

**PROPOSED WIND FARM  
AT BALLYKETT, CO. CLARE**

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**BIODIVERSITY ENHANCEMENT  
AND MANAGEMENT PLAN**

**JANUARY 2024**

*Prepared for*

**BALLYKETT GREEN ENERGY LTD.**

*by*

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## 1.0 INTRODUCTION

### 1.1 Background

This Biodiversity Enhancement and Management Plan (BEMP) has been prepared in support of the Environmental Impact Assessment Report (EIAR) produced for the proposed Ballykett Wind Farm, Co. Clare. Full details of the proposed Development are given in Chapter 2 of the EIAR.

As part of the Development, an area of cutover bog, measuring approximately 0.54 ha, will be directly impacted as a result of the proposed development of turbine T4 and its associated hardstanding areas. As the cutover bog is considered of Local Importance (higher value), mitigation is being provided to off-set the habitat loss through the implementation of the Biodiversity Enhancement and Management Plan (BEMP), as described in this report. In particular, the BEMP is focused on the rehabilitation of an area of raised bog habitat (3.4 ha), which had been planted with commercial forestry. Following the implementation of the measures outlined in this report, there will be a net gain 2.86 ha in peatland habitat on the site.

The bog rehabilitation programme described in this report will be implemented in accordance with published guidance and best practice, as follows:

- SNH (now NatureScot) "Planning for development: What to consider and include in Habitat Management Plan – Guidance" (Version 2, March 2016).
- Coillte (2016) *Demonstrating Best Practice in Raised Bog Restoration in Ireland* (LIFE Project Number LIFR09 NAT/IE/000222). End of Project Report.
- Mackin *et al.* (2017) *Best practice in raised bog restoration in Ireland*. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

Bog rehabilitation by removal of planted forestry has been successfully carried out elsewhere in Ireland, as described by Mackin *et al.* (2017):

*'Removal of forestry is a proven restoration measure, and has been used effectively by organisations such as Coillte at a number of raised bogs in Ireland, both on the high bog and cutover. In recent years, this measure has been applied at many raised bog sites as part of EU LIFE-funded restoration projects, including Crosswood Bog SAC, Lough Ree SAC, Killyconny Bog (Cloghbally) SAC, Girley Bog NHA, Scohaboy Bog NHA and Wooddown Bog NHA'.*

## **1.2 Outline Description of Proposed Wind Farm Site**

The Site for the proposed Ballykett Wind Farm Development is situated approximately 3.5 km northeast of Kilrush, Co. Clare.

The locations for the proposed turbines is within a former raised bog of the 'Western' category. Peat depths on site are generally shallow (0.5-2.0 m) to moderately deep (2.0-3.5 m), with isolated pockets of deeper peat (up to 5.0m). The majority of the bog basin within the study area was planted with commercial conifer plantation in the early 1990s. An area of unplanted cutover bog, which measures approximately 9.7 ha, occurs within the study area – while cut for turbary in the past there is no evidence of recent cutting and the surface is now well revegetated

Drainage of the Site is to the Moyasta River, which rises to the north-east of the site and flows for a section through the Redline Boundary. The Moyasta River is an example of a Depositing/lowland river (FW2), and flows in a general westward direction before draining to Poulmasherry Bay.

Ecologically, the Site for the proposed wind farm can be described as being dominated by Conifer plantation (WD4 of Fossitt 2000), with relatively small areas of Cutover bog (PB4) and Improved grassland (GA1) (latter one field in southernmost part of site).

## **1.3 Objectives of the BEMP**

### **Objectives - primary**

To rehabilitate an area of former raised bog planted with commercial forestry since the early 1990s (hereinafter known as the 'peatland restoration area') to offset the loss of cutover bog as a result of the proposed wind farm development.

### **Objectives - secondary**

To provide habitat for peatland associated species such as meadow pipit (Red-listed), skylark, the common frog and the common lizard, which may be affected by the loss of some cutover bog habitat as a result of the proposed project.

