



APPENDIX 6-4

BIODIVERSITY MANAGEMENT AND ENHANCEMENT PLAN

Biodiversity Management and Enhancement Plan

Meenbog Wind Farm



Table of Contents

1.	INTRODUCTION	1
2.	HEN HARRIER HABITAT ENHANCEMENT	3
2.1	Overview	3
2.2	Land Selection	3
2.2.1	Hen Harrier Use of the Area.....	3
2.2.2	Assessment of Alternative Land	4
2.2.3	Existing Baseline Condition	5
2.2.4	Rationale for Land Selection.....	8
2.3	Methods to Achieve Management Objectives	9
2.3.1	Tree Felling.....	9
2.3.2	Furrow and Drain Blocking.....	9
2.3.3	Revegetation.....	9
2.3.4	Creation of Patchy Scrub.....	10
3.	BLANKET BOG ENHANCEMENT	10
3.1	Overview	10
3.2	Land Selection	10
3.3	Methods to Achieve Management Objectives	13
3.3.1	Tree Felling.....	13
3.3.2	Furrow and Drain Blocking	13
3.3.3	Peat Dams.....	14
3.3.4	Plastic Dams	14
3.4	Stump Flipping and Surface Smoothing	15
3.4.1	Smoothing With Bucket	15
3.4.2	Cross-tracking.....	15
3.4.3	Stump Flipping and Mulching	16
4.	SITE MANAGEMENT	17
4.1	Forest Service Best Practice.....	17
4.2	Site Access	17
4.3	Temporary Watercourse Crossings.....	20
4.4	Tree Felling and Brash Management.....	21
4.5	Sediment and Erosion Control.....	23
4.5.1	Mitigation by Avoidance.....	23
4.5.2	Mitigation by Design.....	24
4.5.3	Silt Traps.....	24
4.6	Drainage	25
4.6.1	Pre-emptive Site Drainage Management	25
4.6.2	Drain Inspection and Maintenance	25
4.7	Surface Water Quality Monitoring	26
4.8	Biosecurity Measures.....	26
5.	MONITORING DELIVERY OF OBJECTIVES	27
5.1.1	Management of Woodland and Scrub	27
5.1.2	Monitoring of Habitat Suitability for Hen Harrier.....	27
5.1.3	Monitoring of Hen Harrier Activity.....	27
5.1.4	Monitoring of Blanket Bog	27
6.	IMPLEMENTATION	29
6.1.1	Responsibility for Implementing the Measures	29
6.1.2	Auditing	29
	BIBLIOGRAPHY	30

1.

INTRODUCTION

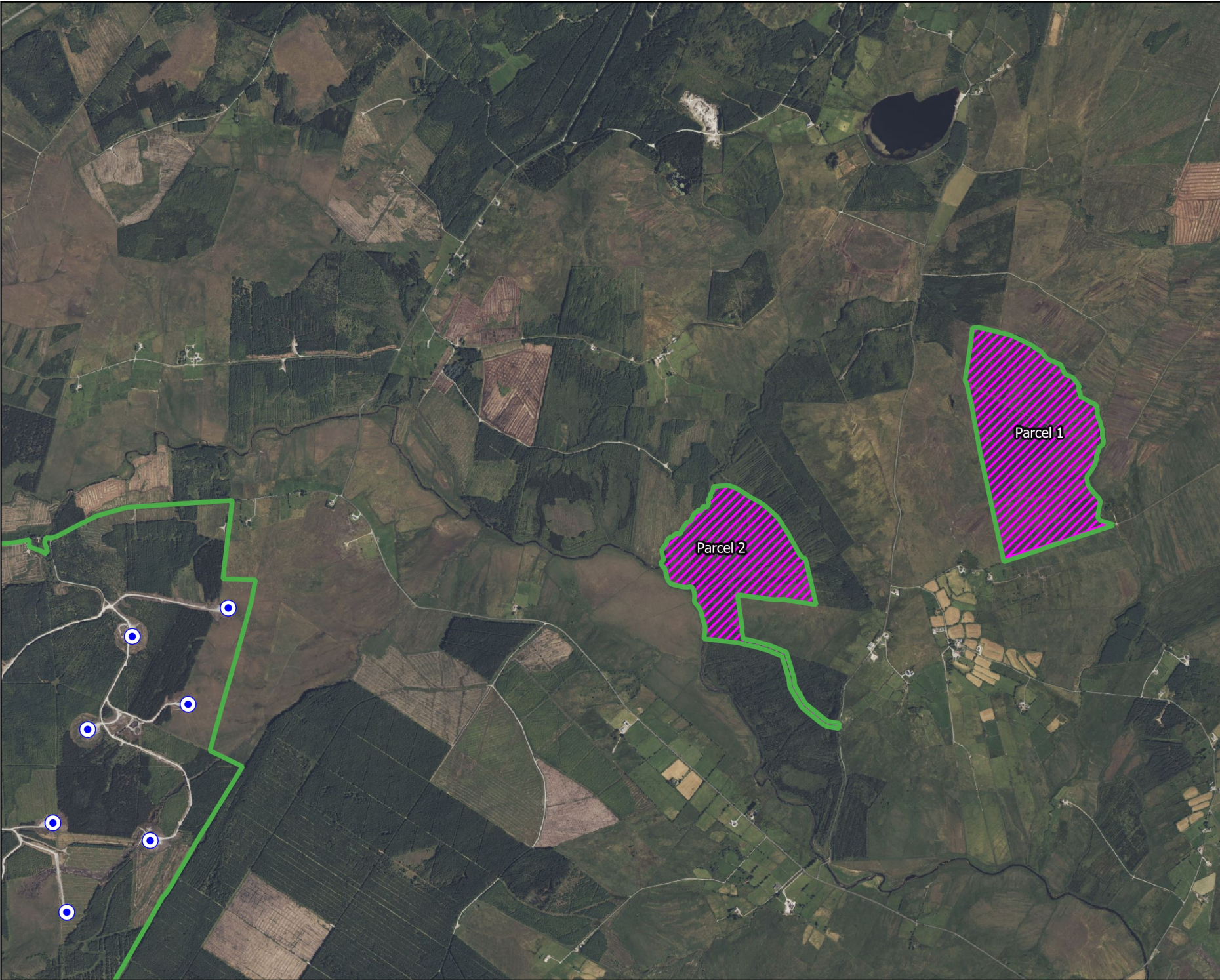
This Biodiversity Management and Enhancement Plan (BMEP) provides a comprehensive plan for the conversion of approximately 108.41ha of coniferous forestry to peatland and scrub habitats. The BMEP Site is located in two parcels in the townland of Tievecloghoge. These will be referred to as the Parcel 1 and Parcel 2 hereafter. The locations are shown in Figure 1-1.

The plan is designed to create approximately the same amount of permanent foraging habitat for hen harrier as will potentially be lost by the Prospective Development. The target condition for this habitat will be open heathland, with pockets of willow and birch scrub covering a maximum of 30% of the enhancement area in total.

The plan will also include the enhancement of approximately 6.2ha of blanket bog in a flat area of the BMEP Site with relatively deep and wet peat. This will provide approximately twice as much blanket bog habitat as has been lost or degraded by the Existing Development and the peatslide combined. No further peatland will be lost to facilitate the Prospective Development.

Specific site management recommendations for the creation of an open heathland and scrub mosaic and blanket bog are provided in Sections 2 and Section 3 respectively. Site management, including access to the BMEP Site, temporary watercourse crossings, tree felling and brash management, sediment and erosion control, drainage, surface water quality monitoring and biosecurity measures are largely common to both the the creation of open heathland and scrub mosaic and blanket bog and are described in Section 4.

As detailed in Section 1.1.1 in Chapter 1 of this EIAR, the various development components are described and assessed using the following references: 'Subject Development', 'Existing Development', 'Prospective Development', 'Permitted Development', 'Site', 'Wind Farm Site', 'Grid Connection Site', 'BMEP Site', 'Grid Connection', 'November 2020 Peat Slide', '2017 EIAR' and 'proposed turbines' or 'proposed turbine locations'.



