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CRUACH CLENAMACRIE WIND FARM

APPENDIX 10.5 OUTLINE HABITAT MANAGEMENT PLAN

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WSP

110 Queen Street
Glasgow
G1 3BX

Phone: +44 141 429 3555

WSP.com

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1 INTRODUCTION

1.1 PURPOSE OF THE REPORT

1.1.1 This outline Habitat Management Plan (oHMP) forms an Appendix to the proposed Cruach 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 and 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.

1.1.3 This document sets out the strategy the Applicant (Voltalia UK Ltd) proposes to employ to ensure habitat management measures are implemented to mitigate the effects on identified features, as well as delivering additional biodiversity improvements across the Site and off-site areas, cognisant of 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*".

1.1.4 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 Proposed Development, alongside additional enhancement measures.

1.1.5 No significant adverse impacts were predicted for ecological or ornithological features within **Chapter 10: Ecology** or **Chapter 11: Ornithology**. This 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 design 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 4: Assessment of 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 The following document outlines criteria for identifying and delivering compensatory peatland habitat restoration measures with regard to NatureScot (2023)[2] guidance. The aim would be to restore and/or enhance a greater area than that which is predicted to be affected by the Proposed Development, whilst providing additional enhancement to the surrounding landscape. All available on-site peatland restoration opportunities have been identified and detailed in the plan.

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[1] https://www.gov.scot/publications/national-planning-framework-4/ (Accessed 15 August, 224)

[2] 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 (Accessed 15 August, 2024)

1.2.3 Within the EIA Report assessment, it is predicted that 3.1 hectares (ha) of peatland habitat would be permanently lost and an additional 4.77 ha likely to be temporarily or indirectly affected and altered during the lifespan of the Proposed Development. Based on a combined loss (direct loss and indirect modification) of peatland communities of 7.87 ha, it is proposed that ~57 ha of peatland will be restored across the Site.

1.2.4 It is understood that further liaison with NatureScot/Peatland Action will be undertaken in order to commit funding to strategic peatland restoration efforts (in the order of 30-40 ha) within the wider area in order to address any compensatory shortfall in providing a 10:1 offset provision. In so doing, this approach aligns with NPF4 policies, which are relevant to development proposals on peatland, carbon-rich soils and priority peatland.

1.2.5 In addition, as recommended in NatureScot guidance, a further 10% of the baseline assessment of the extent of priority peatland habitat (173 ha) should be restored in order to deliver a 'significant level of enhancement' under NPF4, which would result in an additional enhancement provision of 17.3ha.

1.2.6 Given the lack of additional on-site peatland enhancement opportunities, in order to deliver a 'significant level of enhancement' under NPF4, the Plan proposes a suite of additional habitat restoration measures to be delivered at two off-site locations. This will include the enhancement of habitat networks associated with designated sites and their protected features across the wider landscape, focusing on marsh fritillary (*Euphydryas aurinia*) habitat improvement across open ground; and improving the condition of Atlantic oak woodland and promoting regeneration through deer management.

1.2.7 Peat management and reinstatement during and following construction is detailed separately in a Peat Management Plan (PMP) (**Appendix 9.2**) 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.

1.2.8 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 HMP including (but not necessarily limited to) the applicant, FLS, ABC, NatureScot and Royal Society for Protection of Birds (RSPB).

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 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 This 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

50-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 five yearly 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.

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 Site characteristics and the Proposed Development can be found in the **Chapter 5: Project Description**.

1.4.2 The oHMP provides:

- A brief background to the management measures through consultation and baseline summary of the Site characteristics (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 monitoring prescriptions needed to evaluate success or otherwise of the implementation of management; and the programme for delivering HMP activities (Section 5.4).

2 BACKGROUND AND BASELINE

2.1 CONSULTATION

2.1.1 Advice was sought from NatureScot (NS) regarding the scope of habitat management and enhancement opportunities associated with the Proposed Development. In light of the lack of peatland restoration opportunities on Site sufficient to address the full 10:1 offset requirement; NS advised that the application should clearly address the factors noted in their relevant guidance[2].

2.1.2 With respect to the requirement for additional peatland enhancement, NS stated:

"Where the relevant policy tests cannot be met on-site, off-site provision may be considered alongside on-site. In these circumstances, off-site delivery should be as close as possible to the Site, with consideration being given firstly to the immediate landscape context and existing ecological value of the Site.

If the Proposed Development is affecting good quality habitat on Site and there is a challenge to deliver sufficient on-site enhancement measures, then the project should be looking for off-site opportunities.

In terms of not undertaking the peatland enhancement element off-site as peatland restoration and providing the offsetting/ compensation element can be addressed, we would (at this stage in time) tend to be flexible over this."

2.1.3 It was acknowledged by NS that the Scottish Government biodiversity guidance[3] does ask for the statutory body to have a flexible approach to providing enhancement, particularly before any Scottish Biodiversity metric has been developed. On this basis, NS were relatively comfortable accepting enhancement of another habitat type.

2.1.4 Further to this correspondence, a Site visit was undertaken to consider the potential feasibility for identifying and carrying out habitat enhancement measures designed to connect up or buffer the nearby SSSI's with focus on protected invertebrates and deer management. A Site visit was undertaken with NatureScot Officer and a dragonfly specialist Pat Batty on 12 and 13 June 2024, with a focus on identification of suitable habitat to support Northern emerald (*Somatochlora arctica*) and opportunities to improve habitat at a historical breeding site.

2.1.5 Deer and herbivore management was also identified by NatureScot as likely to be a key issue affecting the success of creation/ enhancement proposals, and therefore information on how deer/ herbivores will be managed to facilitate successful enhancement would be informative.

2.1.6 The measures detailed in this Plan (as well as **Appendix 10.6**) seek to address the points discussed here and address the relevant policy tests.

[3] Scottish Government (2023). Scottish Government Draft Planning Guidance: Biodiversity (Accessed 15 August, 2024)

2.2 BASELINE INFORMATION

GENERAL SITE DESCRIPTION

2.2.1 The Site consists of a mix of blanket bog and heathland habitat predominately, with areas of acid grassland and purple moor-grass and rush pasture. Along the south boundary of the Site there are areas of broadleaved and coniferous woodland. The Access track is predominately located within coniferous woodland known as Fearnoch Forest, except for the section associated with Dailnamac in the north which contains other neutral grassland and purple moor-grass and rush pasture surrounded by broadleaved woodland.

2.2.2 Several unnamed watercourses were present across the Site and wider rea, along with the River Luachragan, Allt Taillir and Allt na Seabhaig.

LAND USE AND EXISTING MANAGEMENT

Designated Sites

2.2.3 Several designated sites are situated adjacent to or in close proximity to the Site and off-site areas considered in this plan (See **Figure 10.5.1**). These comprise Loch Etive Special Area of Conservation (SAC) and two component Sites of Special Scientific Interest (SSSIs) - Clais Dhearg SSSI and Airds Park and Coille Nathais SSSI. The site condition, pressures and management details for these designated sites are provided in Table 2.1.