## **1.4 Statement of Authority**

### **Brian Madden BA Mod. (Hons.), PhD, MCIEEM**

Brian graduated in Natural Sciences from the University of Dublin in 1984 and earned a Ph.D degree from the National University of Ireland for his research on ecosystem processes in raised bogs. Since 1994, Brian has been the principal ecologist with BioSphere Environmental Services.

Brian has carried out botanical surveys and habitat assessments for most terrestrial habitats which occur on the island of Ireland. He is also an experienced ornithologist, with particular interest in birds of peatland and wetland habitats.

BioSphere Environmental Services has been involved in energy related projects, and particularly wind farms, since the 1990s. Many of the projects have included Biodiversity Enhancement and Management Plans, including Castlepook Wind Plan, Co. Cork, Oweninny Wind Farm, Co. Mayo and Eglish Wind Farm, Co. Tyrone.

## 2.0 PLAN DETAILS

### 2.1 Plan area location

The location of the plan restoration area is within the Redline boundary for the proposed Ballykett Wind Farm (see Figure 1). The plot, which measures approximately 3.4 ha, lies south and southeast of an existing area of cutover raised bog which measures 9.7 ha (of which c.0.54 ha will be lost as a result of turbine construction). The plot would extend from the existing open cutover bog (see Plate 1) to the new wind farm track which would link turbine T3 to turbine T4. A firebreak between the bog and the plantation has now largely revegetated and supports shallow pools with Sphagnum moss – this is presently of value as wet bog and will be retained (see Plate 2).

With the plan implemented, the total area of open bog within the study area would measure approximately 12.28 ha.



**Figure 1.** Location of area for peatland restoration at Ballykett Wind Farm.





**Plate 1.** View of planted restoration plot from the existing cutover bog, looking southwards (April 2023). Note that the line of conifers at edge of plantation are taller (4-6 m) than most of those elsewhere in plot due to the better drainage along the edge.



**Plate 2.** View of firebreak along forest edge – this is now a wet ponded strip with bog vegetation and will be retained (looking northeast).



## 2.2 Description of the peatland restoration area

The area of the plan is presently classified as conifer plantation (WD4 of Fossitt 2000). This is on peat which may be up to 3.0 m in depth. The trees are mainly sitka spruce *Picea sitchensis*, with lodgepole pine *Pinus contorta* also present. The trees were planted in the early 1990s but have generally not grown well which probably reflects the depth of peat and wetness of the original bog surface. The trees are small in height and size and are considered uncommercial, having a low yield class (ref. to Forestry Report by VEON, EIAR Appendix 15.2). In places the trees are sparse and have not formed a closed canopy (see Plate 3). In these areas a ground layer with a high cover of ling heather *Calluna vulgaris* still persists and in places there are mounds of Sphagnum moss (see Plate 4). Other bog species include purple moor-grass *Molinia caerulea* and cross-leaved heath *Erica tetralix*. The high cover of ling heather indicates drying out of the peat surface due to drainage from the time of planting and subsequent tree growth. However, it is noted that many of the drains have now filled in with vegetation, including Sphagnum mosses, and are essentially non-functioning as drains (see Plate 5). Where tree growth has been more profuse, the surface is generally dominated by mosses, such as *Hypnum jutlandicum*, *Rhytidiadelphus loreus*, *Thuidium tamariscinum* and *Plagiothecium undulatum*.

The present ecological value of the plot is low and with continued growth of the trees the former bog surface will dry out further.



**Plate 3.** View of stunted conifers (sitka spruce) on peat within the plan area – note the abundant ling heather.





**Plate 4.** View of mound of Sphagnum moss between the stunted trees (April 2023).



**Plate 5.** View of a main drain within plantation – since planting, this has become filled in with bog vegetation and is essentially non-functioning as a drain (April 2023).



## 2.3 Proposed Management Methodology

In order to facilitate the re-establishment of peatland vegetation and maintain an effective hydrological regime, the following measures are proposed. These measures outline the work that will be required for the implementation of the Plan and will be in effect for the lifetime of the project.