Map Legend

-  BMEP Site
-  Site Boundary
-  Proposed Turbine Locations



Drawing Title	
BMEP Site	
Project Title	
Meenbog Wind Farm, Co. Donegal	
Drawn By	Checked By
SD	PR
Project No.	Drawing No.
240505	Fig. 1-1
Scale	Date
1:28,000	2026.04.23
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2. HEN HARRIER HABITAT ENHANCEMENT

2.1 Overview

This BMEP contains proposed measures to ensure that there is no net habitat loss for hen harrier due to the identified *likely significant negative effect* and *likely very significant negative effect* resulting from the Prospective Development. This comprehensive BMEP is first and foremost a deforestation plan, as commercial forestry is a key threat/pressure of *High Importance* acting on hen harrier nationally. It is noted that wind farms are a threat/pressure of *Medium Importance* as per Article 12 reporting of the Birds Directive [Directive 2009/147/EC¹].

The hen harrier population in Ireland is in decline (Ruddock *et al.*, 2024). The factors implicated in the population decline include human-related habitat modification and loss. In Ireland, hen harrier prefer to hunt within pre-thicket forestry (Wilson *et al.*, 2006; 2010; Irwin *et al.*, 2012), heath/bog (Wilson *et al.*, 2010) and rough/marginal or low-intensity agricultural grassland habitats (Wilson *et al.*, 2006; Irwin *et al.*, 2012). Passerines are the predominant source of prey for hen harrier in Ireland, with the meadow pipit being a commonly taken prey species (O'Donoghue, 2010). Habitat modification implicated in the decline includes afforestation, agricultural intensification (*High Importance*) and the proliferation of wind turbines (*Medium Importance*) in the upland regions inhabited by breeding hen harrier, as outlined in Article 12 Reporting 2013-2018 (EU, 2022) and reiterated in the Hen Harrier Threat Response Plan². The national threats/pressures of afforestation, agricultural intensification and the proliferation of turbines are also evident in the surrounding uplands. Thus, the proposed felling of 108.41ha of forestry to create optimal foraging habitat in its place is likely to provide meaningful benefits to the local hen harrier population. This opportunity for the wind farm industry to fund the enhancement of hen harrier habitat was highlighted in the most recent National Survey of Breeding Hen Harrier (2022) report. Section 4.6.7 states:

'There are opportunities for the wind energy industry to increase levels of land management certainty, and regulation/management of the activities within and surrounding windfarms (e.g. recreational users, dog walkers etc) and identify opportunities for the retention and restoration of habitats suitable for breeding (and wintering) hen harrier within and surrounding renewable energy developments.'

2.2 Land Selection

The selection of the BMEP Site was based on knowledge of hen harrier use of the area, as well as the existing baseline condition of the land and its potential to be of value to hen harrier. The suitability of the land for foraging as well as its potential for supporting nest sites was considered. These are described in the following sections.

2.2.1 Hen Harrier Use of the Area

During field surveys for the 2017 EIAR and the EIAR for the Prospective Development, four hen harrier nests were identified in the north of the Wind Farm Site. It is likely that this was the same hen harrier pair returning to their territory each year, given the proximity of the nest locations and consistency in activity. Records of hen harrier were clustered around these breeding sites, with frequent hunting activities around the nests and forays into the wider area. The birds were recorded to the north (Croaghonagh) and immediately south (Barnesmore/Carrickaduff) of the Wind Farm Site, as well as to the far east of the Wind Farm Site (Meenbog, Tievecloghoge and Meenalaught). In winter, the birds were largely absent from the breeding sites, while a male was recorded roosting in Tievecloghoge/ Meenalaught during the winter season. This is considered to be the same male from the breeding sites as it only became active in this area after the bird became absent from the breeding sites without temporal overlap. Occasionally a

¹ <https://www.npws.ie/status-and-trends-ireland%E2%80%99s-bird-species-%E2%80%93-article-12-reporting>

² It is noted that this document does not rank the importance of these threats/pressures, although they are listed in the same order as here.

second male was also recorded in this area in winter. The pair were never recorded in the Barrack Hill area (west of the Wind Farm Site) during the survey period, despite there being extensive areas of open, optimal hunting habitat. It is possible that the Barnesmore Gap creates an ecological barrier or that it is the western edge of the pair's territory. Taken together, the field survey data collected between 2015 and 2025 suggests the pair hold a territory extending from Croaghonagh in the west to Meenalaught in the east. The nests tend to be on the western extent of the territory, while hunting and winter roosting extends eastward.

The field surveys also recorded a roaming male from the south (Killeter). A young male (based on plumage colouration) was recorded here in a number of seasons. This male was distinguishable from the male of the pair discussed above due to some darker colouration, and some interactions between the two males were recorded. This male appeared to be resident in Killeter but had no mate. It is possible this young male took over the territory from a previous male that held a probable territory in this area in 2019. MKO surveys in the wider area also suggest another hen harrier territory to the far east (in the vicinity of Cornashesk/Egglybane/Monegal Bog).

2.2.2 Assessment of Alternative Land

The four known hen harrier nests at the Wind Farm Site are located to the north and north-west of the turbine layout. Because of this, lands to the south, south-east and parts of the south-west of the Wind Farm Site (Barnesmore/Carrickaduff and Killeter) were excluded from the selection process so as not to create a potential risk for hen harrier to travel through the turbine area for foraging. In addition, because field survey results suggest that there may be another hen harrier resident south of the Wind Farm Site (Killeter), therefore it was decided not to select lands that may be on territory boundaries to avoid interference.

Some lands that are currently sub-optimal for hen harrier (i.e., forestry) were present to the west of the Wind Farm Site (Croaghmagawna). However, these were partially within 750m of the proposed turbines. NatureScot (2022a) summarising the review by Goodship and Furness (2022) recommends a disturbance buffer for breeding hen harrier of 300-750m. In order to provide the highest possible quality of enhancement for hen harrier, including habitat that could potentially be utilised for nesting, it was decided to select lands that were further than 750m from any source of displacement that could occur from the proposed turbines. As such, these lands were excluded from the selection process.

Lands further west (Barrack Hill) that are also currently sub-optimal for hen harrier (i.e., forestry) were considered. However, as described above, it is possible that the Barnesmore Gap creates an ecological barrier or that it is the western edge of the pair's territory. These lands were excluded from the selection process because of the possibility that the hen harrier pair would not travel to this area.

Some lands that are currently sub-optimal for hen harrier (i.e., forestry) were present to the north of the Wind Farm Site (Croaghonagh), and are also in closer proximity to the known nest sites. Some forestry was partially within 750m of the layout of the proposed turbines therefore, as explained above, these were not considered appropriate for enhancement. The blocks of forestry further than 750m from the proposed turbines were considered. However, on inspection, some of these areas of forestry contained extensive open areas and large rides, while other areas showed poor tree growth and did not have a closed canopy, therefore may already provide suitable habitat. When hen harrier activity recorded during surveys in this area was analysed, there was evidence of hen harrier already hunting and courting in these areas. As such, these were no longer considered suitable for enhancement as they were already used by hen harrier.

Further north again are the two parcels of forestry that were proposed for enhancement in the Hen Harrier Habitat Enhancement Plan submitted as part of the 2017 EIAR (Meencrumlin). The larger of the two parcels originally proposed is now surrounded by mature forestry blocks, therefore connectivity to this area for hen harrier would be very low. Hen harrier were not recorded in the general area around Meencrumlin during the most recent surveys (although it is acknowledged that survey coverage was low at this location).

To the east of the Wind Farm Site, there is an open area of peatland (Meenbog). To the east of this open peatland at Meenbog is an area of forestry that is currently sub-optimal for hen harrier. This area of forestry separates Meenbog from further open peatland to the east in Tievecloghoge and Meenalaught. In

addition, parts of the peatland in Tievecloghoge and Meenalaught have been planted with forestry and are currently sub-optimal for hen harrier. Two blocks of forestry were identified that are suitable for enhancement. One of these is a large block in Tievecloghoge, while the second block divides Meenbog from Tievecloghoge. These areas are ~3-4.8km from the most recent nesting sites. Although this is further than the 2km core foraging range for hen harrier specified by SNH (2016), as described above, field survey data suggest that the pair nesting at the Wind Farm Site hold a territory extending from Croaghonagh in the west to Meenalaught in the east. As such, these forestry blocks in Tievecloghoge and Meenalaught fall within the territory. Hen harrier can forage up to 10km (Arroyo *et al.*, 2014; SNH, 2016), and territory size and selection is influenced by environmental factors such as prey availability and habitat suitability (Arroyo *et al.*, 2014; Carravaggi *et al.* 2019). Hunting and winter roosting has been recorded in the open peatland adjacent to the forestry blocks, some of which is considered to be the male from the breeding sites. No activity has been recorded in these forestry parcels themselves.