Table 2.1 Designated sites, condition, pressures and management

Designated site and interest features	Current condition, site pressures and management objectives relevant to interest features identified within this plan
Loch Etive Woods SAC Mixed woodland on base rich soils associated with rocky slopes Western acidic oak woodland Alder woodland on floodplains Otter	Key management issues (detailed in the Loch Etive Woods SAC Conservation Advice Package[4]) affecting the qualifying features include grazing, invasive non-native species and changes in local and catchment hydrology. The woodland is considered to be in an unfavourable condition at this site due to the impacts of high levels of grazing. • *High deer numbers have been an ongoing issue at the component sites that make up the SAC; the geographic spread of the 8 SSSIs means deer management varies across the units. Stock levels also vary greatly across the sites. Forestry and Land Scotland own most of Glen Nant SSSI and have installed new fencing and increased deer control over the past few years to reduce herbivore impacts. Mechanisms for improving the condition of the site have also been identified at Coillie Leitire and Ard Trilleachan.* • *A key management requirement for the woodland communities is to ensure low enough herbivore impacts to allow all tree and shrub species present to regenerate.*

[4] https://sitelink.nature.scot/site/8295 (Accessed 13 July, 2024)

Designated site and interest features	Current condition, site pressures and management objectives relevant to interest features identified within this plan
	• *Rhododendron ponticum and sitka spruce are present across parts of the site. The geographic spread of the site, and adjacent conifer forestry means ongoing vigilance is required in order to remove plants before they become established.*
Clais Dhearg SSSI Oligotrophic loch Open water transition fen Upland oak woodland Dragonfly assemblage Marsh fritillary butterfly	The Clais Dhearg Site Management Statement[5] outlines the reasons for the SSSI designation and provides guidance on how its special natural features should be conserved or enhanced. The following provides a summary: *The woods and open ground are currently grazed by cattle, sheep and deer. The oak woodland habitat was assessed as unfavourable[5] due to targets for regeneration and browse pressure failing, however current management is addressing these activities.* *Open areas within and adjacent to the woodland mosaic support a range of mires, heaths, swamps, and grasslands and these provide valuable woodland glade habitats for insects, including the marsh fritillary butterfly and the narrow-bordered bee hawk-moth. Although currently assessed as unfavourable, due to no larval webs being observed during the site condition monitoring (2006), further surveying of the marsh fritillary is required in order to accurately establish and record populations of this species at Clais Dhearg.* ***To maintain the extent of woodland habitats, and where appropriate to enhance existing woodland habitat.*** *A reduction in the present browse pressure within the woodland and on adjacent open ground will provide opportunities for the establishment of tree seedlings. This objective can be achieved through prescriptions described in the SFGS S9 Grazing Plan.* ***Maintain open areas of damp grassland with abundant devil's-bit scabious. Devil's-bit scabious is the food plant of the marsh fritillary butterfly*** *Light grazing of grasslands where devil's-bit scabious is common will ensure that suitable habitat for the marsh fritillary is maintained.* ***Maintain open areas of mire and maintain open areas with sunshine and shade along water courses*** *These are important habitats and niches for breeding dragonflies. The open areas of mire and burn side vegetation can be maintained by stock grazing.*
Airds Park and Coille Nathais SSSI Upland oak woodland	The Clais Airds Park and Coille Nathais SSSI[6] outlines the reasons for the SSSI designation and provides guidance on how its special natural features should be conserved or enhanced. The following provides a summary: *During site condition monitoring in 2008 the upland oak woodland feature was assessed as being in unfavourable, recovering condition.*

[5] https://sitelink.nature.scot/site/357 (Accessed 13 July, 2024)
[6] https://sitelink.nature.scot/site/1672 (Accessed 13 July, 2024)

Designated site and interest features	Current condition, site pressures and management objectives relevant to interest features identified within this plan
Marsh fritillary butterfly	*The site was previously part of an S9 Woodland Grazing Scheme which aimed to improve the condition of the woodland. The S9 scheme sought to complement an existing Woodland Grant Scheme (WGS) which included operations to maintain open areas, diversify age structure and encourage regeneration. At the time in 2008, with positive management in place, the site was assessed as recovering.* *During site condition monitoring of marsh fritillary (2006) the feature was assessed as being in unfavourable condition. Despite suitable habitat being present across the site there was a lack of larval webs observed and as a result many of the targets failed. Follow up surveys in 2009 confirmed that the habitat remains in good condition and, in places, would appear to have improved when compared with photos taken in 2002. However, despite adults being observed during the summer months of 2009 there was still a lack of larval webs observed in September 2009. However, larval webs were observed on land directly adjacent to the SSSI which appeared to be in similar condition, and this would seem to confirm that the site remains an important location for the meta-population of this species.* ***To maintain the extent and distribution of woodland habitats as a fully functioning woodland ecosystem and, where appropriate, enhance the existing woodland habitat*** *Control grazing pressure at an appropriate level to achieve the prescribed management objectives of the agreed grazing plan.* *Aim to maintain areas of wet heath, Molina and mire by ensuring sufficient grazing pressure to prevent the encroachment of scrub.* *Attempt to create appropriate conditions to allow browse sensitive species to regenerate under the existing canopy, improving the age diversity and structure of the woodland.* *Monitor and control deer density at appropriate levels to ensure browse pressure is suitable to achieve management objectives.* ***Maintain open areas of damp grassland with abundant devil's-bit scabious*** *Light grazing will ensure that habitat for the marsh fritillary is maintained and enhanced.*

Taynuilt Land Management Plan

2.2.4 The Site is to the north of the Taynuilt Land Management Plan (LMP) area (See **Plate 10.5.1**), which covers 2,041 ha, comprising three discrete blocks: Fearnoch (1289 ha), Glen Nant (332 ha) & Inverawe (420 ha).

2.2.5 Fearnoch Forest comprises a well roaded, mixed aged, mixed species forest containing a wide range of soil types. Restructuring has taken place across the full extent of the forest. The forest is a very popular recreational area. Clais Dhearg SSSI lies to the West of the forest & Airds Park & Coille Nathais SSSI lies to the East. Both SSSI's also fall within the wider Loch Etive Woods SAC. There are extensive Plantation on Ancient Woodland Sites (PAWS) areas in Fearnoch which often occupy highly

productive sites carrying mixed conifers. Part of the forest falls within the catchment of the Oban water supply.

2.2.6 Primary objectives of the Fearnoch Forest block (from a nature conservation perspective) are:

- Protect and enhance designated conservation sites within & adjacent to the LMP area.
- Restore PAWS areas to create wider landscape scale native woodland linkages.