It is noted that the following activities will be prohibited within the area of the Plan:

- Peat cutting
- Insertion of new drains
- Grazing of livestock
- The planting of new forestry

### 2.3.1 Measure no. 1: Removal of trees

Mackin *et al.* (2017) provide the following advice for the removal of trees from planted bog surfaces:

*'In general, clear-felling using a harvesting machine should only be carried out if a crop is commercially viable, surface conditions are dry and there is a low risk of damage to raised bog habitats. A number of alternatives to clear-felling are available, depending on the particular circumstances of a bog. These include halo-thinning, ring barking, fell to waste using a specialist track machine or chainsaw, or complete tree removal with cables and winches.'*

*'In order to select the most appropriate solution, consideration should be made of the following: the potential for peat-forming habitats to develop, the risk of damage to the bog surface, and the commercial viability (area and yield class) of the crop. Where working conditions on the raised bog surface are unsuitable for machinery, or only a small crop of conifers are present, use of a chainsaw may be the most appropriate solution.'*

To minimise disturbance to the bog surface, trees will be cut manually by chainsaw, where feasible. Trees will be cut at base with the root system left in-situ to decompose. The cut trees will be left where felled as removal would require forwarding machinery which would cause further disturbance to the bog surface.

Where manual removal of trees is not feasible, *i.e.* in areas where the trees are better grown in height and size, a low ground pressure excavator will be used. Access into the plot by harvesting machinery will be over brush mats leading from the new wind farm track. Trees will still be cut at base (not knocked over) and the cut material left in-situ to rot. Consideration will be given to the use of a rotating mulching head cutter attached to a low ground pressure tractor to pulverise the trees in situ.

Ultimately, the method to remove trees will require discussion between a forestry contractor and ecologist following a walk-over site inspection, taking into account the wetness of the ground, the size of the trees and health and safety issues. However, the overall objective is to minimise disturbance to the bog surface.

The clearing of the restoration area will take place with due diligence to the Wildlife Acts 1976 – 2021 as amended. The following conditions are noted:

- Tree felling will take place outside of the bird breeding season (March-August inclusive).
- The restoration plot will be included in the pre-construction surveys to be undertaken within the wind farm site (as described in EIAR) for bat roosts (section 6.8.1) and badger setts (section 6.8.2).

### **2.3.2 Measure no. 2: Blocking of drains**

Forest drains are expected within the management plot (see Figure 9.2 in Chapter 9: Hydrology and Hydrogeology). A walk-over survey suggests that many of these may not today be functioning drains (see Plate 5) but an inspection will take place after the trees are removed. This survey will be carried out by a hydrologist and ecologist to assess which drains should be blocked. The effect of the new wind farm track on local drainage will be taken into account. Identified drains will be blocked by hand using either wooden or recycled plastic dams (see Plate 6) which are hammered into place with a mallet. Alternatively, in areas near the new road, peat plugs may be suitable. Procedure for drain blocking in raised bogs is described in detail in Mackin *et al.* (2017).

The ultimate purpose of blocking drains is to raise water levels in the peat and encourage peat-forming vegetation and especially the growth of Sphagnum mosses.



**Plate 6.** An example of a recycled plastic dam used to block functioning drains on a raised bog site.

## **2.4 Monitoring**

To confirm that the objectives of the bog restoration and enhancement plan are being achieved, the area of restoration will be monitored during the lifetime of the wind project. SNH (2016) note that a Habitat Management Plan should be a live document, which may be altered following monitoring results, unexpected events or evolving guidance. Any alterations would only occur following approval by the relevant (statutory) parties.

### **2.4.1 Monitoring for bog vegetation**

After the trees are removed and drains blocked (as required), a series of permanent quadrats will be set up for the purpose of monitoring of vegetation change over time. The location of these quadrats will be marked using wooden pegs and the grid reference will be recorded using GPS. It is expected that up to ten quadrats will be described and they will be large (at least 5m x 5m) to take into account the scale of the plan area. The occurrence and cover of vascular plant and moss species will be recorded in these quadrats along with a number of other important parameters such as the height of vegetation, cover of bare peat, peat depth, flowering of plant species etc. This survey will take place in early July of each monitoring year. Photographs of the quadrats will also be taken on deployment and subsequently during the following years of monitoring.