These two forestry blocks are hereafter referred to as Parcel 1 (to the east) and Parcel 2 (to the west), and together form the BMEP Site (Figure 1-1).

2.2.3 Existing Baseline Condition

Habitat surveys of the BMEP Site was undertaken in April 2025 and March 2026. Parcel 1 and Parcel 2 are dominated by Conifer Plantation (WD4; Fossitt, 2000) habitat. Other habitats such as Upland Blanket Bog (PB2) and Wet Heath (HH3) are located in small proportions and along the margins of Parcel 1 and Parcel 2.

Parcel 1 is 70.5ha of commercial forestry that was planted in 1995 and is all unenclosed ground (Plate 2-1). The majority of tree species are Sitka Spruce with some Lodgepole Pine and Japanese Larch. There is one ridelane through the plantation, as well as a stream located along the eastern boundary and there is an internal stream crossing the plantation. The canopy of the trees is closed. Sections within Parcel 1 include firebreaks with species compositions characteristic of upland blanket bog (PB2).

Parcel 2 is a 45.7ha parcel of conifer commercial forestry (Plate 2-2). Parcel 2 includes forestry, which did not take well to the wet, peaty soils, resulting in patchy mosaics of conifer plantations (WD4) and areas in which the species composition is characteristic of upland blanket bogs (PB2) and wet heath (HH3). There is one access road which has become largely overgrown.

Parcel 1 and Parcel 2 are 4.2km and 2.3km from the Wind Farm Site boundary respectively, and adjacent to areas of open peatland in Tievecloghoge bog and Meenbog respectively (Plate 2-3). The BMEP Site is currently forested and of low ecological value to foraging hen harrier. Forestry is a net negative for hen harrier, as highlighted in Article 12 reporting. Although commercial forestry can provide suitable hunting habitat for hen harrier in the first ten years of tree growth, before a thicket forms, the trees are typically harvested every 40-45 years, therefore the parcels are likely to be unsuitable for up to 35 years (or 75% of the lifetime).

The main objective of the hen harrier habitat enhancement measures is to create, maintain and improve habitats for the benefit of foraging hen harrier. Hen harrier habitat enhancement will be undertaken across approximately 108.41 hectares of currently conifer plantation on peatland. The target condition for this habitat will be open heathland, with pockets of willow and birch scrub throughout, covering a maximum of 30% of the enhancement area in total.

It is recognised that anything that benefits potential prey species is of benefit to the hen harrier. This BMEP (following this principle) aims to improve the structure of the habitat and abundance of prey. The plan will provide an increase in the availability of passerine prey within enhancement areas. Hen harrier also favours open habitats for foraging over closed canopy forestry, as, among other things, prey is more accessible in open habitats.

Optimal habitat includes heather-dominated wet heath on sloping ground with areas of patchy willow-dominated scrub. Between 10 and 30% of the enhancement area is to be covered in a patchwork of scrub. The aim is to increase habitat heterogeneity and thus create more favourable hen harrier habitat. A single large area of scrub would provide suboptimal foraging conditions for hen harrier, as the passerine birds would have no incentive to fly over open habitat where hen harrier could forage on them. The

retention of existing pockets of scrub is preferable, otherwise scrub may need to be planted in suitable locations to achieve minimum scrub cover.



Plate 2-1 Interior of Parcel 1



Plate 2-2 Interior of Parcel 2



Plate 2-3 Peatland adjacent to Parcel 2

2.2.4

Rationale for Land Selection

The justification for the choice of the BMEP Site includes the following:

- The proposed lands are currently forested and of low ecological value to foraging hen harrier. Forestry is a net negative for hen harrier, as highlighted in Article 12 reporting. Thus, there is the opportunity, through felling and enhancement, to provide meaningful benefits to hen harrier.
- Suboptimal forestry habitat (onsite) will be replaced with favoured (restored) peatland foraging habitat. Although commercial forestry can provide suitable hunting habitat for hen harrier in the first ten years of tree growth, before a thicket forms, the trees are typically harvested every 40-45 years, therefore the forestry habitat (onsite) is likely to be unsuitable for up to 75% of its lifetime. This BMEP will provide habitat of much higher quality and more consistently available than that currently used by the hen harrier, instead of only like-for-like habitat.
- Larger and more continuous areas of land are widely recognised to be more ecologically valuable for conservation. In particular, hen harrier relies on extensive, uninterrupted habitat with low disturbance. Connectivity between areas of suitable habitat in the wider landscape is also ecologically valuable for conservation. The parcels are already adjacent to open peatland and in proximity to each other. Enhancing habitat in these parcels will therefore provide connectivity between areas of suitable habitat in the wider landscape (open peatland at Meenbog and Tievecloghoge bog), as well as connectivity with the Wind Farm Site (Figure 1-1).
- Noting afforestation as a threat/pressure of high importance (as per Article 12 reporting), the plan ensures the removal of closed-canopy forestry, that would not otherwise have been felled until maturity (and subsequently replanted) without intervention. The BMEP will provide land management certainty in these locations that is bespoke designed for hen harrier.
- The removal of forestry will reduce negative edge effects through deforestation, e.g., predation.
- There is a high likelihood of the BMEP Site being encountered by hen harrier as breeding hen harrier occur locally and the lands are within their territory. Field survey data for the Prospective Development shows that hen harrier are using open peatland (Tievecloghoge bog) that is adjacent to Parcel 1 and within 1.5km of Parcel 2.

- Both parcels are within the South Donegal 1 non-designated regionally important area for hen harrier (as shown in ‘Hen Harrier Conservation and the Wind Energy Sector in Ireland’; NPWS, 2021). This will provide benefits to the overall hen harrier population in the region.
- The parcels are 108.41ha in total. This is slightly larger than the estimated area of land from which hen harrier will be displaced (104.88ha). This additional area is to account for small pockets of poor growth within the parcels that may currently be open habitat.

2.3

Methods to Achieve Management Objectives

A key premise of the BMEP is that forestry is a net negative for hen harrier. Forestry is generally accepted to be a habitat that is a net negative for hen harrier, as it is only available to hen harrier for a short period while young (i.e., pre thicket). The majority of commercial forestry’s lifecycle is spent as close canopy forestry, a habitat type of little to no ecological value to hen harrier. At a national level, as highlighted in Article 12 reporting, afforestation is a threat/pressure of high importance for hen harrier.

Following this principle, it is proposed to permanently remove c.108.41ha of forestry and to create more biodiverse upland habitats suitable for foraging hen harrier. This measure ensures the provision of high-quality replacement peatland habitat to offset the loss of onsite habitat through disturbance/displacement related avoidance. The actions required to achieve this are described in the following sections: tree felling, furrow and drain blocking, and revegetation.

2.3.1

Tree Felling

The first action to facilitate the enhancement of the underlying peatland of Parcel 1 and Parcel 2 will be to permanently remove the forestry. Permanent felling to waste will be undertaken as set out in Section 4.

Timber will be stacked in windrows at 50m intervals and then removed from site. Brash will be piled in windrows at 50m intervals and kept on site. While the presence of brash might change the composition of the passerines present, the areas will remain of good ecological value to foraging hen harrier. A 2010 study found that wood debris piles benefited avian species (e.g., warbler spp., robin, chaffinch, etc.) in burnt and logged Mediterranean pine forests (Rost *et al.*, 2010). The habitat heterogeneity created by the inclusion of the wood debris piles allows for the coexistence of species with different habitat requirements; in the present case, this would likely include warbler species in the wood piles and more open habitat species in the large areas of open habitat between wood piles, e.g., meadow pipits and skylark.

These measures should be complete before large scale construction works (i.e., turbine construction) begins. The machine operators will be experienced at working on deep peat and made aware of the specific risks on the parcel. On wet parts, the excavator may need to travel on bog mats.

2.3.2

Furrow and Drain Blocking

Drains/furrows will be blocked where they provide hydrological connection to downstream watercourses. The purpose of this is to prevent any negative effects on downstream watercourses as a result of felling works. These measures should be complete before large scale construction works (i.e., turbine construction) begins.

2.3.3

Revegetation

After tree felling and timber removal, revegetation will be allowed to occur. Revegetation should be underway before large scale construction works (i.e., turbine construction) begins. The progress of revegetation should be monitored by an ecologist using relevés.

