

Appendix 10H

Outline Habitat Management Plan



RWE Renewables UK Onshore Wind Ltd

Eredine Wind Farm Environmental Impact Assessment Report

Technical Appendix 10H: Outline Habitat Management Plan



Report for

Finlay Burns
Development Project Manager - Scotland
RWE Renewables UK Ltd

Main contributors

Alastair Miller
Danny Flenley

Issued by

.....
Alastair Miller

Approved by

.....
Graham Burt-Smith

WSP Environment & Infrastructure Solutions UK Limited

Amber Court, Newcastle Business Park
Scotswood Road
Newcastle Upon Tyne
NE4 7YQ
United Kingdom

Copyright and non-disclosure notice

The contents and layout of this report are subject to copyright owned by WSP save to the extent that copyright has been legally assigned by us to another party or is used by WSP under licence. To the extent that we own the copyright in this report, it may not be copied or used without our prior written agreement for any purpose other than the purpose indicated in this report. The methodology (if any) contained in this report is provided to you in confidence and must not be disclosed or copied to third parties without the prior written agreement of WSP. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to this report by any means will, in any event, be subject to the Third Party Disclaimer set out below.

Third party disclaimer

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by WSP at the instruction of, and for use by, our client named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. WSP excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. We do not however exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud or any other matter in relation to which we cannot legally exclude liability.

Management systems

This document has been produced by WSP Environment & Infrastructure Solutions UK Limited in full compliance with our management systems, which have been certified to ISO 9001, ISO 14001 and ISO 45001 by Lloyd's Register.

Document revisions

No.	Details	Date
0	Draft	12/12/23
1	Draft	05/02/24
2	Draft	26/06/24
3	Draft	05/09/24
4	Issue	25/10/24

Contents

1.	Introduction	5
1.1	Purpose of this Report	5
1.2	Rationale	5
1.3	HMP Delivery and the Planning Framework	6
1.4	Structure of the HMP	7
2.	Baseline	8
2.1	General Site Description	8
2.2	Land use and existing management	8
2.3	Existing Conditions	9
3.	Aims and Objectives	12
3.1	Management Aims	12
3.2	Objectives	12
4.	Restoration & Enhancement Measures	13
4.1	Proposed measures	13
4.2	Peatland restoration	13
4.3	Montane scrub planting	21
4.4	Broadleaf tree planting	22
4.5	Artificial nesting rafts for divers	23
5.	Implementation	25
5.1	Management	25
5.2	Partnership Working	25
5.3	Funding	26
5.4	Monitoring and Review	26
6.	References	29
	Annex A Figures	30

Table 3.1	Management Objectives	12
Table 5.1	Potential HMP Delivery Partners	25
Table 5.2	Indicative Scope of Monitoring and Target Outcomes	27

1. Introduction

1.1 Purpose of this Report

- 1.1.1 This outline Habitat Management Plan (oHMP) forms a Technical Appendix to the proposed Eredine Wind Farm ('the Proposed Development') Environmental Impact Assessment (EIA) Report, **Chapter 10: Ecology**.
- 1.1.2 A detailed HMP, which will include specific prescriptions and confirmation of the peatland restoration location(s), will be agreed with Argyll & Bute Council (ABC), in consultation with Forestry & Land Scotland (FLS), NatureScot and Scottish Environment Protection Area (SEPA), prior to the commencement of construction of the Proposed Development.
- 1.1.1 This document sets out the strategy the applicant (RWE Renewables Onshore Wind Ltd) proposes to employ to ensure habitat management measures are implemented to mitigate the effects on identified ecological features (both non-avian and avian), as well as delivering additional biodiversity improvements across the Development Site, recognising the requirement of National Planning Framework 4 (NPF4)¹, Policy 3 that "*development proposals will contribute to the enhancement of biodiversity, including where relevant, restoring degraded habitats*".
- 1.1.2 The oHMP provides a summary of the rationale, objectives, baseline conditions, restoration opportunities and scope of habitat management works to offset predicted loss of peatland habitats from within the Development Site, alongside additional enhancement measures.
- 1.1.3 No significant adverse impacts were predicted for ecological or ornithological features within **Chapter 10: Ecology** or **Chapter 11: Ornithology**. Nevertheless, the oHMP will provide a mechanism to meet the requirements of NPF4 which sets out new requirements for development to deliver positive effects for biodiversity.

1.2 Rationale

- 1.2.1 During the development phase of the Proposed Development, the applicant has minimised any potential ecological impacts; firstly, by designing the Proposed Development to avoid or limit ecological impacts wherever practicable (see **Chapter 3: Design Evolution and Alternatives**), and secondly, by undertaking to employ industry best environmental practice during wind farm construction and operation (see **Chapter 10: Ecology** and **Chapter 11: Ornithology**).
- 1.2.2 Within the EIA Report assessment, it is predicted that 0.56 hectares (ha) of peatland habitat would be permanently lost and an additional 2.35 ha with potential to be indirectly affected and altered during the lifespan of the Proposed Development. The following document outlines criteria for identifying and delivering compensatory peatland habitat restoration measures with regard to NatureScot (2023) guidance. The aim would be to contribute a greater area than that which is predicted to be affected by the Proposed Development, providing additional enhancement to the surrounding landscape. This approach aligns with NPF4 policies, which are relevant to development proposals on peatland, carbon-rich soils and priority peatland.
- 1.2.3 Based on a combined loss (direct loss and indirect modification) of peatland communities of 2.91 ha and applying NatureScot's guidance of a 10:1 offset, it is planned that 29.1ha of

¹ <https://www.gov.scot/publications/national-planning-framework-4/>

peatland will be restored across the Development Site. In addition, as recommended in NatureScot guidance, a further 10% of the baseline assessment of the extent of priority peatland habitat (38.4 ha) will be restored in order to deliver a 'significant level of enhancement' under NPF4, resulting in a restoration total of 67.5 ha.

