Annex I: Peatland Condition Assessment

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1 Introduction

This Peatland Condition Assessment (PCA) has been undertaken by Fluid Environmental Consulting (Fluid) as **Annex I** to **Chapter 6: Ecology** and has been prepared by Fluid Environmental Consulting (Fluid) on behalf of the Applicant to support the Environmental Impact Assessment (EIA) for Lynemore Wind Farm (the 'Proposed Development'). The Site (**Figure 2.5: Proposed Layout** of the EIA Report) is located within the Dalmagarry Estate on the hills 2 km west of the A9 at Moy within the Highland Council area. The proposed access to the Site is from the A9 via upgraded and new junction and access tracks via Lyneberg Road.

The Proposed Development will comprise 14 wind turbines, with a blade tip height of up to 200 m, Battery Energy Storage, associated infrastructure and ancillary development. The total installed capacity of the Proposed Development is expected to be over 50 MW.

The Study Area consisted of a 100 m buffer around all Proposed Development Infrastructure (**Figure 1 Peatland Condition Assessment**).

This PCA has been undertaken in accordance with National Planning Framework 4 (NPF4) and recent NatureScot guidance on peatland habitats published in 2023 to provide additional information on peatland habitats present within the Site.

1.1 Objectives

The objectives of this report are to:

- Present the methodology and findings of the PCA survey undertaken by Fluid in January 2025;
- Assess the condition of the vegetation present in the proposed turbine locations and within a 100 m buffer of all proposed infrastructure;
- Identify any areas of peatland that are likely to be actively peat-forming; and
- Aid in the identification of peatland that may be suitable for peatland restoration and biodiversity enhancement opportunities based on their current condition.

2 Site Description

The project Site is located primarily on the northeastern slopes of Beinn nan Cailleach, Carn na h-Easgainn, and Carn na Loinne. The terrain is characterised by a combination of stepped hillsides and consistently steeper slopes, with elevations ranging from 616 m Above Ordnance Datum (AOD) at Carn na h-Easgainn in the south to 290 m AOD near the northeastern Site boundary along the A9 public road.

According to the SNH Carbon and Peatlands 2016 map, the majority of the site is classified as Class 1 peat, representing nationally important carbon-rich soils, deep peat, and priority peatland habitats. The summit of Carn na h-Easgainn and areas of forestry in the northeast are classified as Class 5 peat, characterised by peat soils without peatland vegetation.

Peat surveys conducted by Fluid, as detailed in **Appendix 8.2 Peat Survey Report** and illustrated in **Figures 8.8** and **8.9**, confirm the presence of peat deposits across much of the Site. However, there are areas, some of considerable size, where peat is absent. The largest peat-free areas are found on the steeper slopes in the northwestern of the Site and adjacent to the A9 in the northeast of the Site.

The deepest peat deposits are located in the southwestern part of the site, occupying a hilltop area with a slope extending to the south. The deeper peat deposits present over the Site tend to occur in pockets rather than forming a continuous expanse. Peat up to 1.5 m in depth is relatively widespread across the Site.

3 Methodology

3.1 Desk Study

A 100 m buffer was created around all Proposed Development infrastructure in order to delineate the Study Area.

The results of the NVC Survey were then loaded into QGIS in order to determine areas that contain NVC communities consistent with peatland vegetation. Additionally target notes produced as part of the NVC survey were reviewed to identify potential features or areas of interest relating to peatland condition.

The results of peat surveys were used to assess further information on peat depth and identify potential areas where peatland habitats may be present.

The following features were then identified using available aerial photography as potential indicators of peatland condition:

- Potential peat hags;
- Potential bare peat areas;
- Potential artificial drainage features; and
- Bog pools.

These features were mapped to guide the PCA walkover survey.

3.2 Field Surveys

The following field surveys have been used to inform this assessment:

- Phase 1 Habitat and NVC survey – undertaken by Avian Ecology Ltd. between 2023 and 2024 and detailed in **Chapter 6 Ecology** and **Appendix 6.1 Habitats and Vegetation** of the EIA Report;
- Peat depth surveys – undertaken by Fluid between November 2023 and January 2025 and detailed in **Chapter 8 Hydrology, Hydrogeology, Geology and Peat** and **Appendix 8.2 Peat Survey Report** of the EIA Report; and

- Peatland condition walkover survey – undertaken by Fluid in January 2025.