2.3.4 Creation of Patchy Scrub

Areas of patchy willow and birch scrub will be allowed to revegetate naturally to provide structural diversity and maximise establishment success. Scrub may only be allowed to cover a maximum of 30% of the enhancement area in total. If scrub exceeds 30% coverage, it will be removed using a mulching head, as described in Section 4. If scrub cover is less than 10%, scrub patches will be planted using a mix of bare-root saplings and 2-3year old potted trees.

3. BLANKET BOG ENHANCEMENT

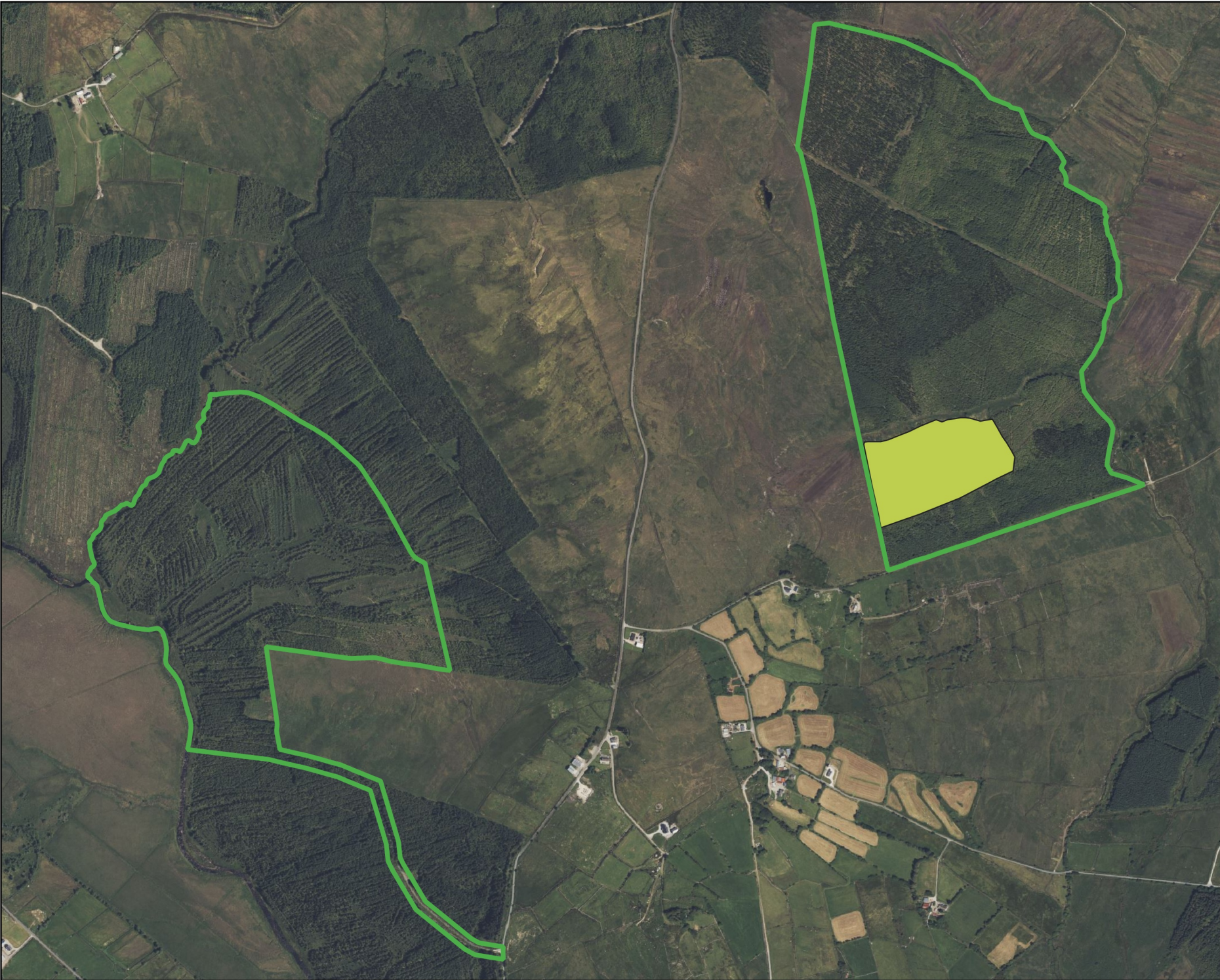
3.1 Overview

The existing development has resulted in the loss of approximately 0.89ha of blanket bog and wet heath habitat to facilitate the construction of two turbine bases as permitted under pl. ref. ABP-300460-17 (amended by APB-303729-19). In addition, the November 2020 peatslide has resulted in the damage to approximately 2.2ha of blanket bog habitat, whereby a mass of peat was lost from the bog and the acrotelm was broken up leaving bare and exposed peat. The proposed enhancement of 6.2ha of peatland habitat through the measures described below will restore approximately twice as much peatland habitat than was lost or damaged as a result of the existing development.

3.2 Land Selection

A location for blanket bog enhancement was selected from within the hen harrier habitat enhancement area. Effective bog enhancement is highly influenced by the topography of the area, with flat areas of deep peat being more suitable than sloping areas where the water table can be more difficult to control. In addition, access for management is another important factor to consider. Sites where machinery can get close to the enhancement area on existing roads or dry ground are preferable to sites where the timber/brush to be removed has to be taken a long distance over poor terrain or where long roads are required.

The 6.2ha for which this plan proposes blanket bog enhancement was chosen specifically because it supports poorly grown forestry on deep peat habitat with blanket bog vegetation persisting over much of the ground layer (Plate 3-1; Figure 3-1). It has a flat topography and is accessible from existing roads to the south of the parcel. There is an elevation difference of 4m (174m elevation south-west to 170m elevation north-east). The topography on site is therefore suitably flat for surface smoothing and furrow blocking or the effective installation of peat dams where required, which is the preferred drain blocking solution in line with NatureScot best practice guidance. The drains on the site are small and have a low gradient and little water or flow. There is a small watercourse (Plate 3-2) that runs in a west to east direction to the north of the enhancement area, with small forestry drains or furrows running into (or towards) that watercourse. There will be a buffer of 20m between the enhancement area and the watercourse. There are few trees in this buffer area and it supports blanket bog vegetation. Access will be required through this buffer zone to facilitate the wider forestry removal for hen harrier habitat creation – this will entail the construction of a temporary watercourse crossing as described in Section 4.



Map Legend

-  Site Boundary
-  Blanket Bog Enhancement Area



Drawing Title	
Blanket Bog Enhancement	
Project Title	
Meenbog Wind Farm, Co. Donegal	
Drawn By	Checked By
SD	PR
Project No.	Drawing No.
240505	Fig. 3-1
Scale	Date
1:12,000	2026.04.23
 MKO Planning and Environmental Consultants Tuam Road, Galway Ireland, H91 VW84 +353 (0) 91 735611 email: info@mkofireland.ie Website: ww.mkofireland.ie	



Plate 3-1 Typical conifer plantation in the blanket bog enhancement area, with blanket bog vegetation on ground.



Plate 3-2 Watercourse to the north of the blanket bog enhancement area, and buffer to be retained.

3.3 Methods to Achieve Management Objectives

The proposed blanket bog enhancement follows the techniques recommended in NatureScot guidance ‘Peatland ACTION - Technical Compendium - Enhancement’, specifically ‘4 Enhancement of Artificial Drains’ and ‘8 Forest to Bog Enhancement’. Guidance has also been taken from the following documents:

- Fernandez, F., Connolly K., Crowley W., Denyer J., Duff K. and Smith G. (2014) Raised Bog Monitoring and Assessment Survey 2013. Irish Wildlife Manuals, No. 81. National Parks and Wildlife Service, Department of Arts, Heritage and Gaeltacht, Dublin, Ireland.
- Perrin, P.M., Barron, S.J., Roche, J.R. and O’Hanrahan, B. (2014). Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Perrin, P.M., Barron, S.J., Roche, J.R. and O’Hanrahan, B. (2014). Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland. Version 2.0. Irish Wildlife Manuals, No. 79. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland

The machine operators used will be experienced at working on deep peat and made aware of the specific risks on the parcel. Ground conditions will be assessed by suitably experienced geotechnical engineer and measures will be put in place to avoid excess damage to the peat substrate. On wet parts of the bog, the excavator may need to travel on bog mats or avoid certain areas.

The methodology followed to undertake this blanket bog enhancement is described in the sections below: tree felling, furrow and drain blocking, stump flipping and surface smoothing. The removal of self-seeded trees and operational monitoring is also described.