- 1.2.4 Peat management and reinstatement during and following construction is detailed separately in a Peat Management Plan (PMP) (**Technical Appendix 6A**) and a Construction Environmental Management Plan (CEMP) will be submitted prior to construction to ABC and agreed with all necessary 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.
- 1.2.5 Habitat networks will be improved across the Development Site, with broadleaf riparian planting, low density broadleaf planting along forestry edges and targeted planting of montane scrub on more elevated areas within the Development Site. These interventions will provide ecological enhancement for a variety of species including black grouse, improving nesting and foraging habitat, whilst installation of artificial nest platforms for divers (*Gavia sp.*) will help contribute to improved breeding success of these species.
- 1.2.6 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 **Chapter 10: Ecology** and **Chapter 11: Ornithology**.

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 Habitat Management Plan (HMP) including (but not necessarily limited to) the applicant, FLS, ABC, NatureScot and Royal Society for Protection of Birds (RSPB).
- 1.3.1 Proposals have sought wherever possible to align with the scope and objectives of FLS's East Loch Awe Land Management Plan², which covers the areas of Eredine, Brenchoillie and Ardchnnell Forests.
- 1.3.2 It is anticipated that this HMP will be a live document that will be further modified pre- and post-construction, taking account of any design changes and priorities within the Development Site, and in response to ongoing monitoring outcomes. New opportunities for habitat management and enhancement may become apparent during this pre- and post-construction period and 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 35-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, however, the above organisations will be invited to participate in this process. This Steering Group will be chaired by the applicant, or its representative.

² <https://forestryandland.gov.scot/what-we-do/planning/active/east-loch-awe>

1.4 Structure of the HMP

1.4.1 This oHMP is intended to be a practical, succinct document, as full details pertaining to current Development Site characteristics, and the Proposed Development can be found in **Chapter 4: Project Description**.

1.4.2 The oHMP provides:

- A brief baseline summary of the Development Site characteristics as a general background (**Section 2**);
- Details of the aims and objectives (**Section 3**);
- Habitat management measures detailing proposed prescriptions/actions (**Section 4**);
- Details of implementation including partnership working, funding and duration (**Section 5.1 – 5.3**); and
- Details of indicative monitoring prescriptions needed to evaluate success or otherwise of the implementation of management; and the programme for delivering HMP activities (**Section 5.4**).

2. Baseline

2.1 General Site Description

- 2.1.1 The Development Site is located between two large areas of open water, which include Loch Fyne (a sea loch) to the south of the Site and Loch Awe (a freshwater loch) to the north of the Site. The Site and the wider Study Area, which are heavily forested with commercial conifer plantation, comprise an area of 31.46 km² which is roughly oblong-shaped, orientated in a south westerly to north easterly direction.
- 2.1.2 The highest elevation within the Development Site is at Beinn Dearg, coordinates E 202400, N 705000, at 482 metres Above Ordnance Datum (AOD) in the south-east of the Site. High elevations are also found at Beinn Dubh Airigh (460m AOD, coordinates E 195912 N 703492) and Beinn Laoigh (435m AOD, coordinates E 196850, N 701160), in the west and south-west of the Development Site respectively. The remainder of the Development Site is predominantly on a high plateau (generally above 300m AOD), decreasing in elevation towards the base of the Abhainn a' Bhealaich valley in the north-west at approximately 250m AOD.
- 2.1.3 A great extent of the Development Site is covered in conifer plantation, of varying ages, mainly composed of densely planted Sitka Spruce. A few small compartments of Lodgepole Pine are present. Typically, afforested land has been mechanically furrowed for planting to improve drainage in poor draining land. Windblown mature conifers are common across the conifer plantations of the site, probably commonest on steeper ground, climatically exposed woodland edges and in areas of boggy ground. Some areas of conifer plantation were planted in blanket bog and consequently the trees were rather stunted due to waterlogging and acidic groundwater conditions.
- 2.1.4 The main open habitat is blanket bog and upland heathland as a matrix of open ground across the upper slopes generally across the south of the Site, which include steep slopes, rock outcrops and cliffs and deeper peat. These open ground areas have a high ecological value and support a range of important species. There are similar areas adjacent to the development boundary.

2.2 Land use and existing management

- 2.2.1 The Development Site is situated within the East Loch Awe Land Management Plan (LMP) area (See **Plate 2.1**), which comprises a landscape scale of 9,697 ha, stretching from the east side of Loch Awe in the west to the slopes above Loch Fyne in the east. Sitka Spruce is the dominant productive species; however, the area provides areas of diverse tree species and age structure. A road network exists across the plan area, which has enabled age restructuring to be carried out across most of the mature forest.
- 2.2.2 The primary objectives of the LMP are: commercial timber production, Plantation on Ancient Woodland Site (PAWS) restoration, renewable energy, landscape re-appraisal in association with restructuring, including a review of management prescriptions with reference to forest resilience in relation to climate change.

