Whitelee Windfarm Extension Project

Habitat Management Plan

WSP Environment & Infrastructure Solutions UK Limited – February 2023

Report for

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Doc Ref. 43122-WOOD-XX-XX-RP-OE-0004_S2_P01.1

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Document revisions

No.	Details	Date
1	Draft	03/11/22
2	Issue	02/02/23

Contents

1. Introduction

1.1 Background

1.1.1 WSP E&I Solutions UK Ltd (WSP) (formerly Wood Group UK Ltd) has been commissioned by ScottishPower Renewables (UK) Ltd (the "Applicant") to provide post submission support for the Whitelee Windfarm Extension Project application.

1.1.2 The Applicant has previously developed the Whitelee Windfarm and the Whitelee Solar/BES/Hydrogen Hybrid Project is a proposed renewable energy development that intends to make use of available renewable energy technologies to maximise and optimise the green energy potential of the entire Site. The Project is to develop a solar photovoltaic (PV) farm, a Battery Energy Storage System (BESS) and a green hydrogen production facility with an associated high-voltage (HV) cable link, haul/link road and associated access(es) and infrastructure.

1.1.3 The Site for the Project is located immediately adjacent (to west) of the Whitelee Windfarm and is situated in its entirety within the administrative boundary of East Ayrshire Council (EAC). The Site also partially overlaps the existing Whitelee Windfarm Habitat Management Area (HMA) and as a result, proposals in this document take into account the partial loss of existing HMA as well as the impacts from the Extension Project. The proposed strategy is therefore to contribute a net positive balance to the blanket bog resource within the Site, provide more favourable conditions for breeding waders and contribute an increase to the extent of the existing Whitelee HMA, which will help to safeguard peat bogs and wildlife species over the long term.

1.1.4 This Habitat Management Plan ("HMP") has been prepared for the Whitelee Windfarm Extension Project (the "Proposed Development") by WSP on behalf of the Applicant.

1.2 Scope of Habitat Management Plan

1.2.1 The purpose of this HMP is to set out the strategy that the Applicant proposes to employ to ensure that habitat management measures are put in place to mitigate the effects on peatland habitats due to the Proposed Development. The delivery can be secured by the imposition of an appropriately worded condition to the consent and permission.

1.2.2 The HMP will also provide a mechanism to meet the requirements of the Nature Conservation (Scotland) Act, 2004[1].

1.2.3 This HMP sets out the aims and objectives by which specified areas will be managed for delivering ecological benefits, together with supporting rationale and an outline of the methods by which they can be achieved. The spatial scope of the HMP includes locations within the Development Site boundary (**Figure 1.1**).

1.2.4 Issues relating specifically to construction of the Proposed Development (e.g. preventing pollution of watercourses, disturbance of protected species or reinstatement/restoration of habitats within the development footprint) are not considered in this document. Further information about the mitigation measures to be employed during the construction, operation and decommissioning periods are included in the EIA Report Chapter 6. Prior to construction commencing the Applicant will submit a Construction Environmental

[1] The Nature Conservation (Scotland) Act 2004 states 'It is the duty of every public body and office-holder, in exercising any functions, to further the conservation of biodiversity so far as is consistent with the proper exercise of those functions'.

Management Plan ("CEMP") to EAC for their approval (in consultation with appropriate consultees). The CEMP will detail the methods and techniques to be employed across the whole of the Proposed Development to ensure compliance with legislation, construction best practice and the mitigation measures. Proposed peat management measures are described in the PMP, which forms part of the CEMP and will be updated as necessary in response to new information from detailed site investigations.

1.3 HMP Delivery and the Planning Framework

1.3.1 A number of stakeholders will be involved in the formulation and agreement of the HMP including (but not necessarily limited to) the Applicant and the Whitelee Habitat Management Group (comprising SPR, NatureScot, RSPB, Scottish Water and the landowners).

1.3.2 It is anticipated that this HMP will be a live document that will be further modified during pre and post-construction, taking account of any design changes and priorities within the Development Site, and in response to monitoring outcomes within the Development Site. New opportunities for habitat management and enhancement may become apparent during this pre- and post-construction period and indeed during the lifetime of the Proposed Development.