Examples of where the proposed techniques have been successfully employed at other locations are provided in the following links:

- [PeatlandAction - Moss of Cree](#)
- https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2024-03/Demonstrating%20Success%20Forest%20to%20Bog_small.pdf

3.3.1 Tree Felling

Permanent felling to waste will be undertaken as set out in Section 4. Timber and brash will be gathered and removed from the parcel in line with best practice. Windrow is not considered suitable for the blanket bog enhancement area, as best practice guidance recommends that brash recovery is particularly important in water quality sensitive catchments. Brash mats may be left in place to facilitate access for enhancement activities.

3.3.2 Furrow and Drain Blocking

The next action will be to effectively block direct connection between the enhancement works and the watercourse to the north. Any collector artificial drains (interceptor drains) that provide connection to the watercourse will be blocked to prevent run off of suspended solids or other pollutants. These measures will take the form of peat dams where there is no flow (as is the case in the vast majority of drains/furrows) and check dams if any flowing drains are encountered. The enhancement works will then commence upslope at the highest point and work systematically downslope towards the natural watercourse.

Given the topography and small size of drains and furrows, it is likely that surface smoothing will be the main action undertaken (see description below). However, if it becomes apparent, following felling, that additional drain blocking is required, this will be undertaken as necessary following the procedures provided below.

3.3.3

Peat Dams

Given the topography of the parcel and nature of the drains, it is likely that, if dams are required, they will be peat dams as opposed to plastic dams that would be required on sites with higher flows and gradients and where there is no other option. Construction of peat dams will be achieved using a low ground pressure excavator with a moderate to long bucket reach to reduce movements. The method is as follows:

1. *Remove the turfs from the surface of the in ditch borrow pit and the dam location, and place to the side.*
2. *Clean out/push away from dam location the unconsolidated peat and debris.*
3. *Key the dam into the sides of the ditch, with a 0.5-1m indent on both sides.*
4. *Use consolidated peat from an in-ditch borrow pit upstream to create the dam. Avoid leaving steep sided or deep holes behind the dam, as these can be dangerous to stock.*
5. *On a sloping site, shallow swales that extend out (or on one side) from behind the dam can be added to re-direct water from the ditch line.*
6. *Regularly compact the peat in the dam with the back of the excavator bucket to ensure an effective seal.*
7. *When the dam is 50cm above the surface place the vegetation turfs across the top of the dam (and in swale if present) and press with the bucket to ensure good contact between the turf and the peat.*

Timber may be used in conjunction with peat dams to block small drains and furrows.

3.3.4

Plastic Dams

It is unlikely that the use of plastic dams will be required. However, this section provides the proposed methodology for the installation of plastic piling dams on ditches less than 1.5m wide, should it be required. Plastic piling is light, versatile and slots together on site. If properly installed, plastic piling dams can form a good watertight seal that will last for decades. Generally, dams are placed at between 10-20m intervals on flat ground but would need to be closer where there is a slope. It is expected that the final water level from the lower dam will rise half way up the upstream dam. The final water level to be at the peat surface or no more than 20cm below the surface. Plastic piling dams will be used in the following situations:

- On ground that is too soft and/or unstable to allow safe machine access.
- On portions of the site that are inaccessible by machine.
- On active drains that are partially infilled with vegetation yet hold too much water to allow effective installation of peat dams.

The methodology for the installation of plastic dams is provided below:

1. Hammer piles in starting from the centre of the ditch.
2. Position the longest pile in the deepest part of the drain. Use a sharp spade to pre-cut the outline of each pile in the surface vegetation. Push the pile into the peat using your own weight.
3. Ensure that the piles remain vertical as it will become increasingly difficult to insert piles if they lean in any direction. Using a mel, drive further and when firm guide adjacent piles into their cams, repeating the process. Continue until all piles are firm in the peat.
4. Piling will only create a good seal if driven into at least 75cm of solid peat, usually found below the 50cm of soft peat in the base of the ditch.
5. The top edge of the pile may require shielding from the metal of the mel. Several methods are used but the most effective is a timber batten resting on the pile.
6. Shape the dam to form a gently curving upstream 'C' shape at the ends. This shape assists dam strength and increases the amount of water retained. The dam must extend well into the banks of the ditch. A rule of thumb is the extensions into the bank on each side, equal the width of the ditch. On slopes, the wings of the dam can be angled down the slope to re-distribute water over the site and reduce pressure behind the dam.
7. Continue driving the piles starting at the centre, until all piles are approximately 30cm above bank level. Leave the dam to fill with water, as the last firming is best done with water behind the dam to lubricate the piles. Finally, hammer the piles until they sit no

more than 10cm above the ground surface. The dams are not to be visible above the vegetation. If they are too high after installation, then the tops of the piling will be trimmed off to make sure that the dams blend in with the landscape. Do not hammer the piles below the ground level, as this reduces the amount of water held and spread across the adjacent peatland.

3.4

Stump Flipping and Surface Smoothing

Surface smoothing and stump flipping is likely to be the primary enhancement activity undertaken in the blanket bog enhancement area. Bog enhancement techniques must reverse the impact of the ridge-furrow cultivation process which continues to persist post-felling, as well as raising the bog water table within the underlying peat mass which have been damaged by the afforestation process. Methods comprising various surface smoothing techniques, and furrow/drain blocking or a combination of both have shown good results in restoring active blanket bog habitat. A variety of techniques can be used depending on the site conditions.

The key principles are ‘enough and no more’ and aim to minimise compaction and disturbance. Mitigation measures to manage surface run-off (particularly water quality) from restored sites may be necessary, depending on the method used, site conditions and sensitivity of receptors. Research in Scotland shows a clear differentiation between ridge-furrow original surface in terms of depth to water table and therefore rates of recolonisation of specialist bog species to post felling sites. Leaving furrows untreated may allow bog vegetation to colonise them over time, but the prospects for expanding cover of bog vegetation onto plough shoulders (the original surface level) and then to ridges seems very poor and the process would likely take a very long time. Plough ridges often occupy up to 50% of the plantation surface area.

Surface smoothing is the process where the ridge and furrows of the forestry drains are levelled or smoothed out using a combination of damping down with the excavator bucket, flipping or mulching stumps, and cross tracking. The operation can employ all three techniques.

3.4.1

Smoothing With Bucket

When the peat is malleable and stumps are small and can be crushed into the ground, damping down with the bucket can be used. When the peat is not as malleable, the stump can be mulched or flipped as described below. The entire area can be smoothed off either by damping down with the bucket, or cross tracking.

3.4.2

Cross-tracking

Once the surface of the ground has been smoothed as described above, the excavator then tracks over the bog surface and the weight of the machine will compress the surface (cross tracking). The aim is to retain as much of the bog vegetation as possible and not bring up too much deep peat to the surface which takes longer to revegetate. The use of a low ground pressure excavator with wide tracks (1.9m or greater) will reduce compaction of the site. Cross tracking is shown in Plate 3-3.



Plate 3-3. Recently ground smoothed peat on a site in Scotland (May 2022)

3.4.3

Stump Flipping and Mulching

Using a low ground pressure excavator with a toothed bucket, the root plate of a stump can be carefully dug up, flipped and pushed into the adjacent furrow. The plough ridges are then smoothed out by sliding the ridge material carefully into the furrows with the excavator bucket, ensuring any vegetation remains on top.

Stump mulching involves the removal of the stump using a stump removal attachment fitted to an excavator. This process is similar to stump flipping, except that the stump is mulched instead of flipped before the ground is smoothed.

4.

SITE MANAGEMENT

4.1

Forest Service Best Practice

All forestry operations will conform to current best practice Forest Service regulations, policies and strategic guidance documents as well as Coillte and Department of Agriculture, Food and the Marine (DAFM) guidance documents, including the specific guidelines listed below, to ensure that felling, planting and other forestry operations result in minimal potential negative impacts to the receiving environment. A toolbox talk is to be delivered to all staff working in the BMEP Site on the relevant mitigation measures as set out below.