3.2.1 Peatland Vegetation Survey

The National Vegetation Classification (NVC) survey identified the following NVC communities within the Site that are consistent with peatland vegetation and are therefore considered in this assessment:

- M15 *Trichophorum germanicum – Erica tetralix* wet dwarf-shrub heath community;
- M17 *Trichophorum germanicum – Eriophorum vaginatum* blanket mire community; and
- M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire community.

3.3 Peatland Condition Walkover Survey

The Peatland Condition walkover survey visited all proposed infrastructure elements as well as features of interest identified from the desk study. The condition of areas of peatland was assessed and recorded using target notes and polygons mapped using QField software to aid in later mapping of features. Georeferenced photographs were taken to produce a record of peat conditions across the Study Area.

3.3.1 Peatland Condition Assessment

Assessment of peatland condition was undertaken on the basis of NatureScot's 2016 guide, the Joint Nature Conservation Committee (JNCC) SSSI selection criteria and recent NatureScot guidance published in 2023.

The PCA survey bases the condition of blanket bog on indicators such as bog-moss cover, extent of bare peat and evidence of grazing and burning (Peatland Action, 2016). The PCA recognises four categories of peatland condition:

1. Near-Natural – peat-forming bog-mosses dominant, with no recent fires, little or no grazing pressure and little or no bare peat, heather is not dominant.
2. Modified – Bare peat is in small patches, fires may be recent, grazing impacts are evident, bog-mosses are absent or rare, extensive cover of heather or purple moor-grass.
3. Drained – within 30m either side of an artificial drain or a revegetated hagg or gully system.
4. Actively Eroding – actively eroding hagg/gully system, extensive continuous bare peat surfaces.

Indicators used to assess the condition of peatland within the Site are discussed in more detail below.

Bog Moss

Bog-mosses such as *Sphagnum* species cover is a critical indicator of peatland health and is used in PCA methodology to determine the degree of peatland modification. The abundance of *Sphagnum* directly reflects the water table level and *Sphagnum* decomposition under anaerobic conditions leads directly to the formation of peat.

Bare Peat

The presence of exposed bare peat is a sign of a declining water table, indicating that the peatland's functionality is compromised. Where bare peat is exposed, it is subject to a greatly increased rate of erosion through weathering processes.

Drainage

Both artificial drainage channels and those related to erosional gullies that provide preferential pathways for surface water flow artificially lower the water table, restricting or preventing peat formation.

Grazing Pressure

Excessive grazing pressure on peatlands can lead indirectly to the removal of *Sphagnum* mosses and other peat-forming vegetation. Selective grazing may alter the vegetation structure of peatland habitats by promoting the growth of tussock-forming grasses such as *Molinia caerulea* through numerous mechanisms. Tussocks create microtopography that increases water flow over the peat surface, leading to localized drying and erosion, which inhibits the growth of key peat-forming species including *Sphagnum* mosses (Brown et al., 2021).

Herbivore trampling may also contribute to the removal of bog-mosses, exposing bare peat to further erosion. Indicators of grazing pressure include the presence of tussock formations, physical breakage of vegetation stems, ‘poaching’ and the presence of deer or sheep dung in peatland habitats.

Burning

Burning of peatland habitat removes vegetation, leaving the soil surface exposed and vulnerable to erosion. Burning often promotes the growth of grass species, leading to an increase in tussock formation and contributing to a reduction in peat formation and increased erosion of existing peat deposits.

M19 *Calluna vulgaris – Eriophorum vaginatum* blanket mire community

It is worth noting that both moderate grazing pressure and controlled burning can be beneficial in the case of M19 communities, particularly in the context of unenclosed hill grazing or grouse moors, as is the case on this Site (Elkington et al., 2002). These influences can promote diversity in bog vegetation; however, excessive burning and grazing leads to limited diversity which can negatively impact peatland condition through the mechanisms described above. These impacts can be observed through the presence of bare peat, tussock growth and reduced presence of shrub-shrub growth, and has been considered in assessment of condition in M19 habitats within the Site environment.

4 Results

The results of the PCA are shown on **Figure 1** with associated target notes provided in **Annex 1** of this report. An overview of the mapped PCA categories is provided in **Table 1**.