1.3.3 The HMP also includes measures that will allow key consultees the opportunity to monitor the success of the HMP and require the Applicant to take action where necessary. The HMP would operate for the 30-year life span of the Proposed Development. The success of the HMP would be monitored over this period, with input from core delivery partners.

1.3.4 The HMP will be funded and delivered by the Applicant and overseen by an HMP Steering group. The purpose of the Steering group will be to review progress and effectiveness of the HMP on at least an annual basis, and to modify or add to the content of the HMP if necessary. The formal membership and format of the Steering group is yet to be agreed - the following organisations will be invited to participate in this process in some form: the Applicant, the Whitelee Habitat Management Group and EAC. This Steering group will be chaired by the Applicant, or its representative.

1.4 Structure of the HMP

1.4.1 This HMP is intended to be a practical, succinct document, as full details pertaining to current Development Area characteristics and the Development proposals can be found in the EIA Report Chapter 6. The HMP provides:

- A brief baseline summary of the Development Site characteristics as a general background (**Section 2**);
- The rationale behind proposed aims and objectives (**Section 3**);
- Details of the aims and objectives (**Section 4**);
- The prescriptions that will be applied in order to achieve those objectives (**Table 4.1**);
- Proposed habitat management measures are presented in **Section 5**;
- Details of implementation including partnership working, funding and duration (**Section 6.1 - 6.3**); and
- Details of monitoring prescriptions needed to evaluate success or otherwise of the implementation of management (**Section 6.4**).

2. Baseline

2.1 General Site Description

2.1.1 The proposed habitat management areas occupy a flat-gently undulating moorland plateau at a mid-altitude range between 230 – 350 m above sea level. The majority of the site is dominated by peat deposits over 1 m deep, with small, localised areas of mineral soil.

2.1.2 The immediate surroundings of the proposed habitat management areas comprise commercial forestry to the immediate north of the site boundary between the site and the B764, plateau moorland to the south and west which comprises the area of land identified for the site and the Eaglesham Moor area of the existing Whitelee wind farm immediately to the east nearby the Lochgoin circuit, Lochgoin reservoir, Lochgoin farmhouse and monument.

Land use and existing management

2.1.3 There are currently no roads, or any other permanent man-made structures of note located within or in close proximity to the proposed habitat management areas. Commercial forestry borders land to the north of the Collorybog Burn and proposed habitat management areas and the existing Whitelee Habitat Management Area (HMA) borders the eastern and southern boundaries. The area of Howeburn Bog and Howeburn Moss fall within these areas of existing management and comprise former commercial forestry where 'forest to bog' restoration has been undertaken. In the absence of the Project, it is likely that rough grazing will continue across the northern area of the site and forestry operations will still occur within the forestry plantation areas.

2.1.4 Across the existing Whitelee HMA, where this is not affected by the Project, habitat restoration will continue to improve these areas in terms of the existing bog resource as well as improving wetland habitats for biodiversity interest (including breeding waders).

2.2 Terrestrial Ecology

2.2.1 Ecological work to support the EIA was conducted in 2020, comprising the following:

- NVC surveys;
- Protected species surveys; and
- Historical desk-based data and literature review.

2.2.2 Full details of the ecological assessment for the Proposed Development are presented in the 2021 EIA Report Chapter 6 Ecology. The following presents a brief baseline summary.

Habitats

2.2.3 The majority of the proposed habitat management areas comprise wet modified bog, formed of stands consisting of the following mire communities: M19a *Calluna vulgaris-Eriophorum vaginatum*, blanket mire *Erica tetralix* sub-community M20a *Eriophorum vaginatum* blanket mire species-poor sub-community and M25a *Molinia caerulea-Potentilla erecta* mire *Erica tetralix* sub-community (**Figure 2.1**), all of which are located on deep peat (i.e., >0.5 m deep) (**Figure 2.2**). Wet modified bog is a heavily modified habitat through anthropogenic means including extensive draining and sheep grazing, colonisation by self-seeded trees

(conifers and broadleaf) and signs of erosion. As such, a large proportion of the Site is assessed as being in poor/modified condition with low cover values of typical mire species and unlikely to be actively peat-forming.