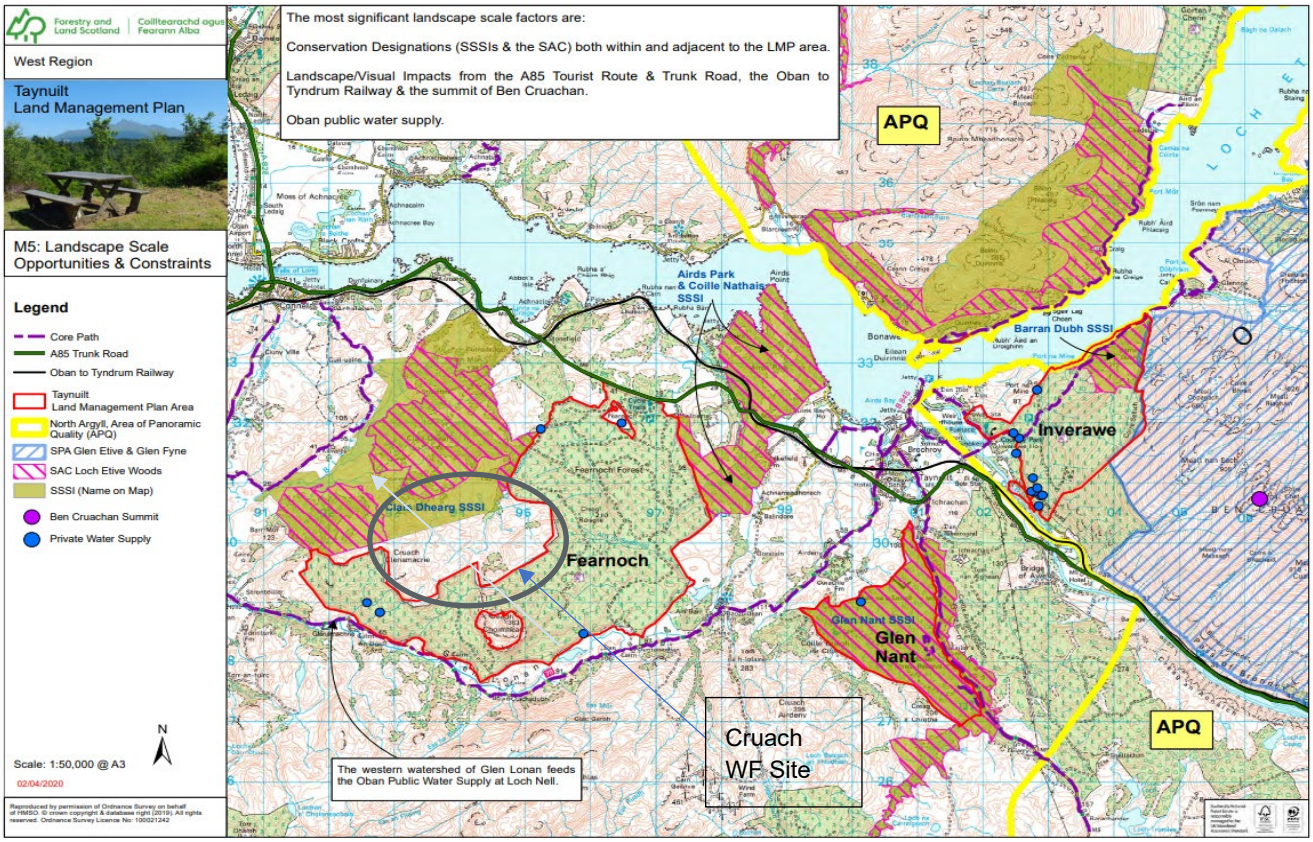

Plate 10.5.1: Taynuilt LMP Area – Landscape Scale Opportunities & Constraints [FLS Taynuilt LMP - adapted]

2.2.7 **Cattle and sheep grazing**: Land ownership boundaries (Thomas Nelson, Lorne Nelson and FLS Fearnoch Forest) are presented on **Figure 10.5.2**. According to the landowner, the Site itself is not grazed, but open ground in the wider area is grazed as part of a much larger block where animals are able to move freely. The landowner provided a rough estimate of the stock present as 25 cows and calves and 100 sheep.

2.2.8 **Deer management**: According to FLS Wildlife Ranger Manager[7], the population estimate is difficult for red deer as they tend to move between private and FLS land, however the following estimate was provided: red deer population estimate - 150; roe deer population estimate - 120.

[7] Email from FLS Wildlife Ranger Manager John Jackson (01/11/23)

2.2.9 Deer control within the Tynuilt LMP Area is undertaken by contract in accordance with the Taynuilt LMP Deer Management Plan and Managing Deer on The National Forest Estate. It is understood that neighbouring landowners undertaken deer management themselves.

2.2.10 Deer activity within the LMP area is negatively correlated with human activity. Many areas on the lower slopes show medium deer impacts with significant regeneration of vulnerable species. On the upper slopes evidence suggest that deer (and feral sheep) grazing have a significant impact on regeneration and biodiversity.

2.2.11 Land adjacent to Fearnoch on the northern margin is managed with different deer control objectives to those detailed within the LMP in light of the presence of Loch Etive Woods Special Area of Conservation (SAC) and Clais Dhearg Site of Special Scientific Interest (SSSI). Deer fencing has the potential to affect deer activity across the march within the designated sites.

2.2.12 Historical land management schemes: The landowner has previously been involved in the following schemes:

- 2009-14 Scottish Forestry Grants Scheme (SFGS) S9 woodland management scheme for cattle grazing in the woodland.
- 2009-14 Scotland Rural Development Programme (SRDP) scheme for moorland management, bracken control both out with SSSI.

EXISTING CONDITIONS

2.2.13 The identification of suitable habitat management units (HMUs) within the Site and two off-site areas A and B, determination of likely habitat types and the suitability for restoration has been informed by the following:

- Presence of designated sites (**Figure 10.5.1**);
- Land ownership boundaries (**Figure 10.5.2**);
- Aerial imagery and Ordnance Survey mapping (OS);
- Peat depth;
- Site visits and engagement with NatureScot and external technical specialists;
- National Vegetation Classification (NVC) survey data for the Site (See **Appendix 10.1**) and for Off-site Area A (See **Figure 10.5.3);** and Habitat Map of Scotland (HabMos)[8] data for Off-site Area B (**Figure 10.5.3**);
- Peatland condition (i.e. presence of historical drainage, erosion features, sheep grazing/ trampling, self-seeded conifer growth etc);
- Loch Etive Woods SAC Conservation Advice Package;
- Airds Park and Coille Nathais SSSI Site Management Statement and Clais Dhearg Site Management Statement; and
- Taynuilt LMP[9], including forestry planting areas/areas of recently clear-felled and unstocked.

[8] https://opendata.nature.scot/datasets/habitat-map-of-scotland/explore (Accessed 10 October 2024)
[9] https://forestryandland.gov.scot/media/yiip02aq/taynuilt_lmp_text_october_2020.pdf

Habitats (On-site)

2.2.14 As identified in **Appendix 10.1**, vegetation communities identified within the Site include:

- Blanket bog and bog pool communities:
  - M1 *Sphagnum auriculatum* bog pool community;
  - M3 *Eriophorum angustifolium* bog pool community;
  - M17 *Scirpus cespitosus-Eriophorum vaginatum* blanket mire;
  - M19 *Calluna vulgaris-Eriophorum vaginatum* blanket mire; and
  - M25 *Molinia caerulea-Potentilla erecta* mire
- Heathland communities:
  - H10 *Calluna vulgaris-Erica cinerea* heath;
  - H12 *Calluna vulgaris-Vaccinium myrtillus* heath; and
  - M15 *Scirpus cespitosus-Erica tetralix* wet heath
- Upland flushes fens and swamps:
  - M4 *Carex rostrata-Sphagnum recurvum* mire;
  - M9 *Carex rostrata-Calliergon cuspidatum/giganteum* mire;
  - M10 *Carex dioica-Pinguicula vulgaris* mire;
  - M11 *Carex demissa-Saxifraga aizoides* mire;
  - M29 *Hypericum elodes-Potamogeton polygonifolius* soakway; and
  - S9 *Carex rostrata* swamp
- Grassland and other communities:
  - M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture;
  - U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland; and
  - U20 *Pteridium aquilinum-Galium saxatile* community

Habitats (Off-site)

2.2.1 As identified in **Figure 10.5.3**, vegetation communities identified within the Off-site Area A include:

- M17 *Scirpus cespitosus-Eriophorum vaginatum* blanket mire;
- M25 *Molinia caerulea-Potentilla erecta* mire
- M23 *Juncus effusus/acutiflorus-Galium palustre* rush-pasture;
- U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland; and
- U20 *Pteridium aquilinum-Galium saxatile* community

2.2.2 As identified in **Figure 10.5.4**, habitats identified within the Off-site Area B include:

- Broadleaved deciduous woodland;
- Mixed forestry plantation;
- Coniferous plantation; and
- Open ground/grassland/heath/mire mosaic

Peatland Resource

2.2.3 As stated in **Chapter 10: Ecology** and the Peat Management Plan (PMP) (**Appendix 9.2**), the Proposed Development has been designed to minimise impacts on the Site's peat resource, commensurate with the need to take into account other environmental effects and technical design constraints. However, much of the 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 Site will involve reuse of peat excavated to allow construction of the Proposed Development. In addition to which, the Site offers opportunities for additional enhancement of peat, over and above mitigation of the Proposed Development's effects, via restoration of historically drained areas of peat and encroachment of self-seeded conifer.