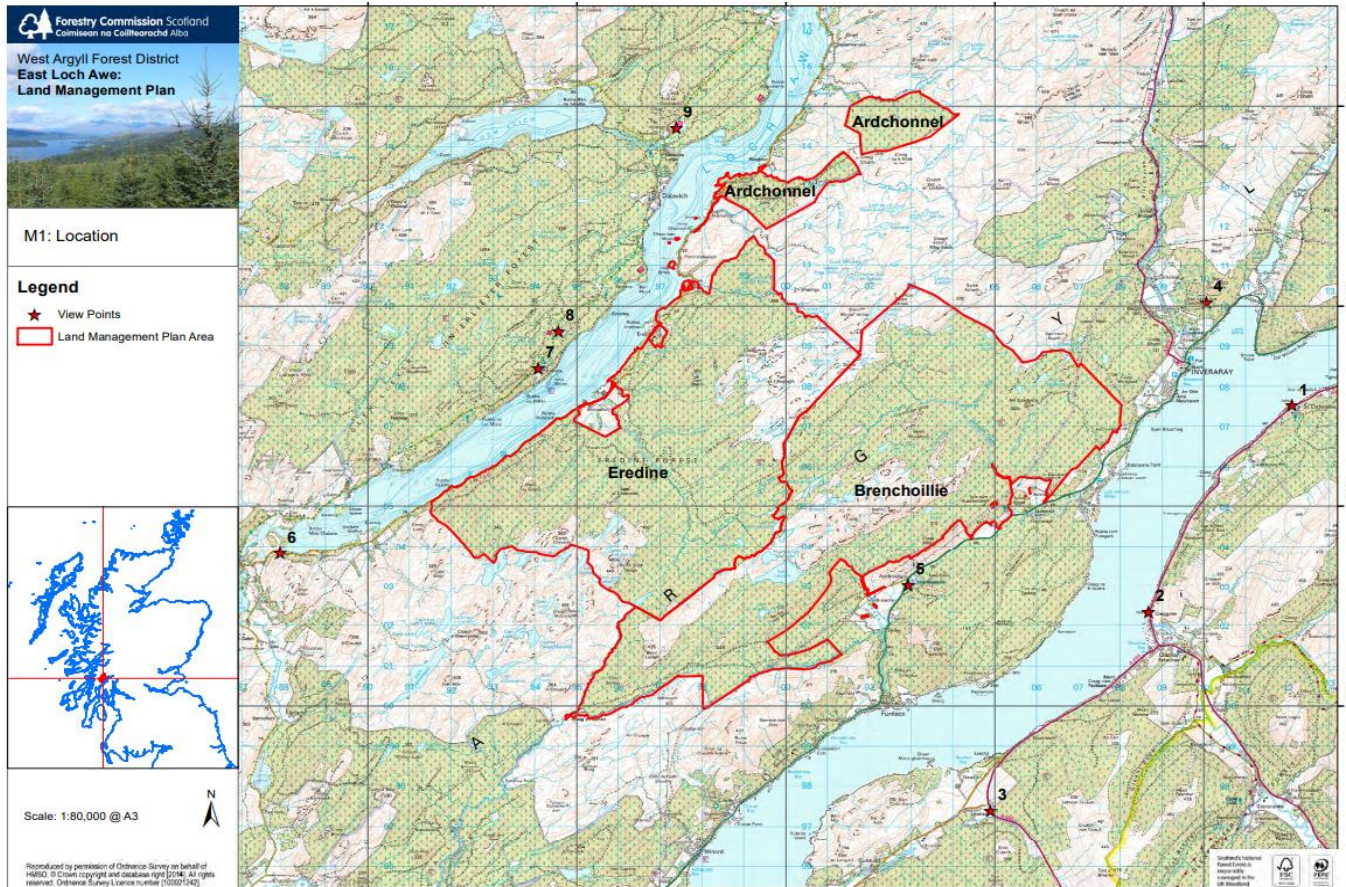


Plate 2.1 East Loch Awe LMP Area

- 2.2.3 **Sheep grazing:** According to the LMP there is no sheep grazing within the LMP Area (which includes the Development Site); however, sheep trespass is considered an ongoing problem across the wider LMP area. Sheep and deer impacts during forest establishment are recognised by FLS to have played a role in areas of poor establishment.
- 2.2.4 **Deer management:** According to FLS, deer control is undertaken within the LMP area. The forest has fairly limited connectivity with adjacent woodland and has a good internal environment and infrastructure for deer control. Trial enclosures on the upper slopes indicate the potential for habitat improvement and regeneration of native woodland where deer numbers are reduced. According to the LMP, many areas on the lower slopes show medium deer impacts with significant regeneration of vulnerable species. On the upper slopes trial enclosures indicate that deer (and sheep) grazing has a significant impact on regeneration and biodiversity. In addition to potential higher activity in these more secluded areas.
- 2.2.5 The LMP recognises that effective deer control within Brenchoillie needs to be carried out in conjunction with a third-party estate due to the retention of sporting rights by the estate.

2.3 Existing Conditions

- 2.3.1 The identification of candidate management areas, determination of likely habitat types and the suitability for restoration has been informed by the following:
- Aerial imagery and Ordnance survey (OS);
 - Peat depth surveys;

- National Vegetation Classification (NVC) survey data (presence of mire communities) (See **Technical Appendix 10B**);
- Peatland condition (i.e. presence of historical drainage, erosion features, sheep grazing/trampling etc.) based on the Peatland Condition Assessment (PCA) (See **Technical Appendix 10B**).
- Presence of designated sites;
- Land ownership boundaries; and review of
- East Loch Awe LMP, including forestry planting areas/areas recently clear-felled and unstocked.

Habitats

- 2.3.2 As identified in **Technical Appendix 10B** (Phase 1 Habitat, NVC and Peatland Condition Report), a large proportion of the blanket bog within the Development Site boundary is considered to be modified through historic drainage and erosion.
- 2.3.3 Large parts of the Development Site, comprise conifer plantation of varying ages, mainly composed of densely planted, Sitka Spruce, and a few small compartments of Lodgepole Pine. Typically, afforested land has been mechanically furrowed for planting to improve drainage in poor-draining land. Plantation was recorded on both deep (blanket bog) and shallow peat (wet heath communities).
- 2.3.4 Outside the plantation areas across open habitat particularly to the south of the Development Site, a number of large erosion features comprising hagg/gully complexes up to ca. 2 m in height were also found to be common; and smaller erosion features (ca. 0.5 m in height) were also recorded.
- 2.3.5 The Development Site conditions in these areas are favourable for the active restoration of peatland habitats and are considered likely to regenerate naturally, following active measures to reduce peat erosion. The implementation of restoration proposals within these areas would therefore be likely to result in downstream ecological benefits resulting from decreased erosion and run-off within local catchments.