2.2.4 To the west of the northern section, the wet modified bog vegetation type was largely M25 mire. Drainage channels were clearly evident on aerial photographs of the site. Grass species were prominent and dwarf shrub species were generally rare or absent, although cross-leaved heath was occasionally locally frequent. Rush dominated vegetation was present along drainage channels, although these weren't always delineated on the ground, and the vegetation in general was tussocky in habitat.

2.2.5 The blanket bog vegetation towards the east of the northern section had a high heather content with large amounts of *Sphagnum spp*., hare's-tail cottongrass and glittering wood-moss. Much of the vegetation tended towards M19 blanket mire. Towards the eastern end of the site, south of the plantation woodland, heather formed a significant component of the vegetation, although it was mainly in the mature growth phase with little or no pioneer or building heather. Other dwarf shrub species were also present including, cross-leaved heath, crowberry, bilberry, cranberry and cowberry. Hare's-tail cottongrass and tufted hair-grass were frequent, but purple moor-grass was only occasionally recorded.

2.2.6 The wet modified bog resource recorded within the far eastern section of the northern section comprises part of the Fenwick Moor Potential Wildlife Site (PWS) (primarily M19a) and is in places closer to good condition blanket bog communities with greater potential for recovery to Scottish Biodiversity List (SBL) and Ayrshire Local Biodiversity Action Plan (ALBAP) quality bog habitat. However, there was also some invasion by tree species *Picea sitchensis* and *Betula sp*. within the eastern section of the Site. As the vegetation slopes south towards the Soutors Burn, the dwarf shrub component is reduced, the grass component increases, particularly wavy hair-grass and the vegetation suggests an acid grassland element. Small amounts of bare peat were also found to be present.

2.2.7 The southern section comprising the proposed cable route and access track runs through relict, wet modified bog close to the northern section and then passes through the existing Whitelee Habitat Management Area (HMA) a large area dominated by wet modified bog on land formerly planted with commercial forestry. The eastern section of the proposed cable route goes through an area dominated by commercial forestry with sections of more heavily degraded wet modified bog.

Protected Species

2.2.8 Otter: Evidence of otter activity was recorded along a number of watercourses within the study area, including Drumtee Water, Collorybog Burn and Dunton Water. Field signs observed comprised spraints, the greatest density of which were recorded along the Drumtee Water and Dunton Water. Two potential resting sites were recorded, one on the Dunton Water, and the other along Rough Hill Burn. Further details are provided in Volume 3B of Volume 3.

2.2.9 Water vole: Sections of five of the watercourses (upstream parts of Drumtee Water and Collorybog Burn, tributary of Drumtee Water, Soutors Burn and Greenfield Burn) contained suitable water vole habitat, with very low disturbance levels, abundant reed, sedge, herb and rush species, suitable bank substrates and shallow slow-flowing sections of water. However, no evidence of water vole was recorded within the water vole Study Area during the survey for the EIA.

Ornithology

2.2.10 Black grouse: Historical and contemporary baseline surveys indicate that the area surrounding the site has previously supported a small number of black grouse. The last record was of a single male from 2017.

2.2.11 Curlew: Based on historical and contemporary data for the Site and wider area, two historical breeding territories fall within the ZoI of the Project footprint.

2.2.12 Lapwing: Based on historical and contemporary data for the Site and wider area, three historical breeding territories fall within the ZOI of the Project footprint.

3. HMP Context and Rationale

3.1 Management Principles, Constraints and Opportunities

3.1.1 This HMP has sought to identify on-site biodiversity opportunities as well as providing the management required to ameliorate the effects of development wherever possible, whilst recognising the constraints posed by species and habitats with competing requirements. The primary principles for habitat management proposals will be to promote opportunities to improve blanket mire habitats.

3.1.2 Other features of importance which are identified in Chapter 6 of the 2021 EIA Report include otter, black grouse, curlew and lapwing. However, it has been established through the EIA process that none of these are likely to be significantly affected by the Proposed Development, subject to the implementation of mitigation measures including pre-construction surveys and implementation of species protection plans. Whilst these features are not priorities for management action in the HMP, several of these species are likely to benefit from the proposed habitat management measures.