- Forestry Standards Manual (Forest Service, 2015)
- Environmental Requirements for Afforestation (Forest Service, 2016a)
- Land Types for Afforestation (Forest Service, 2016b)
- Forest Protection Guidelines (Forest Service, 2002)
- Forest Operations and Water Protection Guidelines (Coillte, 2013)
- Code of Best Forest Practice (Forest Service, 2000)
- Forestry and Water Quality Guidelines (Forest Service, 2000b)
- Forestry and the Landscape Guidelines (Forest Service, 2000c)
- Forestry and Archaeology Guidelines (Forest Service, 2000d)
- Forest Biodiversity Guidelines (Forest Service, 2000e)
- Forests and Water, Achieving Objectives under Ireland's River Basin Management Plan 2018-2021 (DAFM, 2018)

4.2

Site Access

Parcel 1 will be accessed from existing public roads to the south of the parcel. Parcel 2 will be accessed from an existing forest road for a distance of approximately 360m. The existing forest road terminates at this point and it is proposed to construct approximately 700m of new forest road to complete access to this parcel as part of the BMEP. The route of the new forest road is shown in Figure 4-1.

The existing forest road will be upgraded by laying a new surface dressing on the existing section of roadway where necessary. The new forest road will be designed as 'Build On-Top Embankment Roads' (Floating Roads) in accordance with the COFORD (2004) 'Forest Road Manual – Guidelines for the Design, Construction and Management of Forest Roads'. A typical section of a floating road is shown in Figure 4-2. Floating roads minimise the impact on peat, particularly peat hydrology, and significantly reduce the volumes of peat requiring management as there is no excavation required and no peat arisings are generated.

- (1) Prior to commencing floating track construction movement monitoring posts will be installed in areas where the peat depth is greater than 2m.
- (2) Prior to any upgrading works, peat probing and hand shear vane testing will be undertaken along the route of the track.
- (3) Base geogrid will be laid directly onto the existing peat surface along the line of the track in accordance with geogrid provider's requirements.
- (4) The make-up of the new floated access track will be an average of 800mm of selected granular fill with 2 no. layers of geogrid with possibly the inclusion of a geotextile separator (Figure 4-2)
- (5) Granular fill to be placed and compacted in layers in accordance with the TII Specification for Road Works, Series 600 (2024).
- (6) The finished trackwidth will be approximately 4m, with wider sections on bends.

(7) Stone delivered to the floating track construction will be end-tipped onto the constructed floating track. Direct tipping of stone onto the peat will not be carried out.

(8) To avoid excessive impact loading on the peat due to concentrated end-tipping all stone delivered to the floating track will be tipped over at least a 10m length of constructed floating road.

(9) Where it is not possible to end-tip over a 10m length of constructed floating road then dumpers delivering stone to the floating track will carry a reduced stone load (not greater than half full) until such time as end-tipping can be carried out over a 10m length of constructed floating road.

(10) Following end-tipping suitable machinery will be employed to spread and place the tipped stone over the base geogrid along the line of the track.

(11) A final surface layer will be placed over the full width of the floating track, as per design requirements, and graded to accommodate wind turbine construction and delivery traffic.



Map Legend

- Site Boundary
- Existing Forest Road
- Proposed New Road



Drawing Title

Site Access

Project Title

Meenbog Wind Farm, Co. Donegal

Drawn By	SD	Checked By	PR
Project No.	240505	Drawing No.	Fig. 4-1
Scale	1:10,000.00001	Date	2026.04.23



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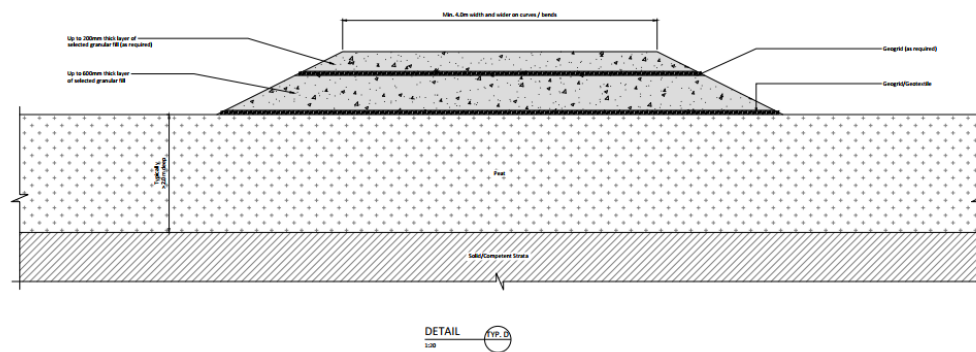


Figure 4-2 Typical section for the new floating forest road

4.3

Temporary Watercourse Crossings

There are two watercourses mapped by the Environmental Protection Agency within the BMEP Site. In Parcel 1, one stream runs from west to east and bisects the parcel. This watercourse will need to be crossed to facilitate the proposed works. In Parcel 2, a watercourse runs in a south westerly direction in the southern section of the western parcel for approximately 250 metres. The crossing of these watercourses will be avoided wherever possible. However, where temporary crossings cannot be avoided, the following measures will be applied:

- No instream works will be undertaken.
- No watercourse will be interfered with and temporary bridge construction will ensure that water flow will not be impeded and conveyance of increased water flow resulting from above normal rainfall.
- Movement of fish will not be impeded.
- Crossings points will be constructed at right angles to the water flow.
- On sloping ground, temporary bridges to be constructed in a 'Hump Back' fashion. This will reduce the risk of silt flowing down the wheel ruts and directly entering the stream/drain being crossed.
- Any run-off will be diverted onto a buffer strip at a suitable point well above the stream.
- The machine track leading to the bridge will be very well brashed and ruts that can act as water channels down to the stream will not be allowed to develop
- Bridging logs will be placed from top of bank to top of bank to ensure that the natural stream banks are left intact.
- The temporary watercourse crossings will be removed following the completion of the works.

Examples of temporary watercourse crossings are provided in Plate 4-1 and Plate 4-2.



Plate 4-1 and Plate 4-2 Examples of temporary stream crossings

4.4

Tree Felling and Brash Management

Tree felling will be conducted throughout both parcels as part of the habitat creation and enhancement. The following measures will be applied:

- The felling of standing trees in harvest blocks will be undertaken by a timber harvesting machine. Extraction of the logs to the forest road will be carried out using a forwarder.
- Low ground pressure machinery will be used.
- These machines will traverse the parcel along specified routes ('racks'), over brash mats comprised of deposited branches, off-cuts from tree stems and tops of trees. This is to distribute machine weight and to provide further soil protection from compaction, rutting and erosion. As it fells trees and progresses into the harvest block, the harvester will collect the brash produced by the felling and delimbing of individual trees, and place it in front of the machine, in advance of it moving further forward along the rack. These brash mats will also be used by the forwarder, as it will stay on the racks as it traverses the parcel. Both machines may travel over the same section of the rack several times. Therefore, racks will be monitored and fresh brash will be gathered by the forwarder and applied to racks to ensure that they remain effective.
- The harvester machine will cut standing trees within the harvest block using a combined chainsaw and grapple (referred to as a 'harvester head') located at the end of a hydraulic boom. This head fells each tree and then strips (or 'delimbs') the stem of branches.
- The merchantable timber will be crosscut into sawlog and pulpwood log products of various lengths from 1.6-5.5 m.
- These logs will be temporarily deposited on either side of the brash-protected rack from where the harvester will operate and over which, the harvester and the forwarder will travel as they traverse the harvest block. The racks will be generally parallel to each other throughout the harvest block, spaced so that the harvester can fell those trees within its reach on both sides. The location of racks will avoid any wet and potentially sensitive areas of the site, and machines will not travel within the aquatic or other exclusion zones of this harvest block.
- Felled timber along the racks will be subsequently collected by the forwarder, which uses a hydraulic grapple arm to load timber into a receiving bunk in its powered trailer. Once the bunk is full, the forwarder will traverse the site along a rack to a stacking bay located beside the forest road, where it will then offload the timber to form (or add to an existing) timber stack, for collection by the haulage truck. At no stage will the forwarder exceed its design capacity and traverse overloaded across the site.

In areas of blanket bog enhancement, all timber and brash will be removed from site and stumps will be either flipped, mulched or tamped down to smooth the surface as described in the following sections. In the remaining areas for hen harrier habitat enhancement, stumps will be cut as close to the surface as possible, timber removed from site, and brash windrowed.

- The brash emanating from felling will be collected and stacked in windrows approximately 50m apart. The ground will be supported by brash in areas where machinery movements are required to facilitate felling. Brash will be cut and stacked and compressed by the tracked machinery to keep the windrows tight and narrow. The windrows will be c.2-3m wide.
- A tracked excavator machine with shears/harvester head (Machine 1) will cut the trees, and following this, the harvesting operator will swing around and drop the brash as far as needed (typically up to 12m from where it was cut).
- From here, the cut tree will be picked up by a second tracked excavator machine (Machine 2) with a dyke/rock bucket or grab.
- The tracked excavator machine will swing around again (c.12m away) resulting in a windrow being located c.24 meters from where furthest away trees were cut.
- The process will then be replicated from the other side so that a windrow (c.2-3 m wide) comprising of the brash from approximately 50m of trees is created (see Figure 4-3 for reference).

