Technical Appendix 6.2: Peat Survey Report



This page is intentionally blank.



Technical Appendix 6.2: Peat Survey Report

Contents

Introduction	1
Methodology	1
Results	3
Summary	8
References	8



Technical Appendix 6.5: Peat Survey Report

Introduction

Kaya Consulting Ltd was commissioned by Appin Wind Farm Limited (hereafter referred to as the Applicant) through LUC to undertake a peat depth survey for the proposed Appin Wind Farm (hereafter referred to as the Proposed Development).

The Site is located approximately 6.2 km north of Moniaive within Dumfries and Galloway. It comprises a single block of commercial forestry / upland area as well as an approximately 11 km of access track from the west. The Site is located in a wider area of largely forested hills in the Southern Uplands. The central valley within the Site consists of steep wooded slopes, with more level ground generally being found on the two ridges towards the Site's perimeter as well as the lower ground in the vicinity of Appin Burn, which flows through the centre of the Site from approximately north-west to south-east.

The Site covers an area of ~ 1,130 ha and comprises predominantly of commercial forestry. Hilltop areas within the Site are typically a mix of upland heath and bog. The topography is defined by the Appin Burn valley, which is surrounded by adjacent summits which comprise a series of rounded hills that align north-west to south-east, leading to pronounced undulating topography along each side of the valley. The highest point within the Site lies near the hilltop at Lamgarroch at ~ 573 m AOD (Above Ordnance Datum) while the western access track is at ~ 225 m AOD near the Water of Ken.

This report covers the methodology and output of the Phase 1 (preliminary, low-density survey), and the Phase 2 (detailed, high-density) peat surveys undertaken at the Site. The purpose of the surveys was to establish an understanding of the peat depths at the Site to optimise site design and layout to minimise both the extent of disruption to peatlands and the quantity of peat excavated.

The Phase 1 survey comprised surveying a 100 m grid across the full area proposed for infrastructure within the Site boundary. Some areas of the Site were not accessed for safety reasons due to very steep topography, with new growth forest in previously felled areas, making ground conditions very difficult underfoot. The results of the Phase 1 survey helped inform the initial layout of the Proposed Development.

The Phase 2 survey used a 10 m grid to cover areas in detail where there will be infrastructure associated with the Proposed Development. This includes the footprint of the turbine locations, working areas, construction compounds, substation and borrow pits. A 20 m grid was used within a 40 m buffer of infrastructure to aid in micro-siting. Additional survey, at 50 m intervals with offsets, was undertaken on the proposed access tracks and the existing access tracks being upgraded.

This document should be read in conjunction with Chapter 6: Geology, Hydrology and Peat of the EIA Report.

Methodology

Desk-based Initial Assessment

The Carbon and Peatland Map (NatureScot, 2016) was consulted prior to the Phase 1 and 2 peat surveys. The map contains information on the likely peatland classes present within the Site. The Carbon and Peatland map was developed to be used as a high-level planning tool to promote consistency and clarity in the preparation of spatial frameworks by planning authorities.

The Carbon and Peatland map for the Site, shown in **Figure 6.6** in the EIA Report, indicates that carbon-rich soils and areas of peatland are likely to be present within the Site. The Site is a complex mosaic of peatland classes, with all 5 classes present:

- Class 1 comprise nationally important carbon-rich soils, deep peat and priority peatland habitat. Class 1 areas
 are likely to be of high conservation value. The area encompassing Turbine 3 and associated access track,
 including access track leading to Turbine 2, is located on an area of Class 1 peatland. This area of Class 1
 peatland covers the area surrounding Blackcraig Hill, Lagdubh Hill and Colt Hill. The western access track
 also passes through areas of Class 1 peatland.
- Class 2 comprise nationally important carbon-rich soils, deep peat and priority peatland habitat. Class 2 areas are of potentially high conservation value and restoration potential. Site infrastructure is proposed on only one area of Class 2 peatland which lies at the hilltop of Mullwhanny, where Turbine 5, Turbine 6 and associated access track are proposed.
- Class 3 dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. The western access track crosses a large area of Class 3. Turbines 1, 2, 7 and 8, along with associated hardstandings and access tracks, are each proposed for areas of Class 3. The western end of the hardstanding for Turbine 9 is located on an area of Class 3.