3.1.3 These principles have underpinned the evolution of the HMP and are discussed in more detail below.

3.2 Factors Influencing the Selection of Habitat Management Areas

Peatland Habitat

3.2.1 Based on the 2020 baseline, the blanket bog habitat was found to be in degraded condition, with evidence of drainage, grazing, erosion and colonisation by conifer and broadleaf trees in the north-eastern section, particularly where it is close to existing conifer plantation. Without the construction of the Project components, over a 30-year timescale, it is likely that the effects of drainage and grazing in particular will continue to degrade the blanket bog resource such that dewatering and grazing impacts will further lead to some drying out of the bog, and a gradual increase in heather and grass cover.

3.2.2 In the absence of the Project, it is likely that rough grazing will continue across the northern area of the site and forestry operations will still occur within the forestry plantation areas. Across the wider Whitelee HMA, modified bog is being actively restored and in the medium term it is expected that there will be a continuing improvement in the condition of bog habitat.

3.2.3 The following sets out broad criteria for identifying and delivering compensatory habitat management which would compensate for the following areas of lost or potentially degraded habitat:

- 4 ha wet modified bog (direct/permanent loss).
- 13.15 ha wet modified bog (direct/solar array).
- 2.57 ha wet modified bog (direct/solar array within the HMA).
- 7.3 ha other habitats (direct/solar array within the HMA). Loss of all HMA will require compensation for the loss of HMA opportunity land.

3.2.4 The Project will therefore result in the combined direct and indirect loss of wet modified bog and land within Whitelee HMA of up to 27.02 ha; and compensatory measures are therefore proposed. It is considered that as a precaution to allow for the uncertainty associated with how bog communities will respond to the installation of solar array, that a net balance will be required to offset worst case scenario loss or degradation of bog communities.

Connectivity with Other Wind Farm HMPs in the Wider Area

3.2.5 The area proposed for restoration to blanket mire (from currently modified/degraded blanket mire) is located within the northern area of the Site, sharing a boundary coincident with the Whitelee Windfarm HMA.

3.2.6 The aims of this HMP in relation to the restoration of blanket mire communities will align with those of the existing Whitelee HMP, which are summarised as:

- To restore conditions for deforested blanket mire habitat.
- To restore conditions for unplanted blanket mire habitat.
- To improve the quality of blanket mire habitat.

4. Aims and Objectives

4.1 Introduction

4.1.1 The area proposed for restoration to blanket mire (from currently modified/degraded blanket mire) is located within the northern area of the Site, sharing a boundary coincident with the Whitelee Windfarm HMA.

4.1.2 The proposed HMA comprises two candidate Management Units (A and B) within which management will be implemented. Both units have been identified within the Site boundary as supporting wet modified bog which would benefit from positive management activities. The condition of the bog habitat within Units A and B is degraded/modified due to grazing pressure, historical drainage, conifer regeneration and localised erosion across the Site.

4.1.3 **Figure 4.1** illustrates the candidate HMAs and provides further detail on Units A and B (**Figure 4.2** and **Figure 4.3**), illustrating historical drains and areas for self-seeded conifer removal.

4.1.4 The aims of this HMP in relation to the restoration of blanket mire communities will align with those of the existing Whitelee HMP[2], which are summarised as restoring the condition and quality of unplanted blanket mire habitat.

4.2 Aim 1: Restore condition and quality of unplanted blanket mire habitats

4.2.1 Blanket bogs in Scotland are a globally important resource that are protected under the EC Habitats Directive Annex I and are included in the UK Biodiversity Action Plan (UK BAP) as a Priority Habitat. The UK BAP has a target for blanket bog restoration to halt the loss of biodiversity, of which Scotland's share is around 600,000 hectares (ha) (Artz *et al*. 2014). It is also clear that substantial carbon abatement is available through the restoration and wise management of the Scottish blanket bog resource, to enable Scotland to meet its targets for carbon emissions reduction[3].

4.2.2 Due to the variable peat distribution (See **Figure 2.2**) across the Site, two distinct HMA units of modified blanket bog habitat have been identified that will benefit from positive management actions. These HMA units comprise a total of 29.59 ha of blanket bog that will be restored by blocking approximately 14 km of drains.

4.2.3 The condition of the bog habitat within Units A and B is degraded/modified due to grazing pressure, historical drainage, conifer regeneration and localised erosion across the Site.