The condition of the blanket bog within the Study Area is consistently fairly degraded, largely characterised by extensive erosional gullies with many modifying influences visible across the Site. These included grazing pressure from deer and at lower elevations sheep, and evidence of historic burning. Self-sown non-native coniferous trees were occasionally observed across the Site, more frequently at lower elevations. Artificial drainage was observed at lower elevations close to the transition between blanket bog and dry heath habitats.

The extensive erosional gullies present across the Site environment were classed as Actively-Eroding and featured extensive bare peat, in many places eroded down to a superficial layer of weathered bedrock. Hydrological seepage was common in these areas, migrating through the peat layer and implying a drying effect on the surrounding peat habitat. A 30 m buffer was created around all mapped Actively-Eroding peat gullies where this drying effect was observed and classed as Modified and Drained condition.

Surface water flow was commonly observed within the base of these erosional gullies. This originated both from seepage through the peat layer itself and from shallow groundwater within the superficial weathered bedrock underlying the peat deposits. This frequently supported areas of M6c vegetation, ranging in size from c. 1 m wide up to c. 50 m in larger erosional gullies.

Three areas were observed where fragments of blanket-bog habitats had retained some Near-Natural features with hummock-hollow formations. Areas of intact bog pools supporting *Sphagnum cuspidatum* were observed in these areas along with hummocks of *Sphagnum capillifolium* and *Hylocomium splendens*. This was typically a result of favourable topography on summit plateaus and within saddles of ridges, where a hydrological balance was retained as a result. These areas were still surrounded by areas of drained and actively eroding peatland where widening erosional gullies appeared to be migrating upgradient as a result of the aforementioned erosional gullies draining the surrounding peat habitats.

Despite the favourable hydrological conditions present in these habitats as a result of their topographical situation, they were all still considered to be at risk due to the surrounding ongoing erosion and subsequent lowering of the water table. The peripheries of these areas featured micro-erosion observed as relic bog pools with bare peat at the base and *Sphagnum* species becoming rare, which are likely to continue to erode and eventually form larger erosional features similar to those that characterise peatland conditions across the Site.

Smaller isolated Near-Natural features such as bog pools and hummock formations were occasionally observed outside of the areas mapped as Modified with Near-Natural features retained due to small-scale local topography; however, these were largely within areas of more heavily modified peatland and are limited in extent so have not been mapped as polygons.

Table 11: Areas and Percentages of PCA Categories within the Study Area

PCA Category	Area (Ha)	% of Study Area
Modified with Near-Natural features retained	3.8	1.4
Modified	84.0	32.0
Modified and Drained	104.1	39.7
Actively Eroding	44.3	16.9
Not peatland habitat	26.4	10.1
Total	**262.5**	**100**

5 Conclusions

The PCA showed the Site to be characterised by extensive erosional gullies and various modifying influences. The majority of the peatland (71.6% of the Study Area) was classified as either Modified or Modified and Drained, with only a small fraction (1.4% of the Study Area) retaining Near-Natural features. Actively-Eroding areas accounted for 16.9% of the Study Area.

Near-Natural features within the Site are a result of favourable topography on summits and saddles of ridges and were found largely to be at risk from ongoing peat erosion.

There were no areas of Near-Natural peatland observed within the Study Area.