Peatland Resource

- 2.3.1 As stated in **Chapter 10: Ecology** and the PMP (**Technical Appendix 6A**), the Proposed Development has been designed to minimise impacts on the Development Site's peat resource, commensurate with the need to take into account other environmental effects and technical design constraints. However, much of the Development Site is covered in peat, with this imposing some limits on the scope to avoid peat altogether. As such, part of the proposed management of peat resource at the Development Site will involve reuse of peat excavated to allow construction of the Proposed Development (detailed further in **Appendix 6A: Peat Management Plan**). In addition to this, the Development Site offers opportunities for extensive peat resource management and enhancement, over and above mitigation of the Proposed Development's effects, via restoration of currently eroded areas of peat. Degraded parts of the Development Site are visible primarily as hagged areas (either vegetated or bare), with degradation of the Development Site's peat resource having occurred both via natural erosion and drainage, as evidence by the extent of hagged and gully complexes across the Development Site.

Terrestrial Species

- 2.3.2 The following species were confirmed as being present on the Development Site, but no significant effects were predicted during construction or operation of the Proposed Development.
- 2.3.3 Details are provided in **Technical Appendices 10C – 10E**:
- Otter (*Lutra lutra*) - Surveys identified evidence of otter activity along most watercourses within the Development Site, including the Abhainn a' Bhealaich and various named and unnamed tributaries; the Douglas Water and its various named and unnamed tributaries, as well as various lochans. A total of 50 resting places (three confirmed holts, 25 potential holts and 22 covered or uncovered couches) were identified.
 - Badger (*Meles meles*) – Historical records of badger were provided by the FLS with a potential sett present within the Development Site boundary (this was located within a area that has since been clear-felled); and two further badger setts within 2km of the Development Site boundary; the historical sett location was checked during habitat walkover surveys or protected species surveys and no badger sett was recorded.
 - Pine marten (*Martes martes*) - A pine marten scat was recorded during habitat surveys in open habitat within the south west of the Development Site, and records provided by FLS confirm presence within the Development Site.
 - Red squirrel (*Sciurus vulgaris*) – Red squirrel are present within the wider forest, which is known as a Red Squirrel Stronghold.
 - Bats – Surveys indicate that at least five bat species utilise habitat within and around the Development Site: common pipistrelle, soprano pipistrelle, *Pipistrellus* species, brown long-eared bats, and bats of the genera *Myotis*.
 - Fish - Suitable salmonid habitat including suitable spawning habitat was recorded. No salmon were found in any of the surveys. Populations of brown trout are likely resident due to the presence of downstream barriers.

Birds

- 2.3.4 A range of bird species were recorded utilising the Development Site or wider area (see **Chapter 11: Ornithology**). Species of special value included:
- Black grouse (eight territories within the Development Site boundary) [BoCC Red list];
 - Black-throated diver (one pair) [WCA Sch. 1, Birds Directive Annex 1, BoCC Amber list];
 - Red-throated diver (at least three pairs utilising different lochans) [WCA Schedule 1, BD Annex 1];
 - Golden eagle (one territory) [WCA Sch. 1, BD Annex 1];
 - White-tailed eagle (39 flights recorded from 2019 to 2021, including an adult pair once); [WCA Sch. 1, BD Annex 1, BoCC Amber list];
 - Osprey (22 flights by a single bird and one flight by two birds during Vantage Point (VP) surveys) [WCA Sch. 1, BD Annex 1]; and
 - Whooper swan (seen on three lochans; one bird feeding close to Loch Dubh-ghlas in June 2020). [WCA Sch. 1, BoCC Amber list].
- 2.3.5 No significant effects in terms of the EIA Regulations were predicted following the application of mitigation, including the habitat management measures described in this plan.

3. Aims and Objectives

3.1 Management Aims

- 3.1.1 This oHMP has sought to identify on-site biodiversity opportunities as well as providing the management required to improve the effects of the Proposed Development wherever possible.
- 3.1.2 The four main aims of this HMP are:
- Aim 1: To restore and enhance on-site peatland habitats;
 - Aim 2: To increase native woodland coverage and enhance connectivity through broadleaf planting and/or natural regeneration;
 - Aim 3: To increase montane scrub coverage; and
 - Aim 4: To enhance habitat for notable breeding species including black grouse and divers.

3.2 Objectives

- 3.2.1 Detailed management objectives are presented in **Table 3.1**.

Table 3.1 Management Objectives

Aim	Ref	Objective
1	1.1	To reduce the development of bare peat and discourage further loss and degradation of peatland by reprofiling and revegetating hagg and gully complexes.
	1.2	To halt progressive erosion by blocking hagg and gully complexes with surface bunds, raising the water table and allowing revegetation of pools.
	1.3	To halt progressive peat drying and erosion through a programme of ground smoothing and drain-blocking to raise the water table.
	1.4	To remove self-seeded sitka spruce, which contributes to drying out of peatland habitats.
2	2.1	To plant low density native broadleaf trees along watercourses and forestry edges to provide improved habitat to provide benefits for a variety of species including black grouse, freshwater fish and otters.
3	3.1	To increase the montane scrub resource and improve woodland connectivity through planting and protection of target areas to limit suppression of growth by deer.
4	4.1	To increase the availability of suitable nesting and foraging habitat for black grouse.
	4.2	To increase the availability of safe nesting locations for diver species on lochs and lochans within the Development Site.

4. Restoration & Enhancement Measures

4.1 Proposed measures

4.1.1 The proposed restoration, enhancement and monitoring measures reflect the different requirements of the variable Development Site conditions, general land use and features to be enhanced. The following proposed measures are illustrated in **Figure 10H-1** and are discussed in further detail:

- Peatland restoration – gully-blocking with surface bunds, reprofiling, revegetation, ground-smoothing, drain/furrow blocking and removal of conifer regeneration;
- Native woodland coverage riparian and non-riparian broadleaf planting;
- Montane scrub coverage; and
- Artificial diver raft installation.