APPIN WIND FARM EIA REPORT

- Class 4 areas are unlikely to be associated with peatland habitats or wet and acidic type. Class 4 areas are predominantly mineral soil with some peat soil. Class 4 is typically found on hillsides and valley slopes within the Site. Turbine 4, as well as various sections of access track, are proposed for Class 4 areas.
- Class 5 comprises areas where soil information takes precedence over vegetation data. Typically, no peatland habitat is recorded. Class 5 is located across the Site, with Borrow Pit 2, Turbine 9 and both construction compounds proposed for areas of Class 5.

The results of the desk-based assessment indicated that peat was likely to be present within the boundaries of the Site, predominantly on hilltop area around the Appin Burn valley and along the proposed route of the western access track.

Survey Methodology

The survey methodology follows current guidance in Scotland (Scottish Government et al, 2017).

The field survey was undertaken by a team with the appropriate experience of assessing hydrology, hydrogeology, geology, soil, and peat for onshore wind farms in upland environments.

The Phase 1 peat survey was undertaken on the following dates:

- 21st to 22nd September 2021 (inclusive);
- 5th to 6th October 2021; and
- 30th November 2022.

The Phase 2 peat survey was undertaken on the following dates:

- 2nd to 3rd of December 2024;
- 17th to 18th of December 2024; and
- 11th to 13th of February 2025 (inclusive).

The following methods were employed for the Phase 1 peat survey:

- The Site was sampled using a 100 m systematic grid. The survey points were aligned to best fit the Ordnance Survey National Grid reference grid. The grid was generated using QGIS software.
- A section of the proposed access track route centreline was probed at 50 m intervals along the track, with 10 m offsets probed on either side of the track.
- A small section at the beginning of the western access track was not probed due to the presence of underground utilities. This area comprised entirely of existing track through forested / previously forested slopes.
- A total of 740 sampling points were surveyed in Phase 1. The extent of the Phase 1 peat survey is illustrated in **Figure 6.7** of the EIA Report.
- The peat survey was carried out using an extendable fibreglass utility probe capable of sampling to 5.0 m. Where the base of the peat could not be detected at 5.0 m the depth was simply marked as 5.0 m and recorded in the notes. Depth recordings were taken by rounding up to the nearest 0.05 m.

The following methods were employed for the Phase 2 peat survey:

- The Phase 2 peat probing was undertaken on a 10 m grid around areas of proposed infrastructure, including turbine footprints, working areas, construction compounds, met mast and borrow pits. A 20 m grid was used within a 40 m buffer of the proposed infrastructure to aid in micro-siting.
- The remaining proposed access track route centreline was probed at 50 m intervals along the track, with 10 m offsets probed on either side of the track.
- A total of 3,509 sampling points were surveyed during Phase 2. This includes multiple iterations of the Proposed Development layout with some areas sampled not carried forward in the final layout assessed within this EIA Report. The extent of the Phase 2 peat survey is illustrated in **Figure 6.7** of the EIA Report.
- The peat survey was carried out using an extendable fibreglass utility probe capable of sampling to 5.0 m. Where the base of the peat could not be detected at 5.0 m the depth was simply marked as 5.0 m and recorded in the notes. Depth recordings were taken by rounding up to the nearest 0.05 m.
- Peat cores were taken using a gouge auger (20 mm diameter) to confirm the existence and composition of peat at the turbine locations, construction compounds, substation and borrow pits. The locations of the cores are shown in **Figure 6.7** of the EIA Report.



Results

Peat Depths

Table 1 shows the range of results obtained during the Phase 1 and Phase 2 peat surveys. A total of 4,249 probes were collected.