6 References

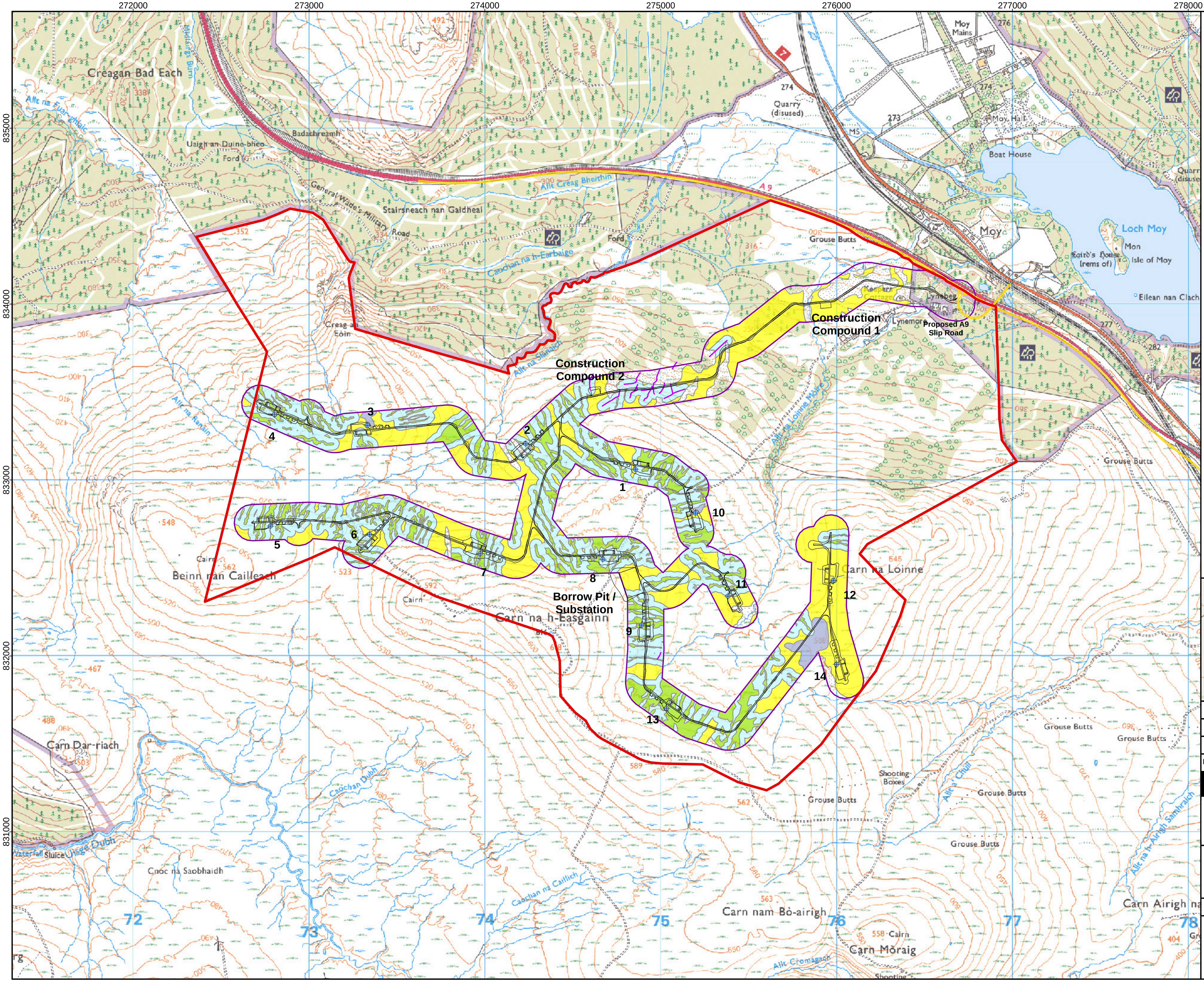
Brown et al., 2021. *Contrasting effects of long-term vegetation change and carbon dynamics*. Global Change Biology.by Brown et al. (2021).

Elkington et al., 2002. *National Vegetation Classification: Field Guide to Mires and Heaths.* T. Elkington, N. Dayton, D.L. Jackson and I.M. Strachan. JNCC, Peterborough.

Joint Nature Conservation Committee (JNCC). 1994. *Guidelines for the Selection of Biological SSSIs. Part 2: Detailed Guidelines for Habitats and Species Groups. Chapter 8 Bogs.* JNCC, Peterborough.

NS. 2023. Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Available at: https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management, accessed March 2025.

Peatland Action, 2016. Peatland Condition Assessment Guide. https://www.nature.scot/sites/default/files/2017-10/Guidance-Peatland-Action-Peatland-Condition-Assessment-Guide-A1916874.pdf, accessed March 2025.



Legend:

- Application Boundary
- Study Area

Infrastructure Layout

- Proposed Turbine Locations
- Infrastructure Layout

Peatland Condition Assessment

- Actively Eroding
- Modified
- Modified with Near Natural Features Retained
- Modified and Drained
- Not Peatland Habitat
- Artificial Drains

Coordinate System: British National Grid
Projection: Transverse Mercator
Datum: OSGB 1936
Units: Meter

Rev	Date	Description	Drn	Chk	App
00	27/03/2025	First Draft	JM	DS	AA

Lynemore Wind Farm

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