4.2.4 The core aim is associated with eight objectives; their associated prescriptions are summarised in **Table 4.1**.

[2] A third relevant aim of the Whitelee HMA is to 'Restore conditions for deforested blanket mire habitat', however none of the proposed HMA units comprise previously forested blanket mire.
[3] https://www.parliament.scot/bills-and-laws/bills/climate-change-emissions-reduction-target-scotland-bill#:~:text=Overview,The%20target%20is%20currently%2080%25

Table 4.1 Aim 1 – Restoration of Bog Condition: Objectives and Actions/Prescriptions

Ref.	Objective	Actions/Prescriptions
1.1	Identify suitable damming locations within ditch network of Management Units A (1-3) and B.	Walkover of drain network to identify suitable locations for dam installation, ensuring peat depth (>50cm) and outline frequency/ spacing of damming that will be required to achieve re-wetting of the bog restoration area, ensuring (as far as possible) hydrological separation between the Development Site and the Management Unit.
1.2	Raise bog water table.	In order to create the underlying conditions required for the establishment of typical bog species, restoration works comprising peat dam installation will be undertaken to reverse the effects of negative historical management activities and prevent further habitat degradation. The primary condition required to support blanket bog habitat is water table depth, which is close to the surface throughout the year (generally no more than 0.2m from the surface and the annual range in water table elevation should not exceed 0.3m), including the drought period (typically April – August).
		There are approximately 14 km of drains within HMA Units A and B, which will benefit from drain-damming. This physical intervention creates dams within the existing drains, preventing runoff, stabilising hydrology and enabling the growth of bog-forming species such as *Sphagnum* mosses.
1.3	Monitor bog water table	Based on the requirements outlined, a set of targets/criteria will be defined (See **Table 6.2**) allowing progress to be monitored. It is expected that these will include the employment of dipwells, or similar, to continuously monitor water table depth.
1.4	Reduce sheep density	Reduction in sheep grazing densities (Livestock units (LU)/ ha) will apply within Management Units A and B. To be determined in consultation with the landowner.
1.5	Removal of self-seeded conifer	Self-seeded conifer regeneration will be removed from two combined areas of 4.54 ha within Management Unit B; the best management practice for removal is to be determined. Removal of conifer regeneration is expected to be dealt with by hand but may require additional treatment dependent on size and density.
1.6	Restore degraded or modified bog habitat to high quality active blanket bog (*Sphagnum* and peat cover)	Subject to drain-damming measures detailed in Section 5, the quality of blanket bog will be restored based on the measurement of key features including *Sphagnum* and peat cover. These key features will be monitored to determine successful outcomes.
1.7	Restore degraded or modified bog habitat to high quality active blanket bog (Higher plants cover)	Subject to drain-damming detailed in **Section 5.1**, the quality of blanket bog will be restored based on the measurement of key features including cover of higher plants. These key features will be monitored to determine successful outcomes.
1.8	Monitor development of bog vegetation	Based on the requirements outlined, a set of targets/criteria will be defined allowing progress to be monitored.

5. Habitat Management Measures

5.1.1 The proposed habitat management and monitoring measures reflect the different requirements of the variable Development Site conditions. The management area is split according to treatment type, underlying habitat and the ecological feature to be benefitted.

5.1.2 The proposed Management area has been defined according to areas which require different types of active management, as shown in **Table 5.1**.

Table 5.1 Proposed Management Areas

Unit	Habitat	Size (Ha)	Management measure	Ecological feature
A (1, 2 and 3)	Wet modified bog	14.59	Ditch-blocking Exclusion of grazing	Blanket bog (restored)
B	Wet modified bog	34.05	Ditch-blocking Removal of self-seeded conifer	

5.1 Drain damming

5.1.1 There are approximately 14 km of drains within the two HMA units, which will benefit from being dammed in order to raise the water table and prevent further damage to the hydrological regime of the peat.

5.1.2 Habitat management at the Whitelee site will aim to improve the condition of blanket bog that has been detrimentally affected by artificial drainage. The proposed management area (Units Ai-iii; and Unit B) have been identified as being suitable for restoration through a programme of drain/ditch blocking.