- The tracked excavator machine will, using its attachment, compress the material so as to keep the windrows tight and as narrow as possible.
- Machinery will avoid entering areas of existing scrub or wet heath habitat will be preserved by cordoning them off as 'no go' zones for machinery by a suitably qualified Ecological Clerk of Works.

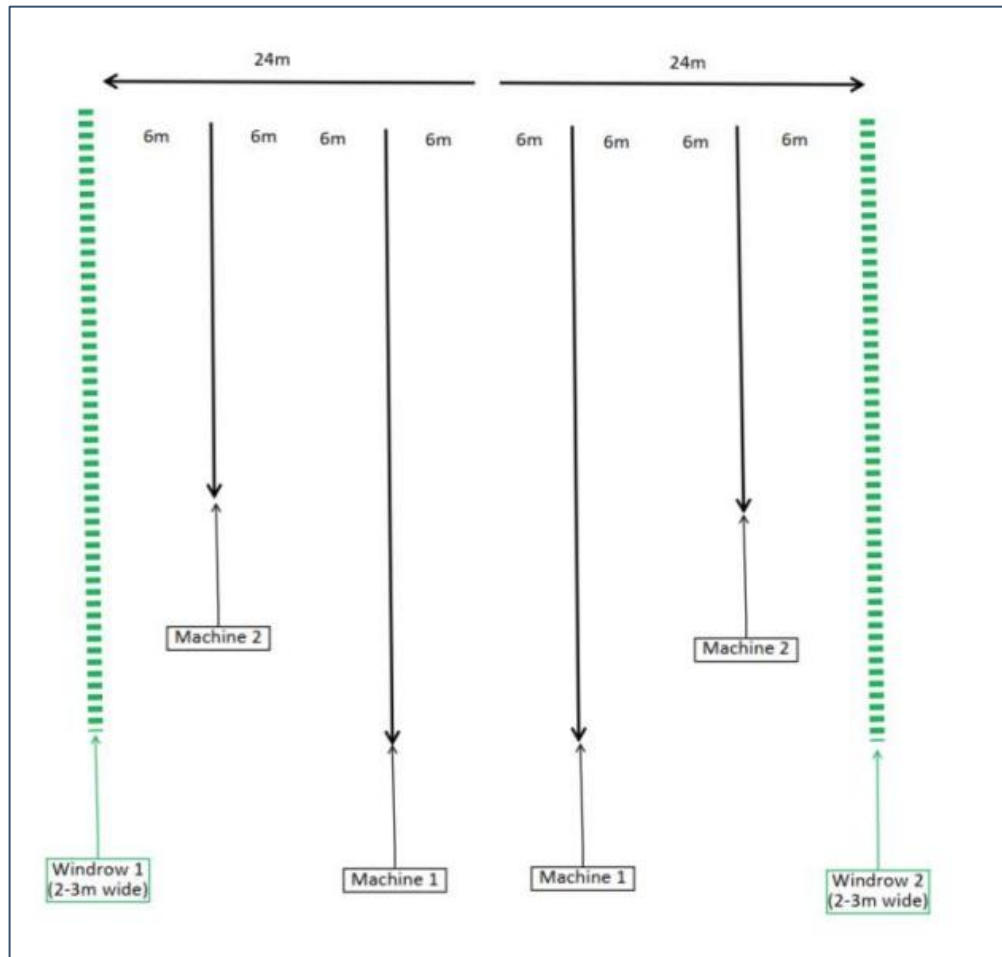


Figure 4-3 Windrows proposed at the open heathland and scrub creation areas

Mulching will occur on trees that are undeveloped or young and not large enough to be felled using a conventional forest harvester. Mulching typically breaks up the tree into strips or chips. Mulching machines can vary from tractor mounted attachments to flail heads mounted on a small excavator. An example of an area that will be mulched is shown in Plate 2-2.



Plate 2-3 Image of young conifers that may be mulched

4.5 Sediment and Erosion Control

Mitigation by Avoidance will be conducted through the use of buffer zones around aquatic zones. In addition, Mitigation by Design will be employed during felling works. These are detailed below. Following this, silt traps, pre-emptive site drainage management, drain inspection and maintenance and surface water quality monitoring are described.

4.5.1 Mitigation by Avoidance

There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document 'Forestry and Water Quality Guidelines' are shown in Table .

The setback distance from sensitive hydrological features means that adequate room is maintained for the proposed mitigation measures (discussed below) to be properly installed and operate effectively. This buffer zone will:

- Avoid physical damage (river/stream banks and river/stream beds) to watercourses and the associated release of sediment.
- Avoid soil disturbance and compaction within close proximity to surface watercourses.
- Avoid the entry of suspended sediment from works into watercourses.
- Avoid the entry of suspended sediment from the drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.

Table 4-1: Minimum buffer zone widths

Average slope leading to the aquatic zone		Buffer zone width on either side of the aquatic zone	Buffer zone width for highly erodible soils
Moderate	(0 – 15%)	10 m	15 m
Steep	(15 – 30%)	15 m	20 m
Very steep	(>30%)	20 m	25 m

4.5.2

Mitigation by Design

The following supplementary mitigation measures will be employed during felling works. These will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses. They comprise best practice methods which are set out as follows:

- Machine combinations (i.e., handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance.
- All machinery will be operated by suitably qualified personnel.
- Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicle through watercourses will occur, as vehicles will use road infrastructure and existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works.
- Machines will traverse the parcels along specified off-road routes (referred to as racks). The location of racks will be chosen to avoid wet and potentially sensitive areas.
- Brash mats will be placed on the racks to support the vehicles on soft ground, reducing mineral soil disturbance and erosion and avoiding the formation of rutted areas in which surface water ponding can occur. Brash mat renewal should take place when they become heavily used and worn. Provision should be made for brash mats along all off-road routes, to protect the soil from compaction and rutting.
- Silt fences will be installed at the outfalls of existing drains downstream of felling areas. No direct discharge of such drains to watercourses will occur. Sediment traps and silt fences will be installed in advance of any felling works and will provide surface water settlement for runoff from work areas and will prevent sediment from entering downstream watercourses. Accumulated sediment will be carefully disposed of at pre-selected spoil repository areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground.
- In areas particularly sensitive to erosion it will be necessary to install double or triple sediment traps and increase buffer zone width. These measures will be reviewed during construction. Double silt fencing will also be put down slope of felling areas which are located in close proximity to streams and/or relevant watercourses.
- Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded;
- Timber will be stacked in dry areas, and outside watercourse buffer zones. Check dams and silt traps will be emplaced on the down gradient side of timber storage/processing sites.
- Refuelling or maintenance of machinery will not occur within 50m of an aquatic zone or within 20m of any other hydrological feature. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required.
- Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors.

4.5.3

Silt Traps

Silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time, and allow settling of silt in a controlled manner.

4.6 Drainage

4.6.1 Pre-emptive Site Drainage Management

The works programme for the felling operations will also take account of weather forecasts, and predicted rainfall in particular. Felling will only be carried out during periods of no or 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. Operations will be suspended or scaled back if heavy rain is forecast. Where there is risk of severe erosion occurring, works will be suspended during periods of high rainfall. 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 to be used on a daily/weekly basis, as required, to allow site staff to direct proposed and planned construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Éireann 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.
- MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale.
- 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events.
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Éireann 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 Éireann provide a 24-hour telephone consultancy service. The forecaster will provide an interpretation of weather data and give the best available forecast for the area of interest.

Using the safe threshold rainfall values will allow planned works to be safely executed (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event.

Works will be suspended if forecasting suggests any 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)
- >half monthly average rainfall in any 7 days

4.6.2 Drain Inspection and Maintenance

The following items will be carried out during and after pre-felling inspections:

- Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging or bogging of machines.
- Inspection of all areas reported as having unusual ground conditions.
- Inspection of main drainage ditches and outfalls. During pre-felling inspections the main drainage ditches will be identified. Ideally the pre-felling inspection will be carried out during rainfall.
- Following tree felling all main drains will be inspected to ensure that they are functioning.
- Extraction tracks within 10m of drains will be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground.
- Culverts on drains exiting the Site, if impeded by silt or debris, will be unblocked.