Guidance from NatureScot (NatureScot, 2023) defines carbon-rich soils as peat soils and peaty soils. Peat soils in Scotland are defined as soil with a surface peat layer with more than 60% organic matter and of at least 50 cm thickness. Peaty soils can have a shallower peat layer (<50 cm) at the surface (NatureScot, 2023).

At the Proposed Development Site:

- 64.6% of probes were recorded as having a depth of less than or equal to 30 cm. These probes are not classified as peat.
- 22.2% of probes were recorded as having a peat depth of between 30 cm 50 cm. These probes are not formally considered to be peat and are organo-mineral soils or peaty soils (if a peat layer is present).
- 10.7% of probes were recorded as having a peat depth of between 50 cm 100 cm and are peat soils.
- 2.5% of the probes were recorded as having a peat depth of over 100 cm and are peat soils.

Table 1 - Peat Depth Summary

Peat Depth Range (cm)	Number of Probes	% of Total Probes
<= 30	2,743	64.6
30 - 50	941	22.2
50 - 100	452	10.6
100 - 200	95	2.2
200 - 300	15	0.4
300 - 400	2	< 0.1
400 - 500	1	< 0.1

Peat Cores

Table 2 shows the information collected from coring. A total of 18 cores were taken; the locations of which are shown in Figure 6.7 of the EIA Report.

The cores taken at Turbine 4, Turbine 7, Turbine 6 hardstanding, construction compound 2 and each of the three borrow pit locations did not contain peat. Of the remaining 11 cores, it was determined that the acrotelm layer was between 10 cm and 70 cm in the cores surveyed.

A variety of base material was found to underly the areas cored:

- 17% of the cores obtained had a bedrock base.
- 17% had a clay base.
- 66% of the cores were underlain by gravel, likely associated with the highly weathered top layer of bedrock.

A representative example of the cores taken is shown in Image 1.

Core Number	Proposed Infrastructure	Peat	Acrotelm thickness (cm)	Catotelm thickness (cm)	Notes	Von Post scale	Base Layer
1	Turbine 1	Yes	10	35	N/A	H3	Clay
2	Turbine 2	Yes	20	45	N/A	H3	Clay
3	Turbine 3	Yes	15	15	N/A	H3	Clay
4	Turbine 4	No	N/A	N/A	N/A	N/A	Gravel
5	Turbine 5	Yes	20	0	Peat with single, bomogenous	H3	Gravel

Table 2 - Collected Core Data



APPIN WIND FARM EIA REPORT

TECHNICAL APPENDIX 6.2: PEAT SURVEY REPORT

Core Number	Proposed Infrastructure	Peat	Acrotelm thickness (cm)	Catotelm thickness (cm)	Notes	Von Post scale	Base Layer
					unsaturated horizon.		
6	Turbine 6	Yes	25	0	Peat with single, homogenous, unsaturated horizon.	НЗ	Gravel
7	Turbine 7	No	N/A	N/A		N/A	Gravel
8	Turbine 8	Yes	20	0	Peat with single, homogenous, unsaturated horizon.	H6	Gravel
9	Turbine 9	Yes	50	0	Peat with single, homogenous, unsaturated horizon.	H3	Gravel
10	Construction Compound 2	Yes	70	0	Peat with single, homogenous, unsaturated horizon.	H9	Gravel
11	Turbine 5 Hardstanding	Yes	10	20	N/A	H3	Gravel
12	Turbine 5 Hardstanding	No	N/A	N/A	N/A	N/A	Gravel
13	Construction Compound 2	No	N/A	N/A	N/A	N/A	Gravel
14	Construction Compound 1	Yes	30	0	Peat with single, homogenous, unsaturated horizon.	H3	Gravel
15	Substation	Yes	10	90	N/A	H3	Gravel
16	Borrow Pit 3	No	N/A	N/A	N/A	N/A	Bedrock
17	Borrow Pit 2	No	N/A	N/A	N/A	N/A	Bedrock
18	Borrow Pit 1	No	N/A	N/A	N/A	N/A	Bedrock