4.2 Peatland restoration

4.2.1 The following peatland restoration proposals will provide a variety of benefits to the peatland habitats within the Development Site, the assemblage of species that depend upon them and the associated ecosystem services benefits e.g. the carbon storage and downstream water quantity and quality.

4.2.2 Suitable areas for peatland restoration comprise actively eroding peatland features with only limited vegetation cover and historically drained peatland across the Site. The extent of these areas would be subject to refinement prior to completion of the final HMP but management proposals will aim to stabilise, revegetate and restore the hydrology of peatland habitat across the Development Site.

4.2.3 Identified peatland erosion features with opportunity for restoration have been mapped and are illustrated on **Figure 10H-1**. These areas are sufficient to deliver a 10:1 offset of impacted peatland (29.1 ha), as well as an additional 10% enhancement (38.4 ha) and have the potential for recovery through a programme of restoration measures dependent on the type of erosion or modification identified.

4.2.4 It should be noted that there could be opportunity, through further discussion with FLS at the detailed design stage, to deliver forest to bog restoration within the Site, which could potentially allow for the delivery of more targeted restoration areas rather than more dispersed areas across the Site. However, at this stage, such areas are either not available or cannot be confirmed.

4.2.5 As peatland restoration methods are evolving, best practise methods at the time of restoration works will be used and determined in consultation with FLS and NatureScot.

4.2.6 **Plates 4.1 – 4.5** illustrate peatland modification and erosion features within the Development Site.



Plate 4.1 Peatland being drained and actively eroding north of Lochan Gaineamhach [NM 99999 04486]



Plate 4.2 Actively eroding gullies west of Loch Garbh [NM 98408 03298]



Plate 4.3 Actively eroding peatland, gullies and hags west and north of Lochan Gaineamhach NM 99743 04199 and NN 00198 04595



Plate 4.4 Recently felled forest on peatland south/southeast of Loch Sidheannach [NM 96718 02644]



Plate 4.5 Conifer (Sitka Spruce) encroachment on blanket bog [NM 98853 03659]

Hag, gully and peat bank reprofiling

4.2.7 There are extensive erosion features across the Development Site. The primary aim of restoring these features is to prevent further erosion of the peat at the faces (stopping peat erosion and encouraging revegetation in conjunction with slowing the flow of water). The following best practice measures³ will be considered:

- *Ensure the cause of continued erosion has been addressed; in this case halting or slowing the flow of undercutting watercourses;*
- *Roll back the vegetation, preserving the root structure;*
- *Remove and reprofile the underlying peat to 30-35° Sometimes 40-45° can work if site conditions allow;*
- *Hags > 2 m need to be re-profiled with machinery from above AND below to ensure that the slope has adequate vegetation to recover;*
- *Work the gully bottom edge. Leave the toe intact but manage the new flow channel away from the toe (baffles or spur surface bunds can be used);*
- *Ensure turves are laid bridging the break in slope at the top of the hag. This prevents slumping, as water can get behind the turves and wash them down the slope. Tamping can be less disruptive than block turving. Compaction of turves is important;*
- *Ensure turves used have sufficient depth to them as they will be on a relatively highly draining surface and so they need to have a root system that can hold together long enough to allow new growth; and*
- *Larger, wetter turves are better. Turves can be harder to handle when dry. Using 30-45 cm turves has been successful. Heather dominated turves stretch better, but heather dies off more than grass.*

Adapted from NatureScot (2023) – Peatland Action Technical Compendium

³ <https://www.nature.scot/doc/peatland-action-technical-compendium-restoration-7-stabilisation-and-revegetation>

Surface bunding

4.2.8

Surface bunding may be required to impede and/or disrupt surface flow over larger areas of bare peat (such as a wide, shallow gully, or large bare peat pans) that leads to water loss. Surface bunds will allow water retention and the creation of smaller pools (larger pools should be avoided due to the greater disturbance of wind/wave action).

- Cell bunding (See **Plate 4.6**) could be considered on larger bare peat surfaces and involves joining up of surface bunding to create cells which hold back water on the surface. Within the Development Site, the use of coir logs would be suitable.
- Gully bunds/blocking (See **Plate 4.7**) might be considered in shallower gullies to slow/disrupt surface water flow, comprising peat turves, coir logs, heather bales.



Plate 4.6 Example of cell bunding using coir rolls at a restoration site in Yorkshire Dales



Plate 4.7 Example of gully bunds within revegetated peat filled gulleys at a restoration site in Yorkshire Dales

Gully/drain-blocking

- 4.2.9 Outside the commercial forestry plantation, in the open upland areas within the Development Site, there is little evidence of any extensive man-made artificial drains, however, there are extensive eroding gully complexes where it is envisaged it will require a combination of techniques dependent on peat depth, drain depth, slope and access etc. It is anticipated that deeper eroding gullies would be restored through a combination of blocking and reprofiling techniques, using conventional surface bunds (peat turves, coir logs, timber dams etc.) (See **Plate 4.7 and 4.8**), or other agreed appropriate measures, and these would be combined with reprofiling of the gully edges.
- 4.2.10 The aim in these areas will be to block artificial drainage features (eroding gulleys) in order to reinstate a more natural hydrology and retain more water on a peatland. Damming will help the creation of shallow bog pools and allow excess water to seep out of these pools across the peatland.



Plate 4.8 Timber dam/sediment trap installed at a restoration site in the Yorkshire Dales

- 4.2.11 Stone dams may also be required in very deep gulleys with high flows of water (max 2 m wide) (See **Plate 4.9**). They can also be used where mineral bunds were found to have washed away. Stone dams are used when gully erosion is down to the mineral layer (i.e., where there is no alternative), or where peat is less than 50 cm deep. Peat or timber dams will not key into the surface and water will scour underneath either of these dams in such situations. The intention is to trap sediment, thus enabling growth of vegetation, slowing the flow of water and reduction of erosive forces, and ultimately raising the water table in the peat adjacent to the gully.