Terrestrial Species

2.2.4 The following species were confirmed as utilising habitats within the vicinity of the Site. Further details are provided in **Appendices 10.2 - 10.4**:

- **Bat Species** - The results of the static detectors found four species/genera of bats which were soprano pipistrelle, common pipistrelle, Myotis species and brown long-eared bats. Habitat within the Survey Area is moderate suitability for foraging, commuting and roosting bats including the linear habitats such as woodland edges and valleys intersected by watercourses and open habitats of bog, heath and grassland. Majority of the woodland within Fearnoch Forest that the access track passes through does not contain suitable roosting opportunities owed to the tree species and maturity.
- **Pine Marten -** FLS provided one record of a pine marten on the edge of Fearnoch Forest located approximately 250m east of the access track. The woodland surrounding the Site provides suitable foraging and commuting habitat for pine marten. Woodland with rocky outcrops throughout the area provide suitable denning opportunities for pine marten. Pine marten could also forage amongst the bog and heath habitats for species such as field vole.
- **Red Squirrel** - FLS provided two records of potential red squirrel dreys within Fearnoch Forest to the south of the Site within larch and spruce trees. The woodland surrounding the Site provides suitable foraging and commuting habitat for red squirrel.
- **Reptiles** - The heathland, degraded bog and woodland rides/edge as well as stone tracks and rock outcrop for basking provides suitable habitat for reptiles including common lizard, slow worm and adder. Deforested woodland brash piles and tussocks present within the degraded blanket bog and heathland provides hibernacula for reptiles.
- **Terrestrial invertebrates** - Butterfly Conservation provided records of moth and butterfly species within 2km of the Site boundary. No records were within the Site boundary itself. Species records within 2km included butterfly species chequered skipper, marsh fritillary and small pearl-bordered fritillary with moth species transparent burnet, forester and Rannoch brindled beauty. FLS provided 29 records of ant nests within 2km of the Site, which were all located within Fearnoch Forest. Seven of the records were located within 50m of the access track which were all confirmed as Scottish wood ants.
- **Marsh fritillary** is a notified species for the adjacent Clais Dhearg SSSI, which is generally found in open but sheltered habitat with abundant patches of devil's-bit scabious which is the caterpillar's sole foodplant. Records from NBN Atlas show confirmed presence within Clais Dhearg SSSI and Airds Park SSSI, with scattered records between these sites.

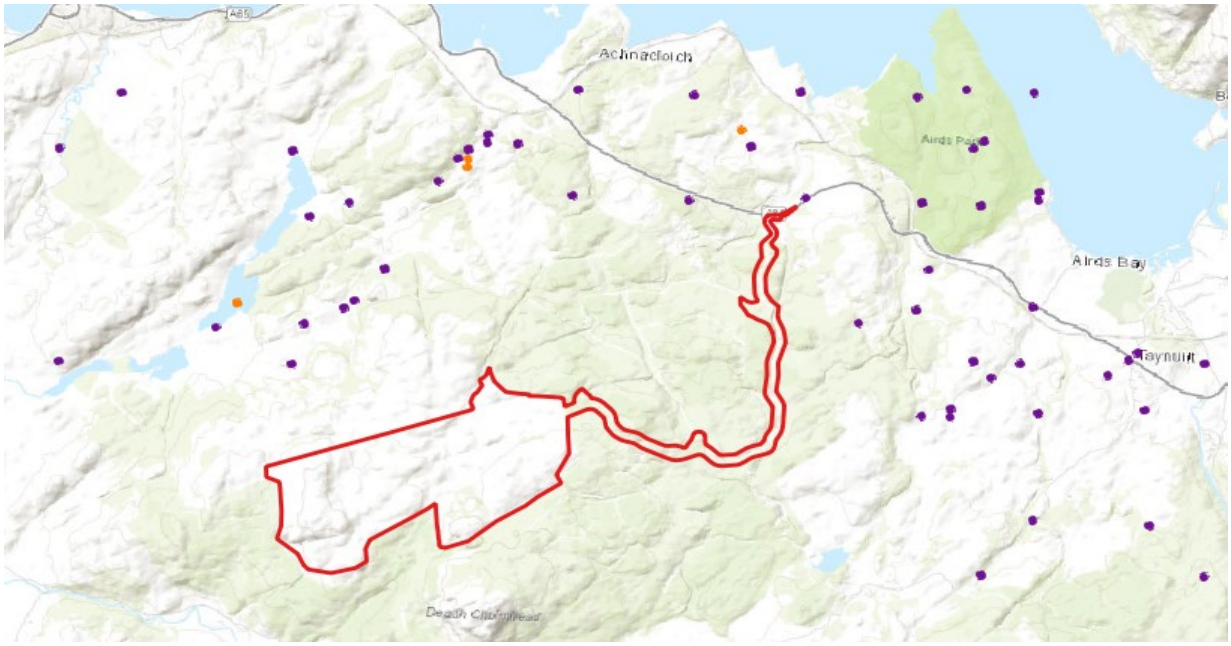

Plate 10.5.2: Marsh fritillary (purple) and Northern emerald (orange) (NBN Atlas)

Birds

2.2.5 A range of bird species were recorded utilising the Site or wider area (see **Chapter 11: Ornithology**). Species of special value included:

- **Black grouse** - Recorded on and around the Site throughout the year with one core lek and three other lower status, peripheral leks located in and around the Site. [SBL, BoCC Red list];
- **Hen harrier** - Regularly recorded over and around the Site with confirmed breeding in 2021 and 2022 [Annex I Birds Directive[10]; WCA Schedule 1, 1A; Scottish Biodiversity List (SBL); BoCC Red List]

2.2.6 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.

[10] EU Directive 2009/147/EC on the conservation of wild birds (codified version of Council Directive 79/409/EEC, as amended).

3 AIMS AND OBJECTIVES

3.1 MANAGEMENT AIMS

3.1.1 This oHMP has sought to identify on and off-site biodiversity enhancement opportunities as well as providing the management required to minimise the effects of the Proposed Development wherever possible.

3.1.2 The four main aims of this HMP are:

- Aim 1: To improve the condition of modified peatland communities within the Site;
- Aim 2: To improve the condition of off-site northern emerald habitat;
- Aim 3: To improve the condition off-site marsh fritillary habitat;
- Aim 4: To control deer numbers to improve condition of designated woodland, ensure protection of on-site peatland restoration areas and maintain woodland regeneration to supporting breeding hen harrier.

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 halt progressive peat drying and erosion through a programme of drain-blocking to raise the water table.
	1.2	To remove self-seeded Sitka spruce, which contributes to drying out of peatland habitats.
	1.3	To install peat bunds to further raise the water table, reduce vigour of purple moor-grass and reintroduction of Sphagnum
2	2.1	Halt the progressive drying out of northern emerald habitat by halting run-off
	2.2	Halt the progressive drying out of northern emerald habitat with removal of bog myrtle
3	3.1	Improve off-site marsh fritillary habitat with targeted bog myrtle removal
	3.2	Improve off-site marsh fritillary habitat by maintaining open areas of damp grassland with abundant devil's-bit scabious, controlled by grazing pressure at an appropriate level.
	3.3	Improve condition of Atlantic oak woodland and off-site marsh fritillary habitat with rhododendron removal
4	4.1	To monitor and control deer density at appropriate levels to ensure browse pressure is suitable to improve condition of proposed non-designated management areas, Atlantic oak woodland within nearby designated sites and areas of non-designated regenerating broadleaf woodland.

4 HABITAT MANAGEMENT MEASURES

4.1 MANAGEMENT UNITS

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

4.1.2 The proposed HMUs have been defined according to the different types of active management, as shown in Table 4.1 and illustrated in **Figure 10.5.2**. Management Units A and B are within the Site boundary; Management Units C, D, E and F are located off-site. The extent of the proposed deer management (Cruach Deer Management Area) is illustrated in **Figure 10.6.1** (**Appendix 10.6**).

Table 4.1 Proposed Management Units

Unit	Habitat	Size (Ha)	Management measure	Ecological features likely to benefit
A	Blanket bog	10	Ditch-blocking	Priority peatland communities
Bi		30	Removal of conifer regeneration and installation of surface peat bunds	
Bii		13		
C	Quaking bog/acid flush	0.4	Control run-off and bog myrtle control	Northern emerald
D	Marshy grassland and bracken	7	Bog myrtle and bracken control	Marsh fritillary
E	Marshy grassland, wet heath and blanket bog	25	Grazing management	Marsh fritillary
F	Broadleaf woodland, Marshy grassland, blanket bog	48	Rhododendron removal	Marsh fritillary, Atlantic oak woodlands
-	Broadleaf woodland, Marshy grassland, blanket bog	2,158	Deer management	Atlantic oak woodland, Priority peatland communities and hen harrier

4.2 PROPOSED MEASURES

4.2.1 The proposed restoration, enhancement and monitoring measures reflect the different requirements of the variable conditions on- and off-site, general land use and features to be enhanced. The following proposed measures are illustrated in **Figure 10.5.2, Figure 10.5.3** and **Figure 10.5.4** and are discussed in further detail:

- Peatland restoration - ditch-blocking and reprofiling (HMU A);

- Removal of self-seeded conifer regeneration on peatland (HMU Bi,ii);
- Halt drainage/run-off at historic northern emerald site (HMU C);
- Bog myrtle and bracken control within northern emerald site (HMU D);
- Cattle grazing management within marsh fritillary habitat (HMU E);
- Rhododendron control within open ground and woodland habitat (HMU F); and
- Deer management across a defined Cruach Deer Management Area (CDMA)

4.3 PEATLAND RESTORATION

4.3.1 The following peatland restoration proposals will provide a variety of benefits to the peatland habitats within the 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.

4.3.2 Suitable areas for peatland restoration comprise 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 restore the hydrology of peatland habitat across the Site.

4.3.3 Identified drained peatland and areas of encroaching conifer regeneration with opportunity for restoration have been mapped and are illustrated on **Figure 10.5.3**. These areas will deliver a ~ 8-10 ha of restored peatland, with the potential for recovery through rewetting and gradual revegetation and halting the negative drying effects of conifer growth on bog.

RESTORATION OF ARTIFICIAL DRAINS WITH PEAT DAMS (HMU A)

4.3.4 There is a network of historical field drains within HMA A (See Plate 10.5.3 and **Figure 10.5.3**), which will benefit from being dammed in order to raise the water table and prevent further damage to the hydrological regime of the peat, and improve the condition of blanket bog that has been detrimentally affected by historical drainage.

Plate 10.5.3: Example of historical on-site field drains on blanket bog (HMU A)

4.3.5 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.

4.3.6 Drain damming will be undertaken on peatland drains where peat depths are >0.5m and drain dimensions are suitable for damming.

4.3.7 A suitably experienced peatland ecologist will identify the number, location and spacing of peat dams required, which will take place in year 1 of the implementation of the final HMP following good practice guidelines detailed in Peatland Action Technical Compendium (NatureScot, 2023)[11].

4.3.8 The following best practice measures[12] will be applied:

- *Where possible peat dams should be created in conjunction with drain reprofiling. An alternative type of damming with reprofiling could be installation of wave dams and zipping, however these two methods have not yet been in use for long enough to assess whether they produce effective measures in the long term. Standard peat dams, with reprofiling, have been shown to work across the suite of Peatland ACTION projects over the last decade.*
- *Install peat dams where drains are at their narrowest. A general rule is that dams need to be spaced at 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. If the drain is aligned to the slope this is a significant risk. Where possible, construct dams with a bit of a longer spur on the downhill side 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.*
- *The dams must be formed so they span the full width of the oxidised cross section of the drain i.e., the zone that has sunken due to the drain on each side. On some sites this can be very pronounced and extend up to 2 m either side of the drain. If this is not blocked then water will still be trapped in this swale and will simply flow round each dam shoulder and continue down the drain route.*

[11] NatureScot (2022). Peatland ACTION - Technical Compendium. https://www.nature.scot/doc/peatland-action-technical-compendium

[12] https://www.nature.scot/doc/peatland-action-technical-compendium-restoration-7-stabilisation-and-revegetation

- *If there is a spoil line adjacent to the drain (typically on the downslope side) this must be broken through or squashed adjacent and immediately upstream of the dam to ensure water can disperse laterally. Spoil heaps are usually highly oxidised (becoming crumbly) so should not be used for creating dams or infilling when reprofiling.*
- *Donor material of turf required for the top of the dam should be gathered from a donor site that should be upstream and upslope of the dam. Turves should be taken from shallow borrow pits adjacent to (but not too close to) drains. Do not use vegetation from the drains themselves - leave this intact.*
- *Where flow rates are high and/or drains are greater than 1 m wide and/or deep, it may be worth considering more substantial "composite" dams (peat used with wood or plastic piling), or plastic piling dams.*
- *Ditch blocking work will occur between September and March to avoid disturbing breeding birds.*

Plate 10.5.4: Modified bog with rank heather and purple moor-grass coverage and encroaching sitka (HMU Bi)

INSTALLING SURFACE PEAT BUNDS AND SPHAGNUM PLUG PLANTING (HMU B)

4.3.9 In addition to restoring the hydrological processes of modified and drained bog across the Site by slowing or interrupting surface water flow through the blocking of channels (grips or drains), purple moor-grass and heather dominated blanket bog (Plate 10.5.4) within HMU Bi and Bii will be restored through a combination of surface bunding and sphagnum planting within a combined area of 43 ha.

4.3.10 Peat bunds would comprise an impermeable dam (See Plate 10.5.5) feature constructed on the bog surface, rather than within drains or grips (as above). They are intended to slow the flow of water over and through the modified bog, holding the water for longer and, in doing so, rewetting the peat and creating the conditions that support active blanket bog species assemblages, including sphagnum, which form in a low disturbance, low nutrient, low pH and low-flow (waterlogged) environment. It is

anticipated that by rewetting these modified bog habitats dominated by purple moor-grass and in some places heather, will reduce suitability for these species, which have a preference for drier conditions and increase the ability of sphagnum mosses to survive and compete.

4.3.11 Trials conducted by Moors for Future as part of the Partnership MoorLIFE 2020 project investigated whether bunding is an effective restoration technique showed that the construction of different bund-types has had little to no negative or harmful impact upon the blanket bog ecosystem or its designated features and found that scallop and fish-scale bund-types (See Plate 10.5.6) showed the largest amount of surface water pooling.

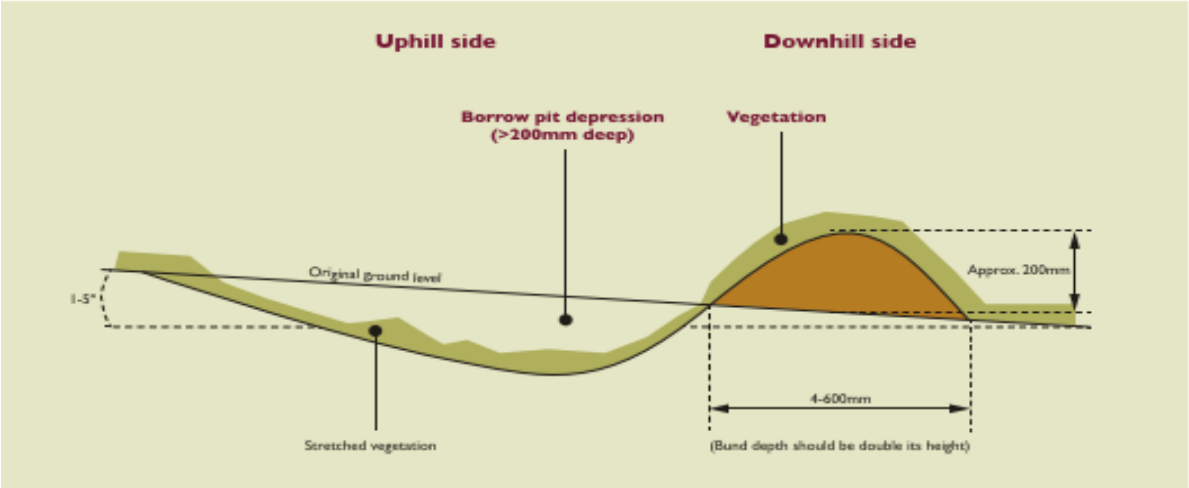

Plate 10.5.5 – Cross section of a peat bund (Moors for the Future Partnership, Sphagnum Practitioners Guide 2022)[13]

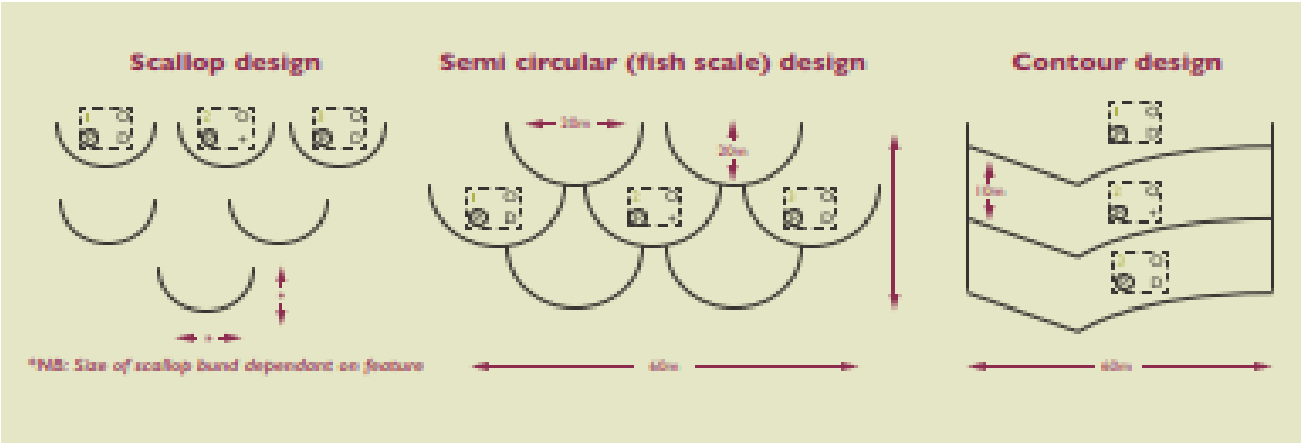

Plate 10.5.6 – Different bund types trialled by Moors for the Future Partnership (Sphagnum Practitioners Guide 2022)

[13] Moors for the Future Partnership (2022). Sphagnum Practitioners' Guide. A Toolkit for Sphagnum Reintroduction into Blanket Bog.

4.3.12 Bunds would best be constructed on the flatter areas within the HMU B, where slope angles are 5 degrees or less and where the deepest peat is found. Where slopes are shallower, water backing up behind the bund will cover a greater area, resulting in more area of peat being kept wetter for longer.

4.3.13 It is recommended that liaison with the local Peatland Action officer is undertaken in order to confirm that the technique of creating bunds is judged to be appropriate, safe and practical, as well as agreeing best practice measures[14], which would include the following:

- *In high surface water flow situations, it is better to use surface bunds with gaps, i.e., fish-scale or scallop bunds, so that water can pass through. Such bunds can be used on edges of raised bogs to stop surface water accumulating in areas where this isn't desired.*
- *Ensure areas of surface water are not too large; wave action over larger pools can cause erosion of the bunds. Rule of thumb is not to have cellular bunded cells too large (10 x 10 m). Ensure the design of pools through cell bunding avoids channelling water into the edges of e.g., raised bogs, consider the overall shape of the site in the design.*
- *Pools may need to be seeded with Sphagnum.*
- *Surface bunds should be well-capped with vegetation, which would then help to colonise the pools.*
- *Linear bunds should have "tie-backs" or finger bunds every 20-25 m minimum, these can be 5 m long.*
- *The final height of the surface peat bund is usually around 250-300 mm above the peat surface. Bear in mind that peat features will settle.*

4.3.14 Once small shallow pools have been created following bund installation, where sphagnum mosses can more readily colonise, some sphagnum planting is proposed in order to encourage growth. This would involve harvesting sphagnum from donor sites (within the Site itself, or close to the Site), or potentially use of cultivated sphagnum moss in the form of plug plants and spreading these in pools behind peat bunds or pushing small plugs of sphagnum into the wetter areas of bare peat.

SELF-SEEDED CONIFER REMOVAL

4.3.15 There is a high density of non-native conifers (chiefly Sitka spruce) in the vicinity of the existing forestry (within Fearnoch Forest) within the Site (See Plate 10.5.7), which is having a negative impact on the bog, contributing to the drying out of bog communities. Regenerating conifers will therefore be removed from a combined areas of 43 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.

[14] https://www.nature.scot/doc/peatland-action-technical-compendium-restoration-5-bunding-intervention

Plate 10.5.7: Extensive areas of encroaching sitka spruce on blanket bog within HMU Bi

4.4 NORTHERN EMERALD HABITAT RESTORATION (HMU C)

CONTROL OF DRAINAGE/RUN-OFF

4.4.1 To the northeast of the Clais Dheargh SSSI is an area of mire with extensive sphagnum mire and runnels with bog sedge (*Carex limosa),* common sedge *(C. nigra)* and star sedge (*C echinata*) amongst common cotton grass (*Eriophorum angustifolium*) (See Plate 10.5.8). This is an established breeding site for the northern emerald, part of the dragonfly assemblage protected feature, which is monitored periodically by dragonfly specialist Pat Batty.

4.4.2 Following a visit[15] on 13 June, according to Pat the site was found to be drier than on previous visits, with little water amongst the quaking sphagnum lawns and no open water in any runnels. The site was found to be draining in a north easterly direction before joining an unnamed watercourse. As a result of the gradual de-watering, this has led to extensive encroachment of bog myrtle (*Myrica gale*), which has resulted in the adverse modification of habitat condition which is unlikely to support this species without further intervention.

[15] A WSP ecologist was accompanied by a dragonfly specialist and NatureScot Officer to consider opporiuntiites for habitat restoration.

Plate 10.5.8: Easterly view over HMU C - quaking mire with Sphagnum lawns (lighter patches) and C. limosa, encroached by extensive bog myrtle coverage

4.4.3 Installation of peat bund (see Plate 10.5.9) at the edge of the bog as it drains down the slope (in a north easterly direction) will ensure that water draining from the bog is held back, enabling rewetting of the bog to occur and improve conditions for Northern emerald.

4.4.4 In doing so, it is expected that the hydrology of the site will improve, allowing run-off to be retained and bog pools and runnels to form naturally, providing the specific habitat requirements for this species.

Plate 10.5.9: HMU C and area affected by drainage (green stipple) with indicative path of drainage (blue dash) and location of proposed peat bund

4.4.5 The location of the identified peat bund or dam will be ground-truthed and appropriate measures and approach agreed between the tenant, landowner and suitably qualified ecologist and hydrologist. Proposals will also need to comply with the principles outlined in SEPA's Regulatory Guidance[16] and consultation with SEPA will be undertaken at the detailed design stage.

BOG MYRTLE CONTROL

4.4.6 In addition to addressing the drainage/run-off within HMU C will be the control of encroaching bog myrtle which is currently contributing further to the drying out of the bog/wetland communities.

4.4.7 Careful removal (cutting each plant at the base) by hand is proposed across the HMU, mindful of the sensitive bog communities present. Following an initial cut, further requirement for hand cuts (every two years) will be determined in conjunction with proposed northern emerald monitoring.

4.4.8 Following implementation of these measures, a programme of monitoring will be undertaken to establish successful outcomes, which would include the continued retention of water, raising the water table, improved habitat condition, and presence of northern emerald larvae.

4.4.9 Should monitoring determine that management objectives have not be successful, recommendations for further targeted works should be considered, including the possible creation of shallow bog pools comprising short 2m x 1m alternate sections, 6-10m in between should be explored in discussion with NatureScot.

4.5 MARSH FRITILLARY HABITAT RESTORATION (HMU D AND E)

BOG MYRTLE CONTROL AND REMOVAL OF LITTER LAYER

4.5.1 Opportunities to improve marsh fritillary (See Plate 10.5.13) habitat were identified within HMU D. Habitats within the management unit comprise a mosaic of largely purple moor-grass (*Molinia deschampsia*) dominated grassland and mire communities, importantly with regular presence of devil's-bit scabious (*Succissa pratensis*) the caterpillar's foodplant (See Plate 10.5.12).

4.5.2 In light of the presence of scabious across the management unit, mechanical cuts of bog myrtle (See Plate 10.5.10 and 10.5.11) and removal of the surrounding litter layer are proposed in order to open up the sward and allow for the gradual re-introduction of rough grazing by cattle. Due to the current density of the bog myrtle coverage, these parts of HMU D are no longer subject to grazing management. By controlling the growth of bog myrtle, this will open up the grassland sward allowing light grazing to occur which will be necessary to achieve an uneven patchwork of short and tall vegetation favoured by marsh fritillary.

4.5.3 Use of a Softrak 75 Low Ground Pressure vehicle (or equivalent) fitted with hammer flail harvester head and collector bin allowing 'cut and collect' of arisings would be used to remove the woody bog myrtle growth and leaf litter across the Site.

[16] SEPA (2023). SEPA's Regulatory Guidance on engineering and impounding activities affecting drainage ditches. January, 2023.

4.5.4 Habitat parcels would be cut in February/March avoiding the bird nesting season and the period of flowering devil's-bit scabious.

4.5.5 Proposals would be to trial cut parcels within the HMU D, removing the woody bog myrtle and allowing for better foraging for grazing cattle. Successful outcomes would be reviewed the following year after the first cut and potentially lead to more widespread bog myrtle cutting withing the HMU and the wider area.

Plate 10.5.10: Large extent of HMU D exhibiting extensive bog myrtle coverage over purple moor-grass grassland

Plate 10.5.11: Flushed slopes (Purple-moor grass mire/grassland) (HMU D) exhibiting bog myrtle coverage

Plate 10.5.12: Understorey of flushed slopes (HMU D) with abundant scabious encroached by bog myrtle

Plate 10.5.13: Marsh fritillary on bog myrtle on flushed slope (HMU D)

GRAZING MANAGEMENT

4.5.6 Following the control of bog myrtle and removal of leaf litter build-up within HMU D, it will be necessary for the landowner to re-introduce cattle grazing gradually in each of the parcels as they are opened up, avoiding too much grazing pressure from cattle or particularly sheep, which will eat the scabious plants and contribute to a more homogenous and tighter sward.

4.5.7 The aim will be to gradually open up the vegetation, create a diverse tussocky sward and encourage the spread and density of scabious and other smaller plants across the unit.

4.5.8 Currently, the landowner estimates that the stock present at any given moment is around 25 cows and calves and 100 sheep, which graze HMU E as part of a much larger block.

4.5.9 Because of natural variation in site conditions and grazing preferences of stock it might not be feasible to achieve ideal habitat conditions across the unit all of the time. However, annual monitoring will help determine the amount of ideal habitat present, which will inform decision-making around any required adjustments of stocking levels (of both cattle and sheep) and the grazing period to the site conditions during the year.

4.5.10 Evidence shows that marsh fritillary requires large areas of suitably managed, well-connected habitat in order to maintain a sustainable population[17]. This is because of the large fluctuations in numbers that occur from year to year due to weather, parasitism and food source availability. The species

[17] Bulman, Caroline R.; Wilson, Robert J.; Holt, Alison R.; Galvez Bravo, Lucia; Early, Regan I.; Warren, Martin S.; Thomas, Chris D. *Minimum viable metapopulation size, extinction debt, and the conservation of a declining species*. Ecological Applications, Vol. 17, No. 5, 07.2007, p. 1460-1473.

cannot survive long-term if the only habitats available are on small sites that are isolated from each other.

4.5.11 Through the restoration, monitoring and implementation of beneficial grazing conditions within HMU E, the HMP will seek to contribute to the maintenance and enhancement of existing marsh fritillary population and contribute to the maintenance of a well-connected habitat network, allowing for occasional dispersal between populations within Claish Dhearg SSSI, Ardnaskie Wood (non-designated) and Airds Park and Coille Nathais SSSI.

4.6 REMOVAL OF RHODODENDRON

4.6.1 HMU G is heavily encroached in places by stands (both dense/contiguous and scattered) of rhododendron (*Rhododendron ponticum)* (See Plate 10.5.14), and there are opportunities to control and prevent further spread. Further to the aim of improving habitat networks between existing marsh fritillary populations presented in Section 4.7, control of Rhododendron across HMU G will contribute to the maintenance of suitable grassland habitats and connecting corridors for this species.

4.6.2 The presence of invasive rhododendron is a major cause of designated native woodlands being classified as in unfavourable condition. Given its presence across parts of the Loch Etive Woods/Clais Dhearg SSSI, NatureScot recognise that the geographic spread of this species necessitates ongoing vigilance in order to remove plants before they become established.

Plate 10.5.14: Rhododendron invasion on the hillside between Ardnaskie and Achnacloich

4.6.3 Management of rhododendron within HMU G will be carried out in accordance with Forestry Commission Practice Guide Managing and Controlling Invasive Rhododendron[18] and a suitable biosecurity plan will be prepared and implemented to prevent seed source spread. A full survey will be carried out in order to identify areas where rhododendron is present. This will record the size and

[18] https://forestry.gov.scot/publications/93-managing-and-controlling-invasive-rhododendron

life stage of the plants and the abundance and allow parcels within the unit to be prioritised for clearance. Following on from this, a decision will be made on the best method of treatment following Forestry Commission guidance and presented in a detailed HMP with input from FLS and NatureScot who are responsible for control within the designated sites.

4.6.4 The preferred methods of removing rhododendron would initially be hand pulling seedlings and cutting & stump treatment. However, as with most rhododendron control there will inevitably be regrowth from cut stumps and in such instances, foliar regrowth application will require to be carried out. Overall foliar application will only be applied where there are small isolated individual bushes.

4.6.5 Whichever method is determined most appropriate to be implemented, a single operation will not be 100% effective in removing rhododendron. There will be re-growth from cut stumps and without control of bushes outside of HMU G, there is likely to be further immigration of seed. Therefore follow up monitoring will be undertaken a minimum of every 5 years and treatment as required will be carried out over the duration of the HMP.

Plate 10.5.15: Marsh fritillary recorded on the wing within HMU G

4.7 DEER MANAGEMENT

4.7.1 A Deer Management Plan (DMP) (**Appendix 10.6**) has been prepared in order to contribute to ongoing deer management efforts in the area, to ensure that the condition of broadleaf woodland features of designated sites, as well as maintaining mosaics of scattered woody regeneration to ensure ongoing maintenance of habitat suitability for hen harrier over the plan period.

4.7.2 The DMP includes measures to address existing adverse pressures on the Loch Etive Woods SAC, specifically the Clais Dhearg SSSI component, as well as ensuring that proposed habitat management units are not subject to similar impacts, whilst taking into account deer management on neighbouring land to ensure the objectives are complementary, particularly with respect to the adjacent Fearnoch Forest, within the Taynuilt LMP. The implementation of this plan should ultimately provide biodiversity enhancements within both designated and non-designated habitats, as a result of the reduction of grazing pressure, cognisant of the requirement of NPF4, Policy 3 that "*development proposals will contribute to the enhancement of biodiversity, including where relevant, restoring degraded habitats*".

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 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 & technical input. • Integration of management plan outputs with Taynuilt LMP • Collaboration on deer control
ABC	• Advice, information & technical input. • Integration of management plan outputs with Local Biodiversity Action Plan (LBAP).
NatureScot	• Advice, information, monitoring & technical input. • Licensing.
RSPB	• Advice, information & technical input on habitat restoration & species requirements. • Strategic linkage with other Wind Farm HMP objectives.
Landowners and tenant farmers	• Collaboration on deer control and grazing management • Implementation of grazing reduction
Odanata specialist	• Advice regarding specifications of habitat management • Dragonfly monitoring

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.

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 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 be analysed and prepared by an appropriately qualified ecologist (or ecologists) and issued to the Steering Group. Monitoring results will also 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 The monitoring prescriptions associated with the activities described in Sections 4.3 - 4.8 are summarised in Table 5.2.

5.4.4 Prior to commencement it is recommended that targeted NVC surveys of the two offsite areas (A and B) are undertaken in order to provide an accurate baseline of communities and conditions prior to implementation of management measures.

Table 5.2 Indicative Scope of Monitoring and Target Outcomes

	Objective	Scope of monitoring prescriptions	Target
1.1	To halt progressive peat drying and erosion through a programme of drain-blocking to raise the water table.	Following completion of ditch blocking works, installation of peat bunds, monitoring will include key parameters as set out within Common Standards Monitoring Guidance for Upland Habitats (JNCC, 2009)[19] and Peatland Action Monitoring Strategy 2023-2030[20]. Dipwells will be installed at a range of monitoring points where ditch-blocking and bund installation is proposed. The number and location of such monitoring points will be determined at detailed design stage. Monitoring of vegetation establishment will be undertaken at all identified locations for ditch-blocking, bunding and sphagnum planting and self-seeded conifer regeneration. Monitoring will be carried out for at least one year prior to ditch-blocking, peat bund installation works and will be carried out in the year following these works and for the first five years following installation. 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. 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. 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.
1.2	To remove self-seeded sitka spruce, which contributes to drying out of peatland habitats.		
1.3	To install peat bunds to further raise the water table, reduce vigour of purple moor-grass and reintroduction of Sphagnum		

[19] 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

[20] https://www.nature.scot/doc/peatland-action-monitoring-strategy

	Objective	Scope of monitoring prescriptions	Target
			Annual progress reports will be produced for the first 5 years post installation, 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 or identified stakeholders, including Peatland Action. The frequency of progress updates/monitoring thereafter will be determined at a later stage.
2.1	Halt the progressive drying out of Northern Emerald habitat by stopping run-off	Dipwells will be installed at a range of monitoring points within HMU C. The number and location of such monitoring points will be determined at detailed design stage. Monitoring will be carried out prior to the installation of the peat bund and will continue for at least five years hence.	Core monitoring objective to establish whether restoration works are resulting in conditions favourable to Northern emerald. Likely targets will relate initially to the rewetting/raising of the water table within the HMU, the reduction and continued suppression of bog myrtle in the HMU and the gradual presence of features and conditions likely to support the re-colonisation of northern emerald.
2.2	Halt the progressive drying out of Northern Emerald habitat with removal of bog myrtle	Monitoring of vegetation establishment, including the presence of sphagnum, bog pools and runnels will be undertaken annually following removal of bog myrtle.	
		Alongside the vegetation surveys, two survey visits to establish northern emerald presence will be undertaken annually (over years 1 – 5, 7 and 10) following methods detailed in Batty (2014)[21].	

[21] Batty, P.(2014).*Site Condition Monitoring for the northern emerald dragonfly at Meall na Samhna SSSI*. Scottish Natural Heritage Commissioned Report No. 709.

	Objective	Scope of monitoring prescriptions	Target
		A transect survey will be undertaken for adult dragonflies within and around HMU C; and larvae will be counted within the bog pools. Additional environmental data to be collected will include: water pH, temperature and depth, Sphagnum cover, depth and species, nearest woodland type and distance and the site elevation. • Visit 1 will be undertaken in June to coincide with the emergence period of the northern emerald to maximise the possibility of detecting larvae and exuviae; • Visit 2 will be undertaken in July in good flight conditions after emergence of the species had been noted elsewhere.	
3.1	Improve off-site marsh fritillary habitat with targeted bog myrtle control	Marsh fritillary larval web surveys will be undertaken in the season prior to marsh fritillary habitat restoration following UK Butterfly Monitoring Scheme (UKBMS) methodology[22], within HMUs D, E and G when larval webs are evident in late Summer (mid to late August up to late September). Larval web surveys will be undertaken for the first five years of the plan period and thereafter every three years for the duration of the plan.	Core monitoring objective to establish whether restoration works are resulting in conditions favourable to marsh fritillary. Likely targets will relate initially to the reduction and continued suppression of bog myrtle and rhododendron within the target HMUs, the extent of devil's bit scabious, the condition of the grassland sward in terms of habitat suitability for

[22] https://ukbms.org/sites/default/files/downloads/UKBMS%20Ng2%20-%20Marsh%20Frit%20Webs%20guidance%20notes.pdf

	Objective	Scope of monitoring prescriptions	Target
3.2	Improve off-site marsh fritillary habitat by maintaining open areas of damp grassland with abundant devil's-bit scabious, controlled by grazing pressure at an appropriate level.	In conjunction with the larval web surveys, habitat condition surveys will be undertaken, in order to 1.) establish the successful control/suppression of bog myrtle and/or rhododendron within the HMUs; and 2.) the establishment of suitable habitat, chiefly a patchwork of short vegetation and long, tussocky grasses (12-25cm) where presence of scabious plants and other wildflowers are plentiful.	marsh fritillary and the presence of larval webs within the target HMUs.
3.3	Improve condition of Atlantic oak woodland and off-site marsh fritillary habitat with rhododendron removal		
4.1	To monitor and control deer density at appropriate levels to ensure browse pressure is suitable to improve condition of proposed non-designated management areas and designated sites within the vicinity of the Site	Monitoring specifications related to deer management are detailed in **Appendix 10.6** and summarised below: • Up to date deer population density will be obtained for the proposed Cruach Deer Management Area (CDMA) through a combination of open range counts[23] covering open areas of bog/moorland and other open ground, with dung counts[24] preferable for estimating deer populations in woodland. • Woodland herbivore impact assessment surveys will be undertaken following NatureScot methodology (2023)[25], will be undertaken within the CDMA • Baseline habitat condition would be established at sampling points within the peatland restoration areas and the condition of the sampling points would	Core monitoring objective to establish whether deer management is resulting in conditions favourable to regenerating broadleaf woodland across the CDMA. Monitoring of deer movements and counts would be used to set annual cull targets within the CDMA, which will be set to maintain the designated sites and habitat management units in favourable condition and allow for low level maintenance of sporting activities

[23] https://bestpracticeguides.org.uk/planning/open-range-counting/
[24] https://bestpracticeguides.org.uk/planning/dung-counting/
[25] NatureScot (2023). The Woodland Herbivore Impact Assessment Method User Guide. Version 5th April, 2023.

	Objective	Scope of monitoring prescriptions	Target
		continue to be monitored annually by independent ecological professionals during construction of the Proposed Development and every five years over the plan period, following the completion of construction.	

FIGURES

110 Queen Street
Glasgow
G1 3BX

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