Image 1 - Representative Peat Cores



Peatland Condition

The majority of the Site is comprised of commercial forestry, made up of a mix of new growth, mature plantation and windblown areas. The non-forested areas of the Site are limited to the hilltops surrounding the Appin Burn valley. Heavily modified peat bogs lie above the forestry and have been extensively drained via artificial drainage channels cut into the peat. Numerous conifer saplings were noted across the bog where commercial forestry has begun to naturally spread. In general, the deepest peat depths on-Site were located in these areas.

No natural or near-natural peatland was found at any of the assessed locations. While the NatureScot Carbon and Peatland 2016 map shows there to be an area of Class 1 at Blackcraig Hill, these areas were found to comprise predominantly of modified or artificially drained peatland. An area of Class 1 peatland near the Auchrae Burn at the western Site access was found to contain the deepest peat on-site at 400 cm, however this area has been heavily modified by drainage and has been planted for commercial forestry. Similarly, an area of Class 2 peatland at the hilltop of Mullwhanny was found to be heavily modified by artificial drainage.

Table 3 shows the distribution of peatland condition, based on those used in the NatureScot Peatland Condition Survey (NatureScot, 2016) guidance, at the probed locations across the Site. **Images 2, 3 and 4** show a representation of the peatland condition on-Site.



Table 3 - Peatland Condition Summary

Peatland Condition	Number of Probes	% of Total Probes
Forested / previously forested	2,089	49.2
Drained: Artificial	1,107	26.1
Modified	949	22.3
Not peatland	104	2.4

Image 2 - Heavily modified peatland near Magmallach Burn - artificially drained and previously forested



Image 3 - Modified peatland atop the hilltop at Transparra – self-seeding conifers visible in middle-ground



Image 4 - Artificially drained peatland atop the hill at Mullwhanny





Summary

Kaya Consulting Ltd was commissioned to undertake a peat depth survey for the Proposed Development.

This report covers the methodology and output of the Phase 1 (preliminary, low-density survey), and the Phase 2 (detailed, high-density) peat surveys undertaken at the Site. The purpose of the surveys was to establish an understanding of the peat depths at the Site to optimise site design and layout to minimise both the extent of disruption to peatlands and the quantity of peat excavated.

A total of 4,249 probes were collected across the Phase 1 and Phase 2 peat surveys. The Phase 1 survey consisted of 740 probes. The Phase 2 survey consisted of 3,509 probes.

- 64.6% of probes were recorded as having a depth of less than or equal to 30 cm. These probes are not classified as peat.
- 22.2% of probes were recorded as having a peat depth of between 30 cm 50 cm. These probes are not formally considered to be peat and are organo-mineral soils or peaty soils (if a peat layer is present).
- 10.7% of probes were recorded as having a peat depth of between 50 cm 100 cm and are peat soils.
- 2.5% of the probes were recorded as having a peat depth of over 100 cm and are peat soils.

A total of 18 cores were taken across the survey period, of which seven were found to contain no peat. It was determined that the acrotelm layer was between 10 cm and 70 cm. Generally, gravel was the dominant source of base material with 66% of the cores containing peat having a gravel base.

References

NatureScot (2016) Carbon and Peatland map, [Online] Available at: <u>https://map.environment.gov.scot/Soil_maps/?layer=10</u>

NatureScot (2016) Peatland Condition Survey guidance. [Online] Available at: https://www.nature.scot/doc/peatland-action-how-do-i-assess-condition-my-peatland

NatureScot (2023) Advising on peatland, carbon-rich soils and priority peatland habitats in development management, [Online] Available at:: <u>https://www.nature.scot/doc/advising-peatland-carbon-rich-soils-and-priority-peatland-habitats-development-management</u>

Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland, [Online] Available at: <u>https://www.gov.scot/publications/peatland-survey-guidance/</u>