Plate 4.9 Stone dams within mineral/shallow peat gullies at a wind farm site in the Monadhliath mountains

Ground smoothing and Ditch blocking

4.2.12 There are several areas of previously afforested peatland (See **Plate 4.4**) that will benefit from restoration within the Development Site. In these areas, furrows that were created during forestry activities will be ground smoothed, blocked or dammed in order to raise the water table and stop erosion. In some places, ground smoothing may be sufficient, and will involve the following:

- *Stump flipping to peel off the shallow root systems from the underlying peat, flipping them over, followed by compressing them upside down into the furrows with the back of the bucket.*
- *Furrow reprofiling / blocking is similar to standard drain blocking and reprofiling, but with the added complexity of dealing with tree roots and stumps. It can only be carried out on sites with more rotten stumps and roots and is therefore not possible on recently harvested sites.*
- *Cross-tracking will involve an excavator driving back and forth over the ground so that the whole surface gets flattened, any mulch or brash is distributed, and any stumps or woody debris do not spring back up. Care should be taken not to compact the peat, altering the hydrological function in a negative way.*

4.2.13 Dependent on the site conditions, drain blocking using peat dams may also be required on main drainage channels and peripheral drains. The depth of furrows will dictate which technique to use. The following best practice measures will be considered:

- *Peat dams should be installed where drains are at their narrowest. A general rule is that dams need to be spaced so that the water always reaches the toe of the previous dam. Drains on steeper slopes need dams at short intervals. On sites with very shallow gradients (<1 degree), dams can be spaced more widely with a maximum spacing of 15 m.*
- *Spacing may also depend on drain size and whether drain reprofiling is also being undertaken.*
- *Dams must be a sufficient width to ensure water cannot flow around the dam edge and re-join the same drain line.*
- *Where possible, dams should be constructed with a bit of a longer spur on the downhill side (an overspill channel) to encourage spreading out flow laterally. Behind the dam, water needs to be encouraged to seep across the peatland, rather than creating large pools of water behind the dam. The use of swales can achieve this in most circumstances.*
- *The height of the dam should be slightly higher than the fall line of the drain so that water cannot flow or seep across the top of the dam.*

Adapted from NatureScot (2023) – Peatland Action Technical Compendium

Self-seeded conifer removal

4.2.14 There is a low density of non-native conifers (mainly Sitka Spruce) to the south of the existing forestry, which will be having a negative impact on the bog, adding to the water loss from the Development Site.

4.2.15 Regenerating conifers will therefore be removed from a combined area of 19 ha 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 but may require additional treatment dependent on size and density.

4.3 Montane scrub planting

- 4.3.1 There are upland areas between the open tops and exposed ridges on the Development Site (See **Plate 4.10**), and the lower forested slopes where montane scrub could greatly enhance biodiversity.



Plate 4.10 Examples of suitable habitat on elevated ground within the south and east of the HMP area [NN 01708 04554 and NN 01997 05659] that could support montane scrub

- 4.3.2 Suppression of advance regeneration is likely to be present in many areas which could respond quickly to reduced grazing pressure. Juniper is scattered infrequently across the LMP area and could become a feature of areas protected from deer grazing. Where possible, montane scrub planting will occur in areas with existing remnants of mountain woodland and where the habitat is connected with woodland at a lower altitude to increase ecological value.
- 4.3.3 Provisional montane scrub planting search areas totalling 210 ha are illustrated on **Figure 10H-1**. The extent of the planting within the search areas will be subject to refinement prior to completion of the final HMP. Montane scrub creation will follow Montane Scrub Action Group (MSAG) guidance (Morris, T., unknown). The species of tree to be planted, any required ground preparation, scrub protection and maintenance, and the suitability of the identified locations will be determined by further ground investigation in year 1 of the implementation of the final HMP. Montane scrub planting will take place in agreement with FLS and if possible, species will be sourced locally. Species to be planted will include higher

altitude specialist species as well as other lower altitude species where there is connectivity with existing woodland. A mix of the following species would be considered appropriate:

- Juniper *Juniperus communis*;
- Eared willow *Salix aurita*;
- Downy Willow; and
- Rowan (*Sorbus aucuparia*) is already established in some of these areas, but suppressed by grazing.

4.3.4 A decision on whether to protect establishing montane scrub with fenced enclosures will be taken based on the scope to reduce herbivore browsing impacts by controlling stock numbers or herbivore population size, whether by culling or by changing management practices to modify grazing patterns. This will be determined through engagement with FLS and wider land owners.

4.4 Broadleaf tree planting

4.4.1 Tree planting is proposed within approximately 13.9 ha of identified habitat (See **Figure 10H-1**) within the Development Site, comprising both riparian habitats providing connectivity along core watercourses within the Development Site and non-riparian planting primarily to benefit black grouse along forestry edges. Consideration has been given to the existing broadleaf corridors within the Site and wider environs, bolstering existing wooded nature networks along the Douglas Water to the east and the Abhainn a' Bhealaich to the north.

4.4.2 Planting will comprise a combination of continuous and discontinuous shrub and tree-dominated planting. Native tree species appropriate for the Development Site will be agreed with FLS post-consent, but may include the following mix of broadleaved and conifer species:

- Downy birch *Betula pubescens*;
- Aspen *Populus tremula*;
- Alder *Alnus glutinosa*;
- Eared willow *Salix aurita*;
- Grey willow *Salix cinerea*;
- Hawthorn *Crataegus monogyna*;
- Rowan *Sorbus aucuparia*;
- Scots pine *Pinus sylvestris*; and
- Sessile oak *Quercus petraea*.