During the site visits for vegetation monitoring, a walk-over survey will take place to check for the presence of self-seeded conifers that may become established or which may have been missed at time of initial tree clearing. Seedlings up to approximately 20 cm in height can be easily plucked out by hand, while larger saplings may need to be taken out by hand-saw at some stage later in the year.

The walk-over survey will also observe if any of the inserted dams have failed and are in need of repair or re-instatement. The survey will also check for any additional drains which should be blocked to minimise water loss from the bog. Should remediation or further works be required, the works will be undertaken by the wind farm operating company.

Monitoring will take place during the wind farm Operational Years 1, 2, 3 & 5 of the Plan implementation, with Year 1 being the base year at the time the works are carried out. After Year 5, a review of the progress will be conducted in light of the Plan objectives, and a programme will be developed for the next 5-Year period of the Plan (and so on for the lifetime of the project).

### **2.4.2 Monitoring for birds**

As it is expected that bird species that occur in the adjoining area of cutover bog will, with time, utilise the restored bog, breeding bird species will be monitored.

The post-construction bird monitoring for the wind farm site, as described in the Biodiversity chapter of the EIAR (see Section 6.9.3) will include a transect through the bog restoration area. As for the



main site, the monitoring will be undertaken in Years 1, 2, 3, 5, 10, and 15 of the lifetime of the wind farm. Surveys will be conducted in accordance with SNH guidance (SNH, 2017) and any relevant updates, by an appropriately experienced ornithologist.

## **2.5 Time Period for Plan Implementation**

**Year 1** of the Plan will include all physical measures required, namely the clearing of trees and blocking of drains.

Year 1 will coincide with the completion of wind farm construction works.

### **Year 2 and subsequent years**

Throughout the lifetime of the Plan there is a need to check the restoration area for the re-sprouting of conifers from stumps and for establishment of self-seeded seedlings. This will be done by a walk-over survey during the monitoring years for vegetation. Any conifers recorded will require removal - re-sprouts can be treated with non-hazardous herbicide, while small self-seeded seedlings (up to c. 20) can be plucked out by hand.

The walk-over survey will also observe if any further drains need blocking, *i.e.* if water is seeping out from the restoration area.

The walk-over survey will also observe if any of the inserted dams have failed or if any further should be blocked to minimise water loss from the bog.

### **3.0 OVERVIEW**

The BEMP for the Ballykett Wind Farm project will restore an area of former western raised bog that has been degraded by afforestation. This will offset the loss of cutover bog as a result of wind farm construction. The success of these measures will be evaluated through a detailed monitoring and reporting programme

It is anticipated that various important species of flora and fauna will utilise the area as the habitat develops and improves in quality over time.

The objectives for the Plan are achievable, as similar bog restoration projects have been carried out successfully at various Coillte owned properties in Ireland (Coillte 2016, Mackin *et al.* 2017).

The Plan will be underpinned and supported by a detailed monitoring programme, which will allow for remediations and/or modifications to ensure that the objectives are being achieved throughout the lifetime of the proposed wind farm. A reporting schedule will be agreed with the Planning Authority as evidence of compliance.

#### **4.0 REFERENCES**

Coillte (2016) *Demonstrating Best Practice in Raised Bog Restoration in Ireland* (LIFE Project Number LIFR09 NAT/IE/000222). End of Project Report.

Fossitt, J. (2000) *A Guide to Habitats in Ireland*. Heritage Council, Kilkenny.

Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) *Best practice in raised bog restoration in Ireland*. Irish Wildlife Manuals, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

SNH (now NatureScot) "Planning for development: What to consider and include in Habitat Management Plan – Guidance" (Version 2, March 2016).

Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms.