

Outline Biodiversity Enhancement and Habitat Management Plan for Beinn Ghlas Wind Farm Repowering Project



Alba Ecology Ltd.



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July 2025

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INTRODUCTION

The operational Beinn Ghlas Wind Farm is owned by Beaufort Wind Ltd which is a wholly owned subsidiary of Nadara Limited (hereafter Nadara). Beinn Ghlas Wind Farm is located south-west of Taynuilt in Argyll, Scotland. It comprises of 14 wind turbines and has been operational since May 1999. In June 2022, planning consent was secured to operate the existing wind farm for an additional ten years to August 2033.

A repowering project has also been proposed at Beinn Ghlas (the 'Proposed Development') by Nadara. Alba Ecology Ltd. was commissioned to produce an Outline Biodiversity Enhancement and Habitat Management Plan (OBE-HMP) for the Proposed Development in 2022.

The Ecology and Ornithological chapters of the Environmental Impact Assessment Report (EIAR) predict no likely significant effects on potentially important ecological or ornithological after embedded mitigation. Therefore, the elements within this OBE-HMP are largely considered enhancement measures as defined in the EIA Regulations and best practice EIA guidance. Where elements are defined as compensation/offsetting, these are clearly identified in the relevant sections.

Policy and guidance set the context that developments should not just try to avoid causing likely significant effects but also seek to provide net benefits or enhancements for important biodiversity over and above design requirements for avoidance, minimisation or compensation (e.g. CIEEM, 2018; 2019). The Scottish Government has three important policy documents related to renewable energy planning, the climate crisis and biodiversity crisis in Scotland:

- National Planning Framework 4 (NPF4, 2023);
- Tackling the Nature Emergency - Scottish Biodiversity Strategy to 2045 (Scottish Government, 2024) and
- Onshore Wind Policy Statement (Scottish Government, 2022).

In these documents, the Scottish Government recognises the need to jointly tackle the climate emergency and the nature crises throughout society. This OBE-HMP demonstrates how the Proposed Development complies with the policy documents and how it will practically and directly contribute to the delivery of these Scottish Government priorities.

The Scottish Biodiversity Strategy (2024) aims to tackle the twin crises of Climate Change and Nature Emergency. It's vision encompasses three main objectives: *(i) By 2045, Scotland will have restored and regenerated biodiversity across our land, freshwater and seas; (ii) Our natural environment, our habitats, ecosystems and species, will be diverse, thriving, resilient and adapting to climate change; and (iii) Regenerated biodiversity will drive a sustainable economy and support thriving communities, and people will play their part in the stewardship of nature for future generations.*

Scotland's Onshore Wind Policy Statement sets out Scottish Government's ambition to deploy 20 GW of onshore wind by 2030, as well as details on the formation of an Onshore Wind Strategic Leadership Group, tasked with taking forward the aspirations of the Statement and development of the Onshore Wind Sector Deal. In Section 3 of this Policy Statement, the Scottish Government sets out its commitment to ensuring Scotland's citizens have access to

affordable, low carbon and renewable energy whilst tackling the climate and nature crises in tandem. Peat and Carbon Rich Soils, Forestry and Biodiversity are all considered in this section of the Statement.

NPF4 was adopted by Scottish Ministers in February 2023. It is a long-term plan for Scotland that guides spatial development, sets out national planning policies, designates national developments and highlights regional spatial priorities. It includes a range of policies that will contribute to delivering Scotland's commitment to net zero emissions by 2045 and tackling the climate and biodiversity crises.

Key NPF4 policies that this OBE-HMP would comply with, if fully implemented, include:

- Policy 1 Tackling the climate and nature crises,
- Policy 3 Biodiversity,
- Policy 5 Soils, and
- Policy 6 Forestry, woodlands and trees.

This OBE-HMP will be developed further through consultation with relevant statutory agencies and interested organisations (e.g. NatureScot (NS), Royal Society for the Protection of Birds (RSPB) Scotland and Argyll and Bute Council) and the landowner and agricultural tenants to provide more detail should the Proposed Development be approved. Until then, this outline OBE-HMP provides a summary of the aims, methods and scope of planned OBE-HMP works in relation to the Proposed Development.

The Beinn Ghlas OBE-HMP is supported by the following documents:

- Technical Appendix (TA) 6.3: Beinn Ghlas Wind Farm Repowering Peatland Condition Assessment (PCA) Survey Report;
- TA 6.11: Beinn Ghlas Wind Farm Repowering OBE-HMP Walkover Survey Report November 2023; and
- TA 6.15: Peatland Habitat and Restoration Opportunities for Beinn Ghlas Wind Farm Repowering.

AIMS & OBJECTIVES

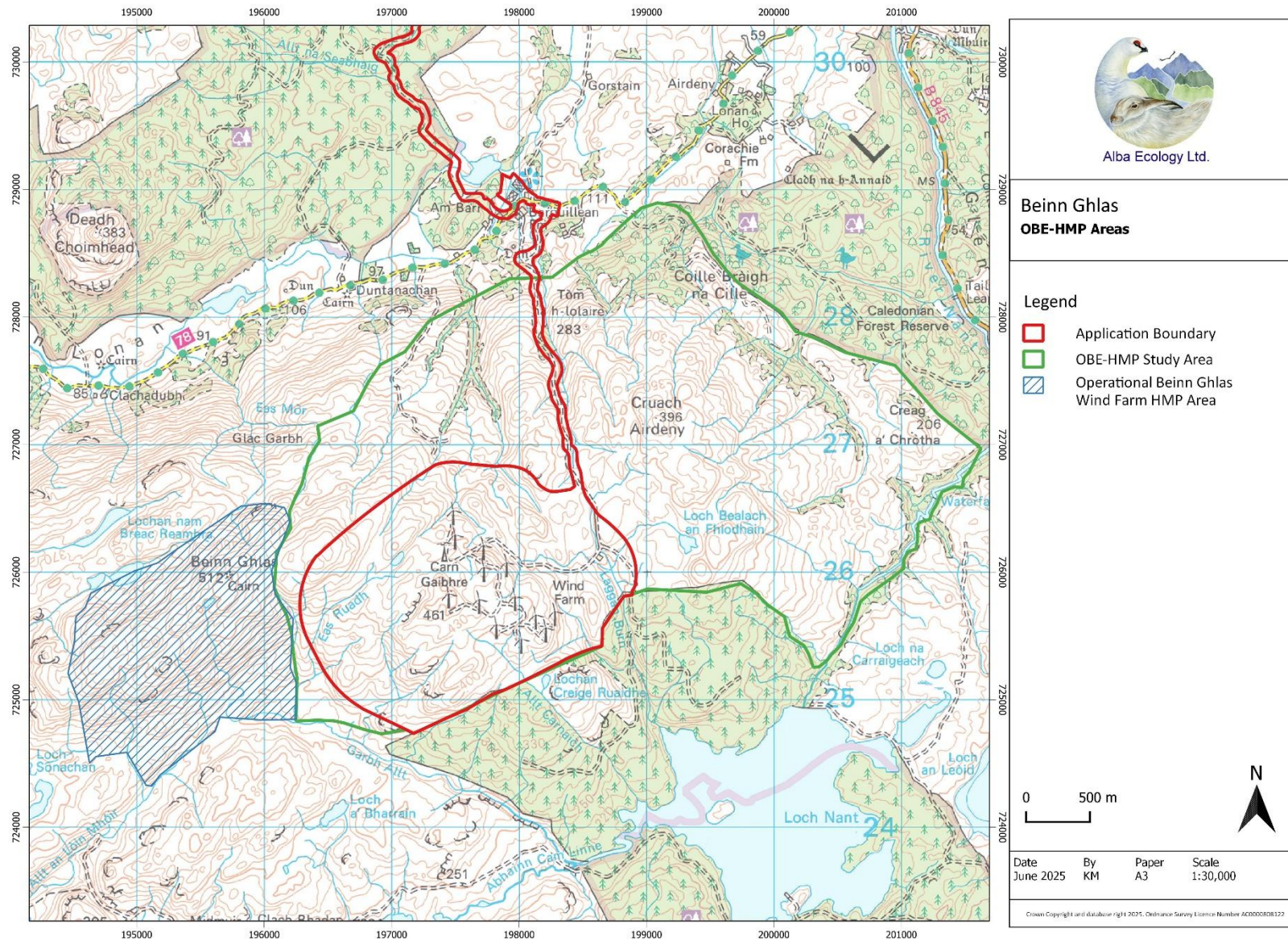
As part of the EIAR, Ecology and Ornithology chapters have been written covering both disciplines. As part of that work, a series of ecological and ornithological mitigation and enhancement measures have been recommended and the purpose of this document is to outline what these are, where they are planned and how they will be delivered within the OBE-HMP Study Area. If the Proposed Development is approved, then it is recommended that delivery of this OBE-HMP is secured through a planning condition.

The overall aim of this OBE-HMP is to conserve, enhance and restore important habitats and associated species within the Beinn Ghlas OBE-HMP Study Area (Figure 1). Please note the Existing HMP Area will continue to be an HMP area for the Proposed Development (Figure 1). Given the generality of this overall aim, it has been subdivided into the seven discrete 'objectives' for which particular work packages and methods have been identified.

- Objective 1: Reduce grazing and browsing pressure;
- Objective 2: Peatland restoration;
- Objective 3: Creating and strengthening nature networks;
- Objective 4: Pond/lochan creation;
- Objective 5: Targeted priority species action;
- Objective 6: White-tailed eagle fatality monitoring; and
- Objective 7: Operational Carcass Recovery Scheme

All potential OBE-HMP sites will be surveyed prior to any work commencing to ensure that existing potentially important biodiversity is protected and considered when developing and implementing the finalised and agreed OBE-HMP, whilst also establishing a '*before management baseline*'. Most proposed OBE-HMP works should ideally be undertaken between September and March (inclusive) to prevent the possibility of disturbing/harming breeding birds. However, if works do take place outside this period, then measures will be put in place to ensure that no significant disturbance of sensitive/legally protected species occurs and compliance with legal obligations towards nesting birds etc. Known significant cultural heritage assets will be buffered and avoided by any OBE-HMP works as advised by the cultural heritage chapter.

Figure 1: The Application Boundary, Operational Beinn Ghlas Wind Farm HMP Area and OBE-HMP Study Area



Objective 1: Reduction in grazing and browsing pressure

Appropriate grazing management helps to maintain peatland habitats in good condition. Grazing is known to contribute to bog habitats by helping the maintenance of the open character and providing a diverse wetland surface in terms of structure and species composition. Heavy grazing can result in the dominance of e.g. tussock forming species such as purple moor-grass and hare's-tail cottongrass and can reduce overall heather cover and the abundance of other species. To allow for effective peatland regeneration and restoration to occur on a site, low grazing densities are likely to be required over a long-time period, i.e. for the life-time of the Proposed Development.



Photo 1: Heather is restricted to steepest of slopes within the Study Area due to grazing pressure. There were c. 20 red deer in the far distance of this photo, which was within the fenced area in the west of the Operational Beinn Ghlas Wind Farm HMP Area.

Historic and current impacts of grazing are evident across the peatland habitats at Beinn Ghlas (see TA 7.3). This has been recognised by the land managers and a change in grazing regime is has recently taken place by the land managers from largely sheep dominated grazing (there were currently 575 ewes, M Charlton, *pers comm.*) to cattle grazing with removal of grazing pressure through the winter months as cattle will be brought down from hills in winter months. This change is currently being undertaken by the land managers and is not part of the Application or OBE-HMP but is useful background management context.

Nevertheless, the impact of deer grazing across the Study Area is also clearly evident and particularly notable in the west of the site where stock has been excluded as part of the operational Beinn Ghlas Wind Farm HMP (e.g. Photo 1 - blue hatched area in Figure 1) and around woodland where browsing has resulted in there being little to no natural regeneration of tree species. The OBE-HMP Study Area is not part of a Deer Management Group and there is currently no targeted deer management within it.

For effective habitat management to occur, practical deer management will need to take place. The management of deer will reduce grazing pressure across the Study Area, which will support the growth of species such as heather and will be an important factor influencing other

OBE-HMP objectives, particularly peatland restoration (Objective 2) and nature networks (Objective 3).

In the east of the OBE-HMP Study Area there is high quality oak and birch woodland, set among hill slopes of wet heath and marshy grassland. There are remnant patches of woodland particularly riparian woodland on these hillslopes. A reduction in grazing pressure will allow natural expansion of birch and oak woodland.

As such, a reduction in grazing pressure across the OBE-HMP Study Area will comply with NPF4 Policy 3, to conserve, restore and enhance biodiversity ... so they are in a demonstrably better state than without intervention as well as being in keeping with a recent Scottish Government consultation paper (2023) which states *“Substantially reduce deer densities across our landscapes in parallel with ensuring sustainable management of grazing by sheep to improve overall ecosystem health. Reducing herbivore impacts is one of the biggest levers we have in Scotland for reducing biodiversity loss and enabling regeneration at scale. It is a pre-requisite for many of our nature restoration activities including peatland and woodland restoration.”*

The two main management techniques to reduce the detrimental impacts of deer on habitats are: (i) fencing, and (ii) culling.

Fencing has been proposed around all turbine locations (Figure 2). The orientation and layout of the fence will be subject to further discussion with the tenant farmer. Deer and stock-proof fencing around the turbine locations would prevent carrion attracting white tailed eagles into the fenced area and therefore reduce their potential for colliding with the turbines. In addition, the stock/deer fencing will exclude deer from the blanket bog and heathland habitats in an area c. 146.219 ha thereby allowing habitats to naturally recover.

Some cattle grazing is likely to be undertaken within the fenced area. A suitable grazing management plan will be agreed with relevant stakeholders, including the landowner, which would enable the blanket bog vegetation in the fenced areas to be suitably restored/managed. As there are areas of peatland restoration within the fenced area, an establishment period for the peatland restoration would be required, i.e. low grazing levels for the first 2-5 years. The condition of the blanket bog would be closely monitored for the 2-5 years throughout lifetime of the wind farm. The stocking density would be based on the vegetation and adjusted as required.

Fencing is not considered a suitable option over the wider OBE-HMP Study Area due to knock-on effects on adjacent unfenced habitats and due to the large size of the OBE-HMP Study Area. Consequently, deer management across the estate including in the deer fenced areas, in the form of culling and monitoring should be undertaken as part of the OBE-HMP.

The guidance for stock density on open bogs is 0.02 livestock units (LU)/ha/yr or 2 LU per 100ha/yr (Peatland Action, 2014). One LU is equivalent of one cow, 0.15 ewes (Peatland Action, 2014). One red deer is considered to be approximately 0.3 LU (Scottish Government, 2015). However, the actual number of deer and stock a particular site can sustain without damage will depend on a range of factors including habitats, topography, soils, altitude, climate and other land uses in the area.

The OBE-HMP aims to:

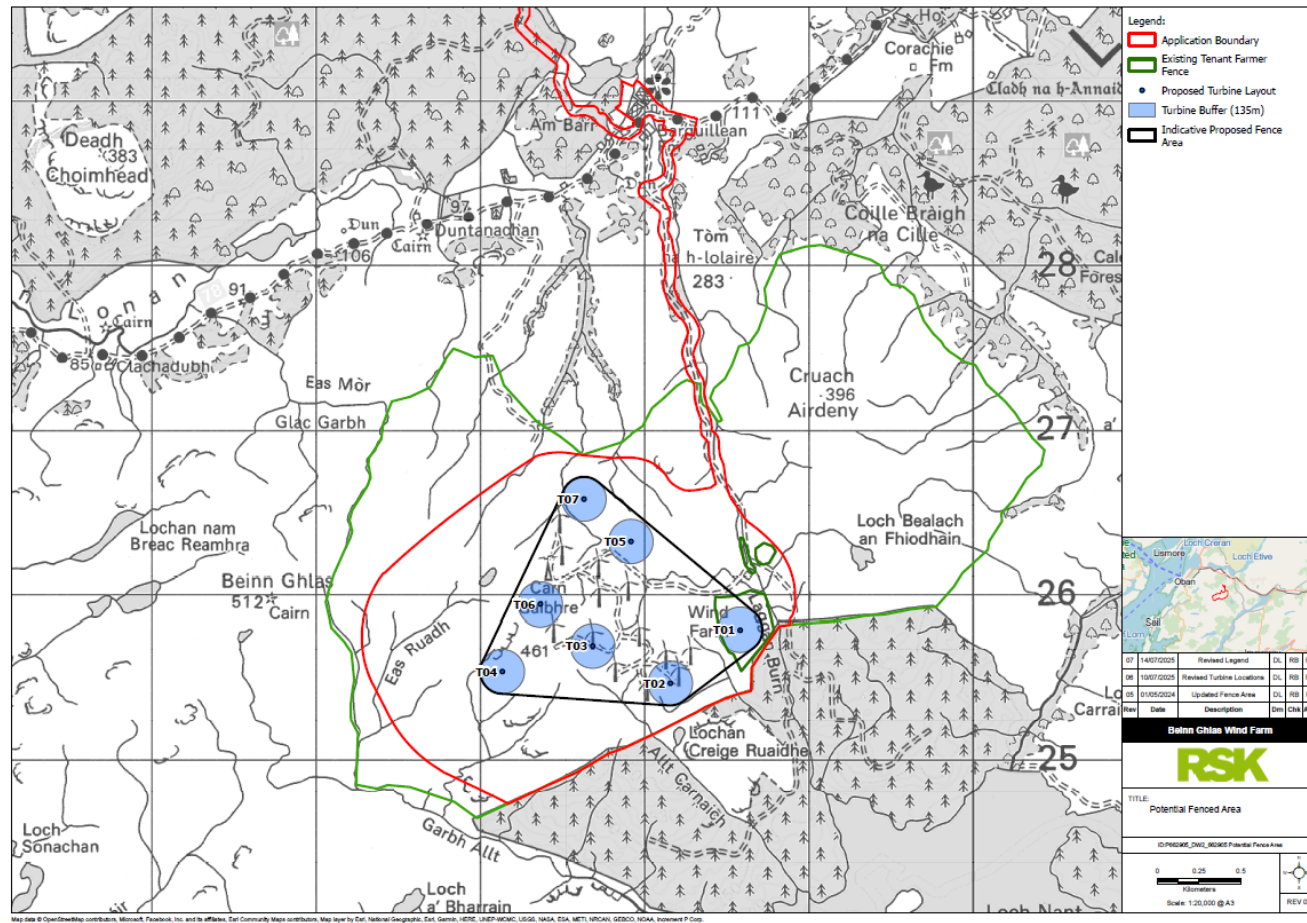
- Exclude deer and stock grazing around the turbine locations to prevent carrion attracting white tailed eagles.
- Reduce deer density across the OBE-HMP Study Area to a relatively low level for the first 5 years to allow peatland restoration (Objective 2) and riparian planting (Objective 3) to establish with regular monitoring of the condition of the vegetation to inform future deer management.

The Applicant is willing to fund and implement an effective deer management of Study Area for the lifetime of the Proposed Development (likely to be c. 35 years, dependent upon planning conditions if the application is successful). This will include establishing deer numbers, appropriate culling regimes and monitoring the vegetation in consultation with relevant land managers and agencies (e.g. NS and potentially a future Deer Management Group). The condition of the blanket bog would be closely monitored throughout the lifetime of the Proposed Development and the deer management adjusted accordingly¹.

It is worth noting that The Scottish Government has a Programme for Government commitment to “*modernise deer management, implementing the recommendations of the Deer Management Working Group*” and (at the time of writing) is consulting on substantial changes to the management of deer across Scotland. Planned OBE-HMP changes to deer management within the Study Area will conform to the Scottish Government’s emerging recommendations on sustainable deer management.

¹In accordance with best practice, assessment of success will be based on suitable habitat response (recovery), not simply numeric culling targets.

Figure 2: The Proposed Fenced Area around all Proposed Turbine Locations



Objective 2: Peatland restoration

Peatland habitats are important for a number of reasons, including their potential for storing and capturing carbon. Peatlands are recognised as globally important providers of ecosystem services, including for provision of food and fibre, water supply, climate regulation, biodiversity, recreation and cultural heritage. As such, priority peatland habitats are referred to in Scottish Planning Policy (SPP, 2014) and more recently in the Scottish Biodiversity Strategy (2024), the Onshore Wind Policy Statement (2022) and NPF4. Policy 5 of NPF4 requires development that impacts upon peatland habitats to include peatland restoration proposals.

Priority peatland habitats, as referred to in NPF4, comprise blanket bog, lowland raised bog, lowland fens, and part of the upland flushes, fens and swamps (as listed in the UK Biodiversity Action Plan). The OBE-HMP Study Area contains complex terrain with peatland habitats, namely blanket bog, in valley bases and on shallow slopes (TA 7.3 and 7.11).

Chapter 6 Ecology assessed that, with the full implementation of proposed mitigation measures including avoidance and minimisation plus the full implementation of the Peat Management Plan (PMP), Construction Environmental Management Plan (CEMP), pollution control measures, there were no likely significant negative or adverse effects predicted for any potentially important ecological receptors including peatland habitats.

However, in light of NS guidance which recommends compensation/offset at a 1:10 ratio (lost:restored) (regardless as to whether effects are predicted to be significant or not), and given the condition of the blanket bog, the importance of blanket bog and peatland habitats in regard to carbon storage and carbon sequestration and the current climate emergency, peatland restoration has been included as part of the Proposed Development as compensation for non-significant effects.

All the blanket bog habitat within the OBE-HMP Study Area had been subject to some degree of modification e.g. through climate change and nitrogen deposition, historic burning and drainage and extensive grazing pressure. The condition of the blanket bog habitat was variable across the Study Area and was on a continuum from very wet bog exhibiting characteristics of Near-Natural blanket bog to highly Modified and Actively Eroding areas (e.g. Photo 2). Additionally, non-native sitka spruce tree seedling/saplings were noted in peatland habitat occasionally across the OBE-HMP Study Area.



Photo 2: Example of an Actively Eroding feature within the OBE-HMP Study Area which was c. 3m high with an expanse of bare peat @ NM 95809 26074.

The areas identified as important blanket bog habitats have been, wherever possible, avoided by the design layout, particularly those areas that are considered to be in Near-Natural condition.

There is potential for peatland restoration within the OBE-HMP Study Area, over and above reduced grazing pressure, including drainage ditch blocking and restoration of all areas that were in an Actively Eroding condition.

In the OBE-HMP Study Area (including details from both TA 6.3 and TA 6.11) there was a total of:

- A total of c. 7,940m drainage ditches that are suitable for infilling resulting in an area of c. 43ha of surrounding habitat that will be re-wetted; and
- A total of c. 6.2ha of Actively Eroding blanket bog has been identified and is suitable for infilling and/or reprofiled resulting in an additional area of c. 24.4ha of surrounding habitat that will be re-wetted.

However, a total of 0.03ha of Actively Eroding bog is predicted to be lost by the permanent land-take (Technical Appendix 7.12) with a total loss of Actively Eroding bog at construction of 0.132. Removing these, and the associated 3m buffer resulted in a total of c. 6.1ha of Actively Eroding blanket bog suitable for restoration and 22.6ha of surrounding habitat that will be re-wetted.

This gives a total of c. 71.7 ha of peatland restoration potential.



Photo 3: Example of an old drain suitable for blocking in the OBE-HMP Study Area @ NM 99110 26851. Water could be heard flowing in the drain underneath the surficial vegetation.

Therefore, planned restoration work would include restoration of at least 71.7 ha which is a 9.1x multiplier of the total predicted loss of blanket bog habitat providing offset/compensation for the predicted non-significant effects blanket bog habitat.

The areas intended for peatland restoration exceeds the area of predicted habitat loss (7.8 ha loss compared to c. 71.7 ha proposed peatland restoration. However, it does not quite meet the 1:10 ratio plus 10 % of peatland restoration that is recommended by NatureScot (2023). This is explored further in **Technical Appendix 6.15**. It should be noted that NS guidance (2023) is likely to change/be replaced as a result of the Peat Expert Advisory Group (PEAG).

Blocking the drainage ditches and blocking and reprofiling erosion features would help to re-wet the peatland habitat and help to establish a more natural drainage pattern. This would benefit not only the vegetation but the numerous species that depend upon it such as invertebrates and wading birds. Effective peatland restoration should be explored as part of the OBE-HMP should the Proposed Development proceed.

The Actively Eroding will be included in the Peatland Management Plan for restoration. It will be important that it is avoided by construction wherever possible and carefully restored, ensuring no additional drainage occurs and potentially using track that goes through/near Actively Eroding blanket bog as a hydrological barrier to prevent water. This restoration should be informed/overseen by a qualified and experienced hydrologist.

Embedded mitigation includes, where possible, preserving the acrotelm from the habitat that is lost and laying it over the top of the areas to be reinstated (e.g. over the 'cut and fill'). This will provide a native, local provenance seed source as well as viable root matter for the areas being reinstated. At this specific location it should be completed as soon as possible after the removal of the acrotelm.

The OBE-HMP aims to:

- Blocking of any drainage ditches and furrows within the OBE-HMP Study Area to restore the natural drainage pattern of the peatland and encourage revegetation and improve the biodiversity of the area.
- Restore the areas identified as Actively Eroding within the OBE-HMP Study Area to re-establish a more natural drainage pattern of the peatland, encourage revegetation, and improve overall biodiversity; and
- The removal of non-native regenerating sitka spruce tree seedlings from the OBE-HMP Study Area.

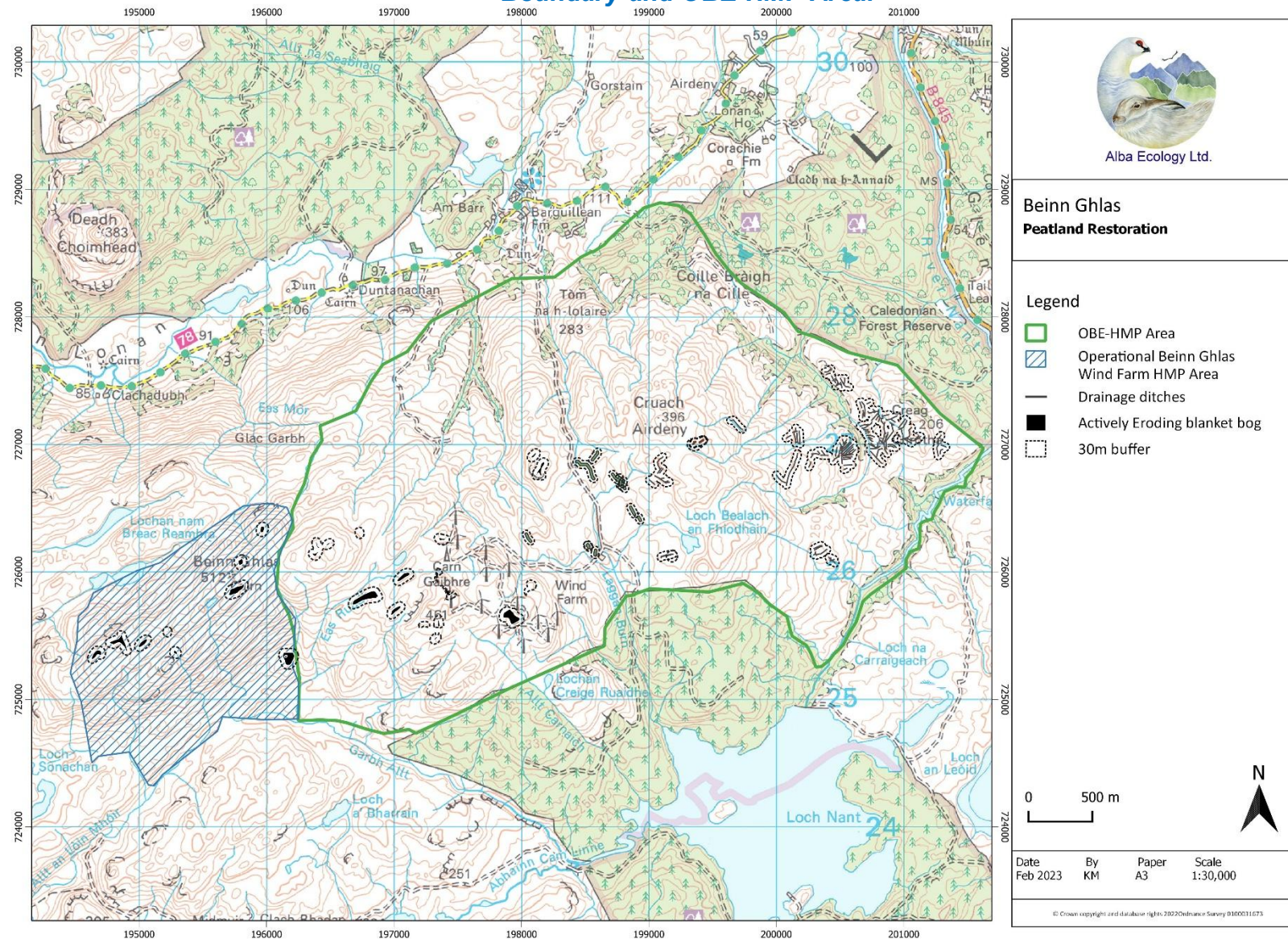
The Applicant is willing to fund and implement best practice peatland restoration techniques within the OBE-HMP Study Area in consultation with relevant organisations and agencies that have particular expertise in this matter (e.g. NS, SEPA).

Figure 3 outlines where peatland restoration measures should be targeted within the Application Boundary and in the wider OBE-HMP Study Area (Figure 3).

The restoration techniques used in these areas will be based on best practice guidance at the time the work is undertaken (e.g. Peatland Action). Best practice techniques for peatland restoration techniques have been developing rapidly, therefore discussions with an experienced peatland restoration team is recommended prior to restoration work commencing. Suitable peatland restoration techniques are likely to include the drainage ditch blocking, hagg reprofiling and cross tracking.

Further discussions with the tenant farmers/land-owner is also recommended to ensure e.g. suitable access to areas within the Site is maintained.

Figure 3: Areas for Peatland Restoration Action within the Operational Beinn Ghlas Wind Farm HMP Area, Application Boundary and OBE-HMP Area.



Objective 3: Creating and strengthening nature networks

Tackling the Nature Emergency - Scottish Biodiversity Strategy to 2045 (Scottish Government, 2023) has a commitment to “*Ensure that every local authority area has a nature network of locally driven projects improving ecological connectivity across Scotland*”. The overarching purpose of the ‘nature network’ commitment is connecting habitats and species at a landscape scale, improving ecological connectivity, creating functioning, healthy and robust ecosystems which mitigate and adapt to the impacts of climate change and provide multiple benefits for society. In addition, Policy 3 of NPF4 promotes the strengthening of nature networks and whereas Policy 6 of NPF4 advocates the enhancement and expansion of woodland.

There is tremendous scope within the OBE-HMP Study Area to produce new functioning nature networks, consisting mostly, but not exclusively, of broadleaved riparian plantings (Figure 4). The proposed nature networks link together woodlands in different catchments. Two new joined up native woodland corridors are proposed, the first from Loch Nant northwards along the Laggan Burn joining up with the existing riparian woodland to the south of Barguilean Farm (e.g. Photos 4 and 5) and the second southwest of Creag a’ Chrotha extending northwest wards along unnamed burns up to Coille Braigh na Cille. Although there were some localised existing woodland patches along the planned routes, there were often sizeable gaps, which will be plugged by native tree/scrub planting. TA 6.11 Beinn Ghlas OBE-HMP Walkover Survey Report illustrates numerous examples of where such planting will be targeted.



Photo 4. Fenced riparian woodland fragment @ NM 98566 26478 between the Laggan Burn and the existing access track demonstrating suitable growing conditions in the absence of grazing pressure. Native tree planting should be targeted to link up with this habitat patch north-south along the side of the access track, creating a native woodland nature network.



Photo 5. Access track side broadleaved planting recommended here to connect native woodland nature network between catchments @ NM 98465 26683.

Functional wildlife corridors are seen as critical to allow biodiversity to move in response to a rapidly changing climate and such practical action should be seen as directly helping to strengthen both regional nature networks in Argyll as well as delivering on Scottish Government national biodiversity strategy priorities.

The multiple benefits and value of native riparian woodland for nature conservation, landscape and ecosystem services has long been recognised. Riparian woodlands play a hugely important role on helping to maintain the health and productivity of rivers and burns as well as being valuable wildlife corridors. For example:

- they protect riverbanks and help stabilise aquatic edge habitats, many of which have become unstable due to extreme climate change derived weather events which in turn benefits invertebrates and fish;
- they cool (help regulate) water temperatures, which is now seen as of critical importance to aquatic species threatened by extreme climate change derived temperatures;
- they control bank erosion, reducing sediment runoff entering watercourses;
- they capture and recycle mineral nutrients;
- they supply invertebrates, woody debris and leaf-litter, helping to kickstart the aquatic food chain for fish;
- they provide shade and cover for fish to allow them to hide from predators;
- they increase biodiversity both directly and indirectly by providing links between different patches of isolated woodland habitats – so called wildlife corridors; and
- they store carbon.

Baseline surveys of the indicative nature network routes will ensure that any areas of deep peat are deliberately avoided by planned tree/scrub planting.



Photo 6: *There were occasional downy birch in steep inaccessible locations along watercourses within the OBE-HMP Study Area @ NM 98632 26076.*

There is an opportunity to create a functioning riparian woodland corridor (nature network), from Loch Nant, northwards along the Laggan Burn joining up with the existing riparian woodland to the south of Barguilean Farm (Figure 4). To create the functioning native broadleaved riparian woodland corridor along the access track/Laggan Burn will require c. 2.6km of planting. Broadleaved planting elsewhere within the Study Area is also planned, particularly to the east of the Study Area along unnamed watercourses (Figure 4). The newly created functioning nature networks will connect native woodland habitats from Loch Awe in the south through to Loch Etive in the north.

A mix of native species will be planted, with trees in the more sheltered, steep-sided valleys and shrubs alone in more open, unsheltered areas. Species appropriate for the site include frequent to abundant downy birch and sessile oak; and more occasional aspen, holly, rowan, Scots pine and silver birch; and the following shrubs: eared willow, grey willow, hawthorn, hazel and alder. The provision of berry-producing tree and shrub species will likely benefit several bird species too. Tree shelters/fencing are likely to be required but will depend upon wider sheep and deer grazing management plans.

The OBE-HMP aims to:

- Create a nature network of woodland and scrub linking Laggan Burn and joining up with the existing riparian woodland to the south of Barguilean Farm (c. 2.6km).
- Create additional nature network links between blocks of existing mature woodland in the east of the OBE-HMP area (c. 0.6km)
- Create up to c. 14.4km of additional native riparian woodland and nature networks in additional locations around the OBE-HMP Study Area to increase biodiversity and to create new native woodland nature networks between the Loch Awe and Loch Etive catchments.

Assuming a c. 10m wide planting area this would give c. 14.4ha of riparian planting and 3.2ha of nature network planting. However, it should be assumed that there would be areas unsuitable for planting (e.g. due to deep peat, GWDTEs, archaeology) and gaps would be required to e.g. move livestock. Therefore, an assumption of c. 7.2ha of riparian planting and 1.5ha of nature networking planting is advised.

A minimum of 1.1ha would be badged as compensatory planting for loss of woodland due to construction. For more details see Chapter 13.

The Applicant is willing to fund and implement the creation of native woodland nature networks in consultation with relevant organisations and agencies that have particular expertise in this matter (e.g. NS; RSPB; FSC).

As a result of the proposed reduction in grazing pressure (Objective 1), natural tree regeneration may be possible in at least some of the locations identified for creating and strengthening nature networks. However, it is recognised that fencing and planting of areas, or fencing to allow natural tree regeneration, or tree planting using other tree protection methods (e.g. the use of protective tubes) may be appropriate. Methods of tree planting and protection would follow Forestry and Land Scotland's (FLS) best practice guidance and need to be effective for delivery of what is likely to be a planning condition.

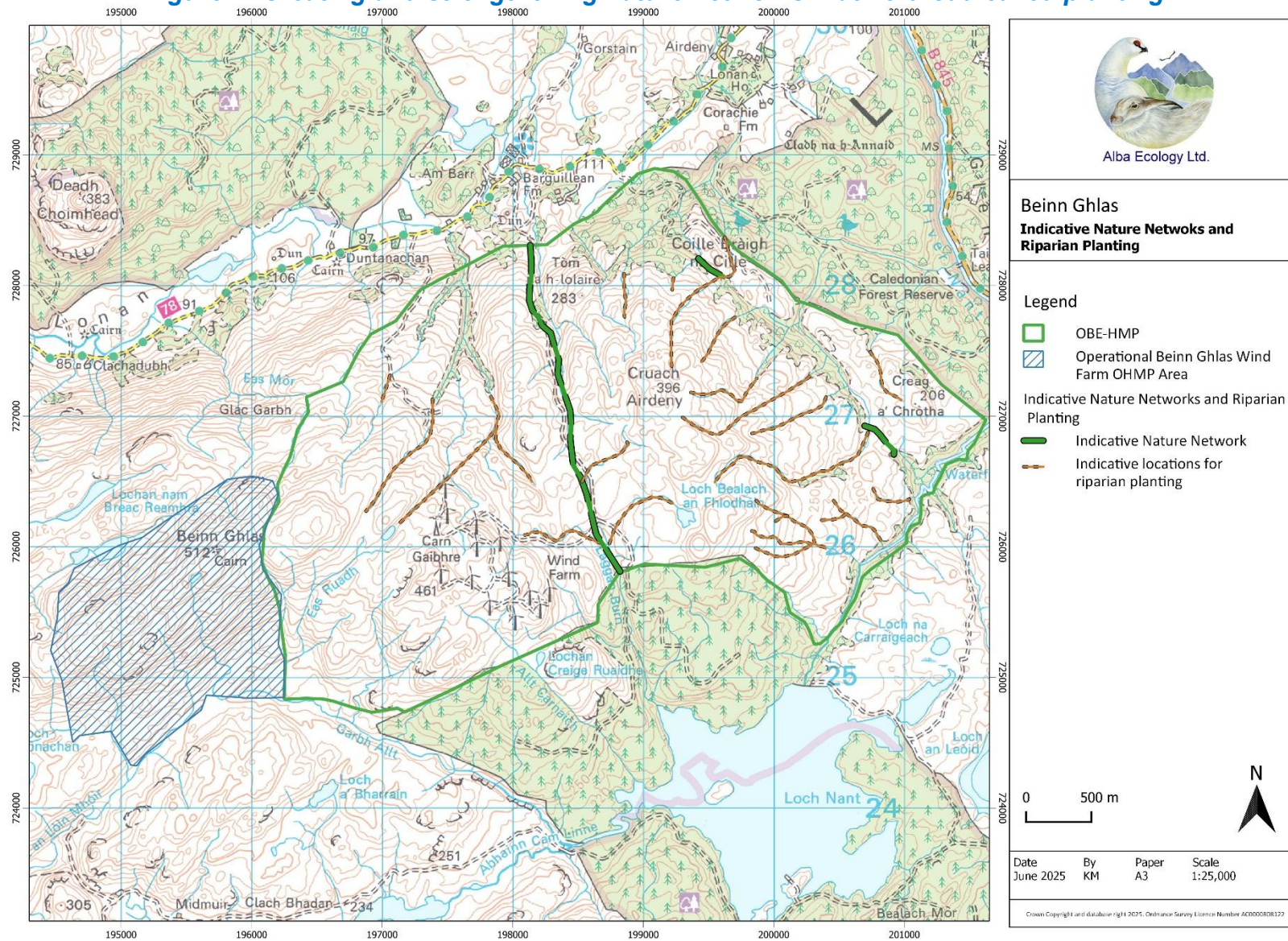
The locations identified for the creation/reinforcement of nature networks are indicative. Specific locations and detailed plans for plantings and tree protection would need to be considered further by suitable technical specialists in consultation with relevant parties, including the tenant farmers/landowner.

The exact location of any fencing and/or tree protection would be informed by targeted surveys and in consultation with contractors, the tenant farmers/landowner as well as relevant consultees post consent and prior to implementation. Constraints to native tree planting may include species rich groundwater dependent terrestrial ecosystems (GWDTE) and deep peat (Confor, 2018). Other considerations include archaeological interests and land management requirements. Specific nature networks and riparian planting surveys and assessment would be undertaken post consent.

If using fencing, aspects such as, type (stock or deer) and moving animals around the site should be taking into consideration. For example, long thin lines of fencing may not be favoured or indeed necessary. Suitably wide gaps in fencing sections (e.g. 20m gaps), to allow animal movement, could be provided, if long lines of fencing are considered necessary. Any deer fencing would be marked to prevent collision from e.g. black grouse.

The areas used for nature network creation will be regularly monitored for success. Success will be based upon tree and scrub species establishment and growth. For example, if planted trees die out in the first few years they should be replanted. If the areas selected for natural regeneration (either within or outwith a fenced area) were found to have little or no tree/scrub establishment after a suitable time scale (e.g. 5 years) then plans to plant the area should be considered/developed.

Figure 4: Creating and strengthening nature networks: native broadleaved planting



Objective 4: Pond/lochan creation

Ponds and lochans provide wildlife opportunities for a variety of aquatic species such as amphibians and Odonata (dragonflies and damselflies) and they also provide a source of food for other species such as bats and birds (with precocial wader chicks often favouring their edges). Lochans and pools can also be important breeding birds, including red-throated divers. Creating multiple ponds would undoubtedly enhance the ecological value of the Study Area, which is relatively poor in terms of existing ponds and bog pools.

Although there are several lochans and areas of bog pools across the OBE-HMP Study Area there is also evidence of some having been historically lost. For example, the Beinn Ghlas PCA survey report identified a location which was marked as a lochan on the 1:25,000 OS map, there was only bare peat and erosion features present in the summer of 2022 (Photo 7).



Photo 7: A former 'lost' OBE-HMP Study Area lochan @ NM 95042 25443.

Reinstating this lochan would provide additional fresh surface water, providing habitat for important invertebrate species and also potentially creating breeding habitat for species such as red-throated divers if sufficiently large and deep enough.

In addition, the creation of multiple ponds will enhance biodiversity across the Study Area, in particular for Odonata. Different dragonfly and damselfly species have different habitat requirements when it comes to ponds. Some species favour smaller ponds because it leads to reduced competition with more widespread and common species. Others favour larger, deeper ponds and the greater variety of niches these provide. Some species prefer nutrient poor ponds, with shade and others more nutrient ponds with light. As a consequence, a variety of pond types are recommended to attract in as wide a variety of species (including localised specialists) as possible.

These biodiversity enhancement opportunities comply with NPF4 Policy 3, through restoring degraded habitats and enhancing biodiversity within the OBE-HMP Study Area.

Broadly speaking, Odonata ponds should be lined (e.g. with clay) to ensure they are permanently wetted, but this is not appropriate in peatland habitats, and so location in relation to topography is an important consideration. The ponds should be shelved and have various depths to ensure a variety of niches are available. Pond size varies, typically the smallest are c. 10m in length and a few metres wide, to ponds over a 100m in length and tens of metres wide.

It is anticipated that a minimum of 10 ponds will be created during peatland restoration and construction work, with additional opportunities for more potentially identified during construction/restoration work. An Odonata expert will be commissioned to provide the detailed design and location for each pond, should the Proposed Development receive consent.

The OBE-HMP aims to:

- Reinststate the former lochan at NM 95042 25443 and create a minimum of 10 Odonata ponds during the construction phase of the repowering to improve overall biodiversity.

The Applicant is willing to fund and implement best practice techniques pond creation in consultation with relevant organisations/agencies and specialist advisors that have particular expertise in this matter. The location of the ponds will be developed further, post-consent, through site specific visits and consultation with ecologist and relevant agencies.

Objective 5: Targeted species action

There are several targeted species actions which provide further biodiversity enhancement opportunities and comply with NPF4 Policy 3. The Applicant is willing to fund and implement these actions as outlined.

Objective 5a Fence-marking

Within the Study Area there is a large, unmarked deer-fence within open woodland and scrub with grassland on to upland moor, which is ideal black grouse habitat (Photo 8). Unmarked deer fences in suitable habitats can cause black grouse mortality through fence strikes, many of which are preventable if the fences are marked to reduce preventable black grouse mortality. Figure 5 identifies the location of the unmarked deer-fence in black grouse habitat. This 0.9km long deer-fence will be marked using best practice techniques by the Applicant. Further details are provided in TA 6.11 Beinn Ghlas OBE-HMP Walkover Survey Report.



Photo 8. *Unmarked deer-fence within Study Area @ NM 99465 28464.*

This management action is not only likely to benefit the local population of black grouse, a UK red-listed species, but also breeding golden eagle through the provision of more black grouse (an eagle prey species) being present.

Objective 5b Installation of red-throated diver rafts

There are two waterbodies within the OBE-HMP Study Area that look potentially suitable for breeding red-throated divers. There is a potentially suitable unnamed lochan at NM 949 259 and also at NM 993 261 (Photo 9; Figure 5). Red-throated divers breed in the wider area and so the provision of nesting platforms in lochans may help them to utilise new breeding sites. Divers probably do not nest on the banks of these lochans due to either fluctuating and unsuitable water levels and/or terrestrial predators such as pine marten. Floating diver rafts move up and down with fluctuating water levels and will be placed away from the shore and their terrestrial predators.

Annual monitoring of occupancy and breeding success will be undertaken by a suitably qualified and licensed ornithologist. Diver rafts will be checked in February and March to establish whether rafts require any maintenance before the start of the diver breeding season. Any maintenance of installed diver rafts will be undertaken during each year of the operational period. Maintenance of the rafts will be undertaken outside of the diver breeding season (April to August) to avoid disturbance.



Photo 9. *Lochan potentially suitable for red-throated diver raft @ NM 993 261.*

Objective 5c Installation of nest-boxes

There is high-quality native birch and oak woodland in the OBE-HMP Study Area. The native broadleaved woodland will support many bird species including several hole nesting species. In UK most woodlands, suitable holes for nesting are at a premium and so there is usually much competition for such natural holes. Rarer and declining hole-nesting species such as redstart and pied flycatcher can be excluded by competition from common hole-nesting species such as blue and great tits and so the provision of suitable (pine marten proof) nest boxes, particularly in the existing native woodland to the east of the OBE-HMP Study Area could benefit these declining species.

Objective 5d Installation of an artificial white-tailed eagle nesting platform

As part of the mitigation for white-tailed eagle, subject to landowner agreement, the OBE-HMP will provide an artificial nest site. The aim would be to reduce any potential collision risk and disturbance by having the nest site further from the turbine array and areas of human activity.

Artificial nests for bald eagle (*Haliaeetus leucocephalus*) have been successfully used in Canada and US. This is likely to be first of its type in Scotland.

A permanent tubular steel tower with a steel mesh platform would be installed and disguised as a tree, similar to the way mobile phone masts are sometime disguised as trees. Photos 10-13 provide some examples. The steel mesh platform would help prevent nest collapse. The artificial nest and tubular tower would be constructed away from tracks in an area of long-term retention.

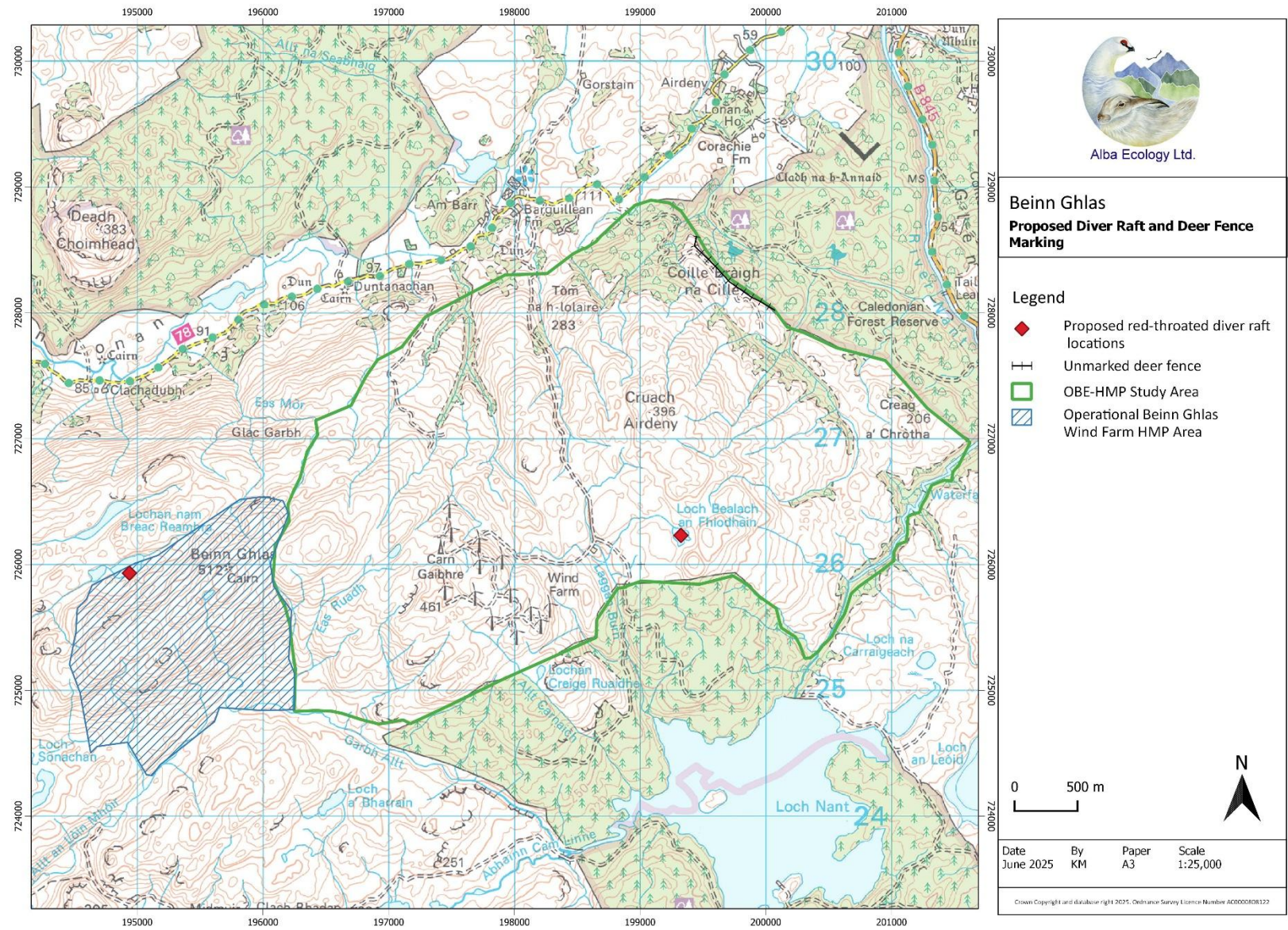


Photos 10-13. *Examples of tubular steel tower disguised as a tree. A steel mesh platform would be included and would provide longevity.*

Objective 5e Annual monitoring of breeding eagles

A programme of annual monitoring of the location and breeding performance of white-tailed eagles and golden eagles within 6 km of the Proposed Development will be commissioned. The aim of these surveys is to determine the success of management measures presented in the OBE-HMP.

Figure 5: Unmarked deer fence and red-throated diver raft locations



Objective 6: White-tailed eagle fatality monitoring

Introduction

A monitoring program would be developed and would commence upon operation of the wind farm. This would help to determine whether livestock/deer carcass removal described under Objective 7 is effective in reducing white-tailed eagle collisions. The monitoring program would also provide valuable information to further understanding on collision risk, and avoidance rates of white-tailed eagle.

The primary objectives of the study will be to:

- a) Document the species and number of any individuals of birds found during searches of turbines during the study period; and
- b) Estimate the mortality rate for white-tailed eagle during the the first years of operation (Years 1 to 5) at the repowered Beinn Ghlas Wind Farm, based on the results of standardised turbine searches, searcher efficiency trials and carcass persistence trials.

The fatality monitoring program will consist of four primary components:

- a) standardised turbine searches.
- b) searcher efficiency trials to estimate the proportion of carcasses missed by searchers.
- c) carcass persistence trials to estimate the length of time that a carcass remains in the field for potential detection by searchers; and
- d) statistical analyses, including the calculation of adjusted estimates of annual white-tailed eagle fatality rates that incorporate searcher efficiency and carcass removal trial data.

Turbine searches

Within a pre-defined plot (200 m x 200 m), trained searchers will look for bird carcasses whilst walking parallel transects spaced 40 m apart, with the searcher looking 20 m on either side. Searches will then be repeated over time at regular intervals, i.e., every 14 days. The state of each carcass will be recorded using the following condition categories, following Johnson *et al.*, 2003:

- **Intact** – a carcass that is completely intact, is not badly de-composed and shows little or no sign of being predated or scavenged.
- **Scavenged** – an entire carcass showing signs of being fed upon by a predator or scavenger or a dismembered carcass (portions) in one location (e.g. wings, skeletal remains, legs etc.).
- **Feather patch** – ten or more feathers or two or more primaries at one location indicating a bird fatality had been there.

However, the number of carcasses found during the searches does not correspond to the real number of birds killed by the wind turbines. This value must be adjusted by carcass removal (e.g. by scavengers or decay) and searcher efficiency rates, which can in turn be influenced by site- and carcass-specific covariates, such as carcass size, season, vegetation cover and topography.

Searcher Efficiency Trials

Searcher efficiency trials will be conducted throughout the study period. Carcasses will be discretely marked and placed in search areas, at random distances and directions from turbines, by the trial coordinator early in the morning prior to scheduled turbine searches. Any carcasses not found during searches will be retrieved at the end of the survey day. Results of trials will be documented on standardised field forms. There will be a target of at least 20 medium or large birds to be placed during each study year. Trials will be distributed across survey seasons to account for variables in weather and vegetation cover. The percent of carcasses found during trials will be used to estimate the level of white-tailed eagle collisions during the study period.

Carcass Persistence Trials

Carcass persistence trials will be conducted during each survey season and will be completed independently of the searcher efficiency trials. There will be a target of at least 20 medium or large raptor carcasses to be placed during each study year. Trials will be conducted throughout the year to incorporate seasonal variability in weather, vegetation and scavenger densities. Fresh bird carcasses of native raptor species (if possible) will be discretely marked and monitored until they are removed by scavengers or completely decomposed (see Urquhart *et al.*, 2015). Carcasses will be checked during the first 5 days after they are placed, then again on days 7, 10, 14, and then every 7 days until Day 28. During the trial periods, the status of all carcasses, including all evidence of scavenging or decomposition, will be documented on standardised field forms. The carcass persistence data will be used to estimate the percent of carcasses that remain detectable in search areas during the 14-day interval between standardised turbine searches.

Fatality estimates

The final purpose of conducting carcass searches and estimating the associated bias correction factors (carcass persistence and searcher efficiency) is to calculate the number of white-tailed eagle fatalities per year. Several estimators have been proposed (e.g. Johnson *et al.* 2003, Erickson *et al.* 2004, Kerns *et al.* 2005, Jain *et al.* 2007, Huso 2010, Korner-Nievergelt *et al.* 2011), mainly for wind power facilities but can also be applied to other human infrastructures.

Statistical analyses using an appropriate estimator will be undertaken, including the calculation of adjusted estimates of annual white-tailed eagle fatality rates that incorporate searcher efficiency and carcass removal trial data.

Objective 7: Operational Carcass Recovery Scheme

No development shall commence until an Operational Carcass Recovery Scheme (“OCRS”) has been submitted to and approved in writing by the Planning Authority in consultation with NatureScot. The OCRS shall thereafter be implemented as approved.

The OCRS area will be defined as being at least two times the rotor blade length away from the turbines.

The OCRS shall include for the following:

- a) Land out to at least 135 m from the turbine envelope² will be fenced to exclude livestock from entering the turbine array.
- b) Weekly searches for carcasses of livestock and deer species which may attract scavenging raptors.
- c) In addition to weekly searches, operation and maintenance staff will be encouraged to report any carcasses of livestock and deer species within the OCRS area immediately.
- d) All carcasses will be removed immediately from the OCRS area, with no carcasses left within at least 135 m of any wind turbine; and
- e) The submission of a review of the OCRS after the first five complete years of commercial operation of the wind farm. The review may include proposals for amendments and shall be submitted to and approved in writing by the Planning Authority in consultation with NatureScot and RSPB Scotland. The amended OCRS shall thereafter be implemented as approved.

MONITORING

In order to monitor progress of the OBE-HMP it will be necessary to regularly monitor the effectiveness and success of the restoration/enhancement measures implemented. To do this, an initial assessment of baseline conditions would be required prior to work commencing (establishing the baseline pre-construction, including illustrative photos), followed by regular post restoration monitoring (including photos). Table 1 outlines the proposed monitoring schedule before and after implementation. It is recommended that this monitoring will need to be agreed with NS and Argyll and Bute Council as part of the planning conditions.

OBE-HMP Objective	Type of Monitoring	Method	Why	Frequency
Objective 1	Vegetation	The percentage cover of sphagnum & indicator plant species, bare peat & vegetation height with the use of quadrats.	To demonstrate any changes in species composition & structure.	Pre-restoration, 1, 3, 5, 10, 15, 20 and 25 years.

² For a 149.9 m turbine the rotor blade length is 66.5 m, therefore 135m is considered appropriate.

OBE-HMP Objective	Type of Monitoring	Method	Why	Frequency
Objective 1	Birds	Moorland bird surveys.	To demonstrate whole ecosystem change.	Pre-restoration, 1, 3, 5, 10, 15, 20 and 25 years.
Objective 2	Efficacy of peatland restoration measures	Visual inspection	To ensure peatland restoration measures have been successful.	Pre-restoration, 1, 3, 5, 10, 15, 20 and 25 years.
Objective 2	Non-native tree regeneration management on blanket bog	To be advised following best practice guidance	To assess protection of existing important habitats.	Pre-restoration, 1, 3, 5, 10, 15, 20 and 25 years.
Objective 3	Assess success of native riparian broadleaved corridor planting.	Use latest FLS assessment methodology.	To assess success of riparian woodland creation.	Pre-restoration, 1, 3, 5, 10, 15, 20 and 25 years.
Objective 4	Pond vegetation	Surveys of macrophytes.	To assess vegetation colonisation.	Pre-restoration, 1, 3, 5, 10, 15, 20 and 25 years.
Objective 4	Odonata in ponds	Surveys of dragon and damselflies.	To assess species colonisation.	Pre-restoration, 1, 3, 5, 10, 15, 20 and 25 years.
Objective 5	Fence marking	Visual assessment of fence marking	To ensure fence marking has been successful.	1, 3, 5, 10, 15, 20 and 25 years.
Objective 5	Nest boxes	Visual assessment of bird boxes, assessment of use through breeding bird surveys	To ensure successful installation and use	1, 3, 5, 10, 15, 20 and 25 years.
Objective 5	White tailed eagle platform	Visual assessment of platform, assessment of use through breeding eagle surveys	To ensure successful installation and use	Annual
Objective 5	Breeding eagles	Breeding eagle surveys	To ensure OBE-HMP measures have been successful	Annual
Objective 5	Breeding divers	Diver surveys	To ensure successful installation and use	1, 3, 5, 10, 15, 20 and 25 years.
Objective 6	White-tailed eagle fatality monitoring	Turbine searches Searcher efficiency trials Carcass persistence trials	Document species and number of any collision victims Estimate mortality rate for white-tailed eagles	Years 1 to 5 inclusive
Objective 7	Operational Carcass Recovery Scheme	Weekly visual searches	To ensure white-tailed eagles are not attracted into wind farm	Weekly

Table 1: The type and frequency of ecological monitoring recommended for the OBE-HMP.

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