4.4.3 Such species will provide additional food sources for black grouse in the spring and winter, together with suitable cover from predation for both adults and broods, and will provide connectivity for the species between foraging, lekking and breeding habitats. Discontinuous areas of planting will ensure that extensive shading of existing food plants (e.g. grasses and bilberry, where present) for black grouse does not occur, with planted tree and shrub species being selected for their preference by black grouse.

4.4.4 During the establishment phase, trees will be protected in accordance with best practice guidance available at the time of planting, with the requirement for fencing being avoided as far as possible.

Planting methodology and maintenance

- 4.4.5 A local contractor (overseen by a suitably experienced ecologist) will be appointed to carry out the tree/scrub planting based on the following planting methodology:
- Prior to planting, a soil survey will be carried out to determine appropriate locations for tree planting; and the suitability of native broadleaf species in these locations will be determined by vegetation type;
 - Plants will be of local provenance where possible, and densities would be around 2500 trees per hectare, in clumps;
 - Hand preparation will be used for all planting areas due to the proximity of watercourses;
 - Planting will take place on suitable soils and vegetation communities in clumps and drifts;
 - Trees will be staked and tubed to protect against deer and vole damage. Five years after planting approximately, all tubes will be removed or when they reach a three-inch basal diameter;
 - Planting will aim to create a mosaic of native species in a random pattern of distribution;
 - Hand weeding will be undertaken annually as required; and
 - Beating up will be undertaken the year after planting and in year five (although there may be a requirement in other years) to replace dead trees. Lost or broken stakes or tubes will be replaced.

4.5 Artificial nesting rafts for divers

- 4.5.1 The following records indicate that breeding attempts by black-throated and red-throated divers within the Development Site have often been unsuccessful (Further details are provided in **Chapter 11: Ornithology**):
- Several instances of unsuccessful breeding attempts by black-throated divers have been recorded at the Development Site. One bird was found incubating on a loch within the Development Site during May 2019, but with no signs of chicks during follow up surveys. In 2020, a pair attempted to breed on the same waterbody but failed at the late egg/early chick stage. In 2021, a pair fledged one chick on the loch. In August 2021 two adults and a juvenile were seen on an adjacent offsite loch. It is assumed these were the same birds.
 - Red-throated divers were seen on eight lochans and incubating on three of these within the Development Site in 2019 and 2020. However, birds bred successfully on only one lochan within the Development Site in 2019, 2020 and possibly also 2021.
- 4.5.2 Lack of successful breeding may be due to the unsuitability of lochs for natural nest sites, the risk of flooding or the risk of predation. Artificial nesting rafts will help combat these risks by providing a more secure nesting site, thereby enhancing the breeding resource within the Site for both diver species.
- 4.5.3 It is proposed that tethered floating rafts, covered in vegetation will provide suitable stable breeding habitat for both species. Different target lochs/lochans will be identified for both species; red-throated divers generally preferring smaller lochans.
- 4.5.4 Rafts will follow similar prescriptions outlined by Hancock (2000), measuring approximately 2m x 3m so they are suitable for both diver species and these would require at least three anchors. Where possible, rafts will be positioned in relatively sheltered and undisturbed

locations in relatively deep water about 30m from the shore. Modifications may be required to standard designs to suit the circumstances of individual lochs/lochans but these are unlikely to present any serious difficulties.

- 4.5.5 To avoid disturbance, nest rafts will be installed post-construction. Locations for rafts will be carefully chosen to avoid risk of collision with wind turbines, mindful that red-throated divers commute between nesting lochans and feeding habitat (the sea and larger waterbodies).

5. Implementation

5.1 Management

- 5.1.1 It is envisaged that the HMP will be an evolving document and all alterations will be agreed with the Steering Group.
- 5.1.2 The oHMP outlines the necessary steps to be taken and that further developing of the management prescriptions above will be progressed following consultation with FLS, ABC 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.

5.2 Partnership Working

- 5.2.1 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 5.1**. It is envisaged that these partners will be involved from the earliest stages in order to ensure the effective delivery of the plan.

Table 5.1 Potential HMP Delivery Partners

Partner	Roles
FLS	- Advice, information, monitoring & technical input. - Integration of management plan outputs with East Loch Awe LMP. - Implementation of grazing reduction and predator control.
ABC	- Advice, information & technical input. - Integration of management plan outputs with Local Biodiversity Action Plan (LBAP).
NatureScot/ Peatland Action	- Advice, information, monitoring & technical input. - Licensing.
RSPB	- Advice, information & technical input on habitat restoration & species requirements. - Strategic linkage with other Wind Farm HMP objectives.
Argyll Estates	Collaboration on deer control
Local forestry planting contractor	- Tree planting. - Installation of fencing.

- 5.2.2 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. This may include local forestry planting contractors, who may be well-placed to deliver some of the identified actions.

5.3 Funding

- 5.3.1 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 35 years.

5.4 Monitoring and Review

- 5.4.1 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 (or key stakeholders) to adjust current objectives and their prescriptions, or to devise new aims and objectives.
- 5.4.2 It is critical 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.
- 5.4.3 For instance, if it is found that deer are clearly implicated in the failure of restoration work within the Site at a significant scale following monitoring surveys, further actions would need to be agreed between the Applicant, FLS and NatureScot. This could involve taking a targeted cull from in and around the Site itself. In due course, should this not have the desired effect, it may be necessary to cull additional animals from these areas. The monitoring of deer movement and counts would continue to be undertaken by FLS and the information provided to the Steering group would be used to manage cull levels.
- 5.4.4 The monitoring prescriptions associated with the activities described in **Sections 4.2 - 4.5** are summarised in **Table 5.2**.