5.1.3 The successful development of blanket bog is dependent on hydrological conditions in which the water table normally lies within 10-20 cm of the ground surface. Once those conditions are achieved on relatively flat ground, with nutrient-poor peat at depths usually greater than 0.5 m, an available source of colonising vegetation and, ideally, a viable seed bank, blanket bog will normally become the dominant habitat over a period of five to ten years, and species diversity can be expected to increase within and beyond that period.

5.1.4 Drain damming will be undertaken on peatland drains where peat depths are >1m and drain dimensions are suitable for damming.

5.1.5 A suitably experienced peatland ecologist will identify the number, location and spacing of artificial dams required together with the most appropriate method of blocking, which will take place in year 1 of the implementation of the final HMP following good practice guidelines such as NatureScot Peatland Action 'Dam Installation techniques - Peat and Plastic Dams' (SNH, 2019), which is included as Appendix B of this HMP. Ditch blocking work will occur between September and March to avoid disturbing breeding birds.

5.2 Removal of self-seeded conifer

5.2.1 There is a low density of non-native conifers (mainly Sitka spruce) within Unit B, which will be having a negative impact on the bog, adding to the water loss from the Site. Regenerating conifers will therefore be removed from within the HMA by hand clearance using chain saws. Trees will be cut below the lowest whorl in order to prevent any future growth and will be left on site.

5.3 Grazing management

5.3.1 Stocking levels will be assessed through annual vegetation monitoring (for the first five years post-construction; and every five years thereafter), which would include assessing of browsing levels across the management units.

5.3.2 Where browsing levels are identified as too high, restoration of modified blanket bog will also be achieved by reducing livestock densities (principally sheep) across these Management Units, during winter months in order to encourage re-growth of dwarf shrubs and avoid damage to specialist bog vegetation. The following sheep grazing densities would be considered applicable within Management Units A and B (**Table 5.2**):

Table 5.2 Sheep grazing densities

Unit	Maximum	Minimum
1st April – 30th September	0.10 LU/ha	0.05 LU/ha
1st October – 31st March	0.05 LU/HA	0.00 LU/ha

*Livestock Unit per hectare

5.3.3 Dependent on the option (based on engagement with the landowner/tenant farmer) to reduce livestock densities within the Site, this may result in targeted livestock proof fencing around Management Units A and B identified for restoration.

6. Implementation

6.1 Management

6.1.1 It is envisaged that the HMP will be an evolving document and all alterations will be agreed with the Steering Group.

6.1.2 The HMP outlines the necessary steps to be taken and that further developing of the management prescriptions above will be progressed following consultation with EAC and NatureScot. The terms of reference need to be agreed, but the Applicant is expected to co-ordinate, deliver and drive the implementation of the HMP.

6.2 Partnership Working

6.2.1 The Applicant will implement the HMP with the help of a number of potential partners which are expected to include (but not be limited to) those listed in **Table 6.1**. It is envisaged that these partners will be involved from the earliest stages in order to ensure the effective delivery of the plan.

Table 6.1 Potential HMP Delivery Partners

Partner	Roles
East Ayrshire Council	• Advice, information & technical input. • Integration of management plan outputs with Local Biodiversity Action Plan (LBAP).
NatureScot	• Advice, information, monitoring & technical input. • Licensing.
Whitelee Habitat Management Group / SPR	• Advice, information & technical input on habitat restoration & species requirements. • Strategic linkage with other Wind Farm HMP objectives. • Liaison with tenant farmer regarding grazing management
Local forestry contractor	• Implementation of self-seeded conifer removal.

6.2.2 Core delivery partners to whom agreements regarding the scope and responsibilities of the HMP will need to be confirmed. Funding will be directed in order to implement the HMP objectives. It is envisaged that the Applicant would provide a costed breakdown for delivering the necessary actions outlined in this document.

6.3 Funding

6.3.1 The implementation of the management plan will be funded by the Applicant. The funding commitment by the Applicant will span the life of the project; a period of at least 30 years.

6.4 Monitoring and Review

6.4.1 HMP prescriptions will be subject to monitoring in order to assess their effectiveness at achieving the overarching aims and objectives. The outcomes of the monitoring prescriptions will be used by the HMP Steering Group to adjust current objectives and their prescriptions, or to devise new aims and objectives.