- All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall.

4.7

Surface Water Quality Monitoring

Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The ‘before’ sampling will be conducted within 4 weeks of the felling activity commencing, preferably in medium to high water flow conditions. The ‘during’ sampling will be undertaken once a week or after rainfall events. The ‘after’ sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status.

Criteria for the selection of water sampling points include the following:

- Avoid man-made ditches and drains, or watercourses that do not have year round flows, i.e., avoid ephemeral ditches, drains or watercourses.
- Select sampling points upstream and downstream of the forestry activities.
- It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry.
- Downstream locations will be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other land-uses where impact increases at third downstream location relative to second downstream location).
- The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed.

Also, daily surface water monitoring forms (for visual inspections and field chemistry measurements) will be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection.

4.8

Biosecurity Measures

The only invasive species that was recorded in the habitat enhancement area was rhododendron, which was recorded occasionally throughout the area. A further, detailed invasive species survey will be undertaken prior to commencement. This will identify any invasive alien species listed on the First Schedule of the S.I. No. 374/2024 - European Union (Invasive Alien Species) Regulations 2024.

The location of the rhododendron on the site will be updated, mapped and clearly marked during the pre-commencement surveys. It will be shown to the contractor by the project Ecological Clerk of Works and excavated with the dead material stacked adjacent to where it was growing. The mapped extent will be used for future monitoring and treatment where necessary.

If other invasive species are recorded on the site, such as Japanese knotweed, they will be clearly marked and fenced off (observing best practice buffer distances relevant to the species recorded) and a bespoke plan will be devised and implemented to ensure that no invasive species is spread as a result of the enhancement and habitat creation works.

The monitoring described in sections 3.5 and 4.3 above will ensure that the enhancement site is surveyed annually for invasive species for the first five years and then at least every five years thereafter for the lifetime of the subject development.

In the interests of biosecurity, all plant, machinery and materials that are to be used on the site will be cleaned and checked by the ECoW to ensure that they are free from potentially contaminating material. Similarly, all plant and machinery leaving the site will be thoroughly cleaned down to ensure that no contaminating materials are transported off the site.

5. MONITORING DELIVERY OF OBJECTIVES

The BMEP will be the subject of ongoing monitoring to assess the effectiveness of the measures proposed and to contribute to advances in habitat enhancement methods, which can be applied to future similar projects. The monitoring can also aid adaptation and implementation of improved methods and measures as they emerge, or the intensification of successful measures.

Monitoring will commence following the completion of the initial enhancement works and will be undertaken annually for a period of 5 years. Following this, it will be surveyed every 5 years throughout the lifetime of the Subject Development. Monitoring will include scrub and woodland management, monitoring of habitat suitability for hen harrier, monitoring of hen harrier activity and monitoring of blanket bog. Each is discussed below.

5.1.1 Management of Woodland and Scrub

To prevent colonisation by tree and scrub species, Parcel 1 and Parcel 2 will be monitored annually for the first 5 years. The area covered by scrub, woodland and the windrowed material will be between 10% and 30% of the total area. Woodland and scrub retained on the site will be located in a mosaic throughout the site and not in one big block.

To prevent the colonisation of the blanket bog enhancement area by tree species, the area will be monitored for all seedling regeneration and the regeneration will be removed annually for the first 5 years.

The frequency of maintenance and monitoring will be reviewed after 5 years and can be reduced if there is little ongoing colonisation. The colonisation will not be allowed to compromise status of the hen harrier habitat or the blanket bog and the monitoring frequency will ensure that this does not happen. The period between monitoring visits and associated maintenance will not exceed 5 years. Where scrub and trees need removing, this will likely be undertaken using a machine with a mulching head.

5.1.2 Monitoring of Habitat Suitability for Hen Harrier

To ensure that Parcel 1 and Parcel 2 provide suitable foraging habitat for hen harrier, the structure will be monitored annually for the first 5 years post initial enhancement works. The frequency of monitoring will be reviewed at this stage and can be reduced if the habitat is in a suitable structure and condition. Full details on the proposed monitoring measures are provided in the Bird Monitoring Programme in Appendix 7-7 of this EIAR. In brief, monitoring will include an assessment of habitat structure, hydrology and threats or damaging activity using a 'scorecard' system. The results will be presented during reporting for the Bird Monitoring Programme.

5.1.3 Monitoring of Hen Harrier Activity

To provide information on hen harrier activity in the BMEP Site, Parcel 1 and Parcel 2 will be monitored annually for the first 5 years to understand short-term use, as well as on Year 10 and 15, to understand long-term use. Full details on the proposed monitoring surveys are provided in the Bird Monitoring Programme in Appendix 7-7 of this EIAR. In brief, monitoring will include monthly field surveys in Parcel 1 and Parcel 2. The results will be presented during reporting for the Bird Monitoring Programme.

5.1.4 Monitoring of Blanket Bog

High level monitoring assessments will be carried out within the target area for the first 5 years post initial enhancement works. These will serve to identify if the enhancement works are progressing as planned, in the potential absence of positive habitat condition assessments, which may take some years to establish.

Ten 4x4m parcels will be established within the target area, within which the following metrics will be recorded:

- > Water levels.
- > Cover of non-native species.
- > Presence of sphagnum or other indicator species (yes or no).
- > Bare peat cover.

These metrics present the foundations of the proposed measures detailed in this report, and therefore, the potential efficacy of the targeted blanket bog enhancement.

In conjunction with the high-level assessments, vegetation monitoring will be undertaken following the methodology set out in Irish Wildlife Manual No. 79 ‘Guidelines for a national survey and conservation assessment of upland vegetation and habitats in Ireland’ (Perrin *et al.*, 2014) to provide a detailed assessment of the blanket bog enhancement for the operational life of the Subject Development. Four permanent vegetation monitoring parcels will be used, the location of which will be selected to provide a comprehensive coverage of the site condition. Cover and abundance of vascular and bryophyte species will be recorded and it will be assessed as per the condition assessment. Monitoring criteria for condition assessment will be those that are set out in Appendix V of Perrin *et al.* (2014) in relation to Blanket Bog (7130). Fixed point photography, and aerial imagery collection will also be undertaken at each parcel.

Monitoring will commence following the completion of the initial enhancement works and will be undertaken annually for a period of five years. Following this, it will be surveyed every 5 years throughout the lifetime of the Subject Development.

Where monitoring reveals that actions need to be undertaken to ensure the success of the project in achieving its aims of restoring Blanket Bog habitat adaptive measures such as dam maintenance, further surface smoothing, seedling removal or furrow/drain blocking will be undertaken as necessary.

6. IMPLEMENTATION

As previously stated, this BMEP will be implemented prior to the initiation of large scale construction works (i.e., turbine construction). The measures will be implemented as follows.

1. Planree Ltd. (the Applicant) will employ a suitably qualified contractor(s) to carry out the measures as detailed in Sections 1, 2 and 3.
2. A meeting will be held with the contractor to outline the general aims, objectives and requirements of the BMEP.
3. The Applicant will engage a suitably qualified ecologist to confirm that the management objectives are in place and in line with the required timelines.

6.1.1 Responsibility for Implementing the Measures

The Applicant will be responsible for overseeing the implementation of the BMEP, which will be in strict accordance with measures outlined in Sections 1, 2 and 3. The Applicant will also be responsible for engaging a suitably qualified ecologist to audit the land holdings, determine whether the measures are achieving the desired results and, where necessary, amending the plan to achieve the required results. The auditing programme will be in place for the lifetime of the Subject Development. Visits will commence following the completion of the initial enhancement works and will be undertaken annually for a period of 5 years. Following this, it will be surveyed every 5 years throughout the lifetime of the Subject Development.

The Applicant or their agents will also be responsible for ensuring compliance with planning conditions and engaging with statutory bodies and advisory agencies as required.

6.1.2 Auditing

The Applicant will ultimately be responsible for the implementation of the management measures and audits. Audits will be required to ensure the effectiveness of the BMEP. They are essential to ensure adequate plan quality, compliance, and control. Audits will be based on a field inspection and the assessment of the success of the implemented measures.

The BMEP will be audited each year. The audit will assess:

- > Objectives of the plan.
- > Implementation of the plan.
- > Adherence to the requirements of the plan.

The BMEP will be reviewed annually and as previously outlined, any requirement for amendments will be submitted to the planning authority.

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