Table 5.2 Indicative Scope of Monitoring and Target Outcomes

	Objective	Scope of monitoring prescriptions	Target
1.1	To reduce the development of bare peat and discourage further loss and degradation of peatland by reprofiling and revegetating hagg and gully complexes.	Following completion of surface bund installation, reprofiling, ground smoothing and any ditch blocking works, monitoring will include key parameters as set out within Common Standards Monitoring Guidance for Upland Habitats (JNCC, 2009) and Peatland Action Monitoring Strategy 2023-2030 ⁴ . Monitoring will be carried out in the year following reprofiling and revegetation works and will take place annually for the first five years of operation of the Proposed Development. Thereafter in years 10, 15, 20, 25, 30 and 35.	Core monitoring objective to establish whether restoration works are resulting in conditions favourable to the recovery of a functioning peatland habitat.
1.2	To halt progressive erosion by blocking hagg and gully complexes with surface bunds, raising the water table and allowing revegetation of pools.		Likely targets will relate initially to stability and revegetation of the target areas, followed by potentially longer-term change in peatland state that will encourage the re-establishment of some ecosystem functions.
1.3	To halt progressive peat drying and erosion through a programme of drain-blocking and ground smoothing to raise the water table.	Dipwells will be installed at a range of monitoring points where gully blocking is proposed. The number and location of such monitoring points will be determined at detailed design stage. Monitoring will be carried out for at least one year prior to gully-blocking works and will continue for at least five years hence. Monitoring of vegetation condition will be undertaken at all identified locations for conifer removal	Several parameters could be measured that would be expected to be altered through restoration including: • fluctuation of annual water table level, • percentage Sphagnum cover, • presence of positive and negative indicator species, and • change in the extent of bare peat.
1.4	To halt drying out of peatland habitats through removal of self-seeded conifer.		Target outcomes will follow condition monitoring of blanket bog (see below).
2.1	To plant native broadleaf trees along watercourses and non-riparian forestry edges to provide improved habitat and benefits for a variety of species including black grouse, freshwater fish and otters.	Hand-weeding will be undertaken annually and beating up will be undertaken the year after planting and in year 5 (although there may be a requirement in other years) to replace dead trees.	Planting will aim to create a mosaic of native species in a random pattern of distribution, providing improved cover and connectivity along existing vegetated cleughs.

⁴ <https://www.nature.scot/doc/peatland-action-monitoring-strategy>

	Objective	Scope of monitoring prescriptions	Target
3.1	To increase the montane scrub resource and improve woodland connectivity through planting and protection of target areas to limit suppression of growth by deer.	Montane scrub planting areas would be monitored in year 1 after planting to identify any failures, with requirement for 'beating up', followed by two yearly surveys in years 3, 5, 7 and 9 to determine successful establishment. Thereafter, monitoring would be undertaken on a five-yearly basis subject to review.	Planting will aim to create a wider network of montane scrub above the conifer crops, that provides connectivity with woodland (riparian, non-riparian and plantation) at lower altitudes across the Site.
4.1	To increase the availability of suitable nesting and foraging habitat for black grouse.	Black grouse lek surveys will be undertaken to monitor the effect of broadleaf planting on local black grouse populations. An updated baseline (Year 0) will be undertaken prior to commencement of construction works, with monitoring subsequently undertaken in Years 1, 3 and 5 of wind farm operation, then subsequently every five years subject to review. Monitoring in each year will comprise black grouse lek site surveys.	Clumped broadleaf planting along forestry edges and peatland restoration will aim to improve the network of suitable habitat across the Site, improving year round foraging and nesting resource for black grouse and helping to the support the local population.
4.2	To increase the availability of safe nesting locations for divers (<i>Gavia</i>) species on lochs and lochans within the Site	Diver surveys would be undertaken to determine territory occupancy, nest site and breeding success across the Site. An updated baseline (Year 0) will be undertaken prior to commencement of construction works, with monitoring subsequently undertaken in Years 1, 3 and 5 of wind farm operation, then every five years subject to review.	Increasing the number of suitable diver nest sites across the Site will support the local diver population. Monitoring success at identified locations will be reviewed in discussion with the Steering Group and where necessary, alternative locations identified.

6. References

- Gilbert, G., Gibbons, D.W. & Evans, J. (1998) *Bird Monitoring Methods*. RSPB, Sandy.
- Joint Nature Conservation Committee (2009) Common Standards Monitoring Guidance for Upland Habitats. Version July 2009. <https://hub.jncc.gov.uk/assets/78aaef0b-00ef-461d-ba71-cf81a8c28fe3>
- Hancock, M. 2000. *Artificial floating islands for nesting Black-throated Divers Gavia arctica in Scotland: construction, use and effect on breeding success*. Bird Study, 47:2, 165-175,
- MacDonald, A., Stevens, P., Armstrong, H., Immirizi, P. and Reynolds, P. (1998) *A Guide to Upland Habitats. Surveying Land Management Impacts*. Field Guide 1, Scottish Natural Heritage, Edinburgh.
- Montane Scrub Action Group. Active Management of Montane Scrub and Treeline Woodland. Best Practice Guidance 1. https://www.msag.org.uk/uploads/4/0/7/3/40732079/bpg1_introduction.pdf
- Montane Scrub Action Group. Protocol for monitoring planted montane willows. Best Practice Guidance 5. https://www.msag.org.uk/uploads/4/0/7/3/40732079/bpg5_monitoring.pdf
- Montane Scrub Action Group. Tree protection and high-altitude fencing. Best Practice Guidance 4. https://www.msag.org.uk/uploads/4/0/7/3/40732079/bpg4_protection.pdf
- NatureScot (2022). Peatland ACTION - Technical Compendium. <https://www.nature.scot/doc/peatland-action-technical-compendium>
- NatureScot (2023). Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Guidance note. Revised November 2023. <https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-anagement#:~:text=Priority%20peatland%20is%20a%20sensitive,to%20result%20in%20significant%20effects.>
- SNH (1998). *A Guide to Upland Habitats - Surveying Land Management Impacts - The Field Guide*. Volume 2.
- SNH (2016a). *Planning for development: What to consider and include in Habitat Management Plans*. Version 2.
- SNH (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. March 2017, Version 2.

Annex A

Figures
