shut when not in use. Sight gauge tubes, if used must be well supported and fitted with a valve.
- Mobile units must have secondary containment when in use/out on site.

Where mobile bowers are used on site, guidelines will be followed so that:

- Any flexible pipe, tap or valve **will** be fitted with a lock where it leaves the container and be locked shut when not in use;
- Flexible delivery pipes **will** be fitted with manually operated pumps or a valve at the delivery end that closes automatically when not in use. Where possible, a nozzle designed to dispense oil is used;
- The pump or valve will have a lock and be locked shut when not in use.

4.3.1 Transport of Diesel/Oils to the site

Diesel is now classified as a dangerous substance. Under the EU Directive 95/55/EC all such dangerous substances should be conveyed in a container that compiles with the ADR. As such the manufacturer of each bowser should provide certification to contractors that the following:

- A leak-proof test certificate
- A copy of the IBC approval certificate
- An identification plate attached to the container

For loads in excess of 1000 litres (220 gallons), the bowser vehicle driver will have undergone training and hold a special license.

4.3.2 Refuelling on Site

On site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled at the temporary compound and will be towed around the site by a 4x4 jeep to where plant and machinery is located. No refuelling will be permitted at works locations within the 50m hydrological buffer. The 4x4 jeep will also be fully stocked with fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent

operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations to avoid any accidental leakages.

All plant and machinery used during construction will be regularly inspected for leaks and fitness for purpose. Spill kits will be readily available to deal with and accidental spillage.

4.4 Packaging

Packaging will be brought on site and can include cardboard, wood and plastics used to package turbine components. As per the waste hierarchy, packaging will be returned to the originator ahead of re-use or recycling. Where this is not possible, waste should be separated as appropriate and safely stored on site appropriately site in anticipation of recycling.

4.5 Waste Metals

Waste metals from concrete reinforcing etc should have commercial value and will be re-used or recycled with the appropriate licensed waste contractor.

5. EXCAVATED MATERIALS

The Spoil Management Plan (SMP) details the methods, storage and use of excavated materials. These excavated materials will be required for habitat and ecological restoration, reprofiling and backfilling as per the SMP. But whilst they are being stockpiled on site, they need to be classified in order to comply with waste legislation. The National Waste Collection Permit Office (NWCPO) maintains a register for waste facility permits and certificates of registration issued by local authorities.

5.1 Anticipated materials to be excavated on site

The estimated volumes of excavated material area shown in Table 5.1

Table 5.1 Estimated volume (m^3) of soil generated from the construction of the proposed development.

Element	Estimated Total Excavation Volume (m^3)	Estimated Total Reinstatement Volume (m^3)	Estimated Volume for On-site and Off-site Storage (m^3)
Wind farm	59,803m^3	32,331m^3	27,472m^3 in spoil deposition area
Clones Grid Connection Option (incl. substation)	300m^3	30m^3	270m^3 in spoil deposition area
Shankill Grid Connection Option (incl. substation)	600m^3	60m^3	270m^3 in spoil deposition area and 270m^3 to licensed waste disposal facility
110kV Grid Connection Option (incl. substation)	14,132m^3	-	14,132m^3 in spoil deposition area
Haul Route Works	1,000m^3	300m^3	700m^3 to licensed waste disposal facility

5.1.1 Classification and Plan for Excavated Materials on site

The contractor will liaise with the Local Authority on all aspects of waste management relating to excavated soil to ensure compliance during construction. The Environmental Manager will ensure all mitigation measures outlined are adhered to.

5.2 Estimated Volumes of Soil

Estimated volumes are outlined in a Spoil Management Plan (SMP) and provided in Appendix 4 of the CEMP. Whilst there will be significant volumes of soil to be excavated on site during the construction of the development, where possible excavated material will be used for reinstatement and restoration works.

The SMP outlines the re-use proposals for excavated materials. Where materials cannot be used for reinstatement or landscaping, spoil will be disposed of at the designated deposition areas located between turbine T1 and T2. Where material cannot be deposited here; for example road cuttings from trenching works, this will be disposed of at a licensed waste facility.

5.3 Waste Tar Material

All waste tar material arising from road cuttings (from trenching or other works in public roads) will be removed off-site and taken to a licensed waste facility. Due to the potential for contamination of soils and subsoils, it is not proposed to utilise this material for any reinstatement works

5.4 Waste or Not Waste

Any excavated materials which are not intended to be disposed of, or discarded, will NOT be considered as waste. It will not be regulated under waste management controls where the following six criteria are ALL met:

i) Use is a necessary part of the planned works
ii) Material is suitable for that use
iii) Material does not require any processing or treatment before it is reused
iv) No more than the quantity necessary is used
v) Use of the material is not a mere possibility but a certainty and
vi) Use of the soil will not result in pollution of the environment or harm to human health

If excavated materials do not meet any one of the above criteria, unless it is treated to recover the waste, it will have to be classified as waste initially. But following treatment and re-use on site it will no longer be classified as waste.

If excavated soil on site does not meet all of the six criteria listed above, for the purposes of waste description, it would fall under chapter 17 of the European Waste Catalogue (EWC) Construction and Demolition wastes and the EWC code ’17,05’04 soil and stones (non-hazardous) waste would apply.

The principles of the waste hierarchy will be strictly adhered to avoid and minimise production of excavated soil, and to ensure that all materials are recovered and reused on site.

WASTE INVENTORY

THE CONTRACTOR WILL PREPARE AND UPDATE REGULARLY A WASTE INVENTORY FOR INCLUSION IN THE WASTE MANAGEMENT PLAN