- Dipwell monitoring will commence the year before installation of peat dams to establish a baseline and will continue for at least five years following installation of peat dams. Their use will be reviewed at that time by the steering group to determine whether further monitoring will be required.
- Annual vegetation monitoring, based upon Common Standards Monitoring Guidance for Upland Habitats (JNCC, 2009), will commence the year following installation of peat dams. This will continue for the first five years of operation of the Proposed Development, and thereafter in years 10, 15, 20, 25 and 30. The results of such monitoring will inform the management, such that prescriptions can be altered quickly, if necessary.

6.4.2 It is critical that the habitat management process remains flexible, allowing alterations to prescriptions in response to the monitoring programme. The monitoring results for each year will therefore be analysed and presented in an annual report to be prepared by an appropriately qualified ecologist (or ecologists). This report, which will include recommendations regarding any changes to management practices and/or monitoring requirements that may be considered necessary, will be presented to the Steering Group.

6.4.3 The monitoring prescriptions associated with the activities described in **Table 4.1** are summarised in **Table 6.2** below; and a proposed monitoring timetable is provided in **Table 6.3**.

Table 6.2 Scope of Monitoring and Target Outcomes

Ref.	Objective	Scope of monitoring prescriptions	Target outcome
1.1, 1.2, 1.3	Raise the water table close to bog surface; and monitor	Dipwells will be installed at a range of monitoring points within Management Unit A. The number and location of such monitoring points will be recommended by a suitably experienced hydrologist and approved by the Steering group. Monitoring will be carried out for at least one year prior to ditch-blocking works and will continue for at least five years following ditch blocking works.	• The bog water table should be no more than 0.2m from the surface of the main peat mass and the annual range in water table elevation should not exceed 0.3 m.
1.4, 1.5	Grazing management and self-seeded conifer removal	Common Standards Monitoring Guidance for Upland Habitats (JNCC, 2009) will include measuring the impact of grazing, which will help determine sustainable long-term stocking levels.	Target outcomes will follow condition monitoring of blanket bog (see below).
1.6, 1.7	Monitor condition of blanket bog habitat	Monitoring will include key parameters as set out within Common Standards Monitoring Guidance for Upland Habitats (JNCC, 2009) Monitoring will be carried out in the year following ditch-blocking works and will take place annually for the first five years of operation of the Proposed Development. Thereafter in years 10, 15, 20, 25 and 30.	• At least one species of *Sphagnum* should be present (predicted community M17, M18, M19) on each monitoring point. • *Sphagnum papillosum* or *S. magellanicum* should be present where expected community is M17 and M18 on each monitoring point. • *Sphagnum spp*. should account for at least 30% of basal cover on each monitoring point. • Visible trampling or uprooting impacts of large grazing mammals on *Sphagnum* hummocks (or lawns) should be absent at each monitoring point. • Bare peat should comprise <1% of 'basal' cover at each monitoring point. • *Eriophorum spp*. should be present at each monitoring point. • *Calluna vulgaris* should be present at each monitoring point. • *Calluna vulgaris* of at least 20cm average canopy height and with <20% leading shoots browsed by sheep on average should be present at each monitoring point. • 'True grasses' foliar cover should be less than 5% at each monitoring point. • The combined cover of *Calluna vulgaris*, *Eriophorum spp*. and *Trichophorum cespitosum* should account for no more than 75% of foliar cover at each monitoring point.
1.8	HMP monitoring	Annual reports to Steering group	Annual progress reports will be produced documenting the findings of all monitoring and survey work, comparison with previous findings, identifying key trends and issues and providing a basis upon which to formulate further actions through the Steering Group.

Table 6.3 Summary of HMP Activities during lifetime of the Proposed Development

Wind Farm Phase	Pre-construction	Construction Phase		Operational Phase									
Year	0	1	2	1	2	3	4	5	10	15	20	25	30
Identify suitable drain damming locations													
Installation of dipwells and monitor bog water table													
Grazing management/density reduction													
Conifer removal													
Drain damming													
Monitor development of bog vegetation													
HMP Reporting													

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Appendix A
Figures

Appendix B
Peatland ACTION Guidance for land managers – Dam Installation techniques: Peat and Plastic Dams

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