Hill of Fare Wind Farm
Technical Appendix 10.2 - Peat Management Plan

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CONTROL SHEET

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1 INTRODUCTION

1.1 Terms of Reference

EnviroCentre Ltd has been commissioned by RES Ltd to carry out a Peat Management Plan (PMP) for the proposed Hill of Fare Wind Farm ("the Proposed Development"). This report forms Technical Appendix 10.2 of the Environmental Impact Assessment Report (EIAR) for the Proposed Development. This report should be read with reference to **Chapter 10: Hydrology, Geology and Hydrogeological Assessment** of the EIAR for the Proposed Development.

This PMP was updated in May 2024 in response to clarifications requested within SEPAs response (PCS-PERMS2-11273) to the Proposed Developments Section 36 application (ECU00004592).

The PMP is intended to remain a live document and will be updated at the post-planning consent and construction stage to incorporate detailed construction method statements and any further site investigation information that is made available. Detailed methods and timings of handling of excavated peat, its temporary storage and use in reinstatement will be included. The volumes of excavated peat and reuse requirements will also be updated once detailed engineering designs are available.

The PMP covers management of both peat and soils. Current peat survey guidance (Scottish Government, 2017) provides the following definitions, which are adopted within this PMP:

- Peaty (or organic) soil: a soil with a surface organic layer less than 0.5 m deep;
- Peat: a soil with a surface organic layer greater than 0.5 m deep which has an organic matter content of more than 60 %; and
- Deep peat: a peat soil with surface organic layer greater than 1.0 m deep.

1.2 Scope of Report

This report seeks to provide information relating to the disturbance and re-use of excavated peat, with the main purpose of identifying areas of peatland at the Proposed Development and outlining suitable mitigation measures.

The report will provide the following:

- Description of the peat conditions on site;
- Details of the construction activities that would generate peat and of the estimated volumes that would be generated;
- Estimated peat re-use volumes;
- Methods and procedures for handling excavated peat and organic soils;
- Details of temporary storage; and
- Peat reinstatement.

Peat surveys have been carried out at various stages to inform the Proposed Development design (**Chapter 3: Design Evolution and Alternatives** of the EIAR), this assessment, as well as the Peat Landslide Risk Assessment (**Technical Appendix 10.1**) including:

- Initial peat depth survey across the Site on a 100 m grid (Phase 1);
- Targeted peat depth surveys across the proposed infrastructure footprint. (Phase 2). These are described in more detail in **Section 2.1.4**;
- Geomorphological walk-over survey; and

- Peat sampling and analysis carried out at six locations across the Site.

1.3 Report Usage

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre Limited.

If this report is to be submitted for regulatory approval more than 12 months following the report date, it is recommended that it is referred to EnviroCentre Limited for review to ensure that any relevant changes in data, best practice, guidance or legislation in the intervening period are integrated into an updated version of the report.

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2 SITE CONTEXT

The Development Site is situated on Hill of Fare, located approximately 6 km north of Banchory, Aberdeenshire. The Proposed Development consists of 16 turbines and associated infrastructure, access tracks (cut and floating), upgrades to existing access tracks, batching plant, six borrow pits, control building and substation, battery storage, temporary construction compound and enabling works compound (refer to **Chapter 2: Project Description** of EIAR).

2.1 Site Characteristics

2.1.1 Topography

The Development Site is located within areas of upland heather moorland and forestry (standing and felled) with nine distinct hill tops present on the Site.

The Site is characterised by upland plateaus and surrounding hillslopes. In the west of the Site, five distinct hill tops are present with associated flatter plateaus (Hill of Fare, Hill of Corfeidly, Tornamean, Craigrath and Blackyduds), the highest of which being Hill of Fare in the west of the Proposed Development (peak of 470 metres Above Ordnance Datum (mOAD)). The ground gradually slopes towards the Burn of Lythebauds in the north, and towards the Burn of Corrichie in the south. Relatively flatter upland moorlands are present in the centre of the Site, including the flat plateau of Brown Hill. The ground then slopes up to the steeper slopes of three remaining hilltops, Marquis's Hillock and Meikle Tap in the south of the site and Greymore in the north. Relatively flatter heather moorlands are present in the east of the site. Ground levels in the Site range between approximately 312 mAOD to 470 mAOD.

2.1.2 Land Use

The Site is predominantly upland moorland, managed for estate use, with vehicular tracks and grouse butts present. The Site is also accessed for recreation, with a series of footpaths present within the Site. The Site is surrounded by dense plantation forestry, and associated access tracks. Forestry is present within the centre and north-east corner of the site, and north of the access track in the east of the Site. A review of these areas during the May and August peat surveys showed many of these areas are now felled, with standing forest observed in the centre of the Site west of the access track and north of the access track in the east (**Photograph 2-1**). Within the site itself vegetation out with the forestry areas is generally comprised of heather moorland and mossy areas.

Photograph 2-1: Taken on 26th May 2023 by EnviroCentre during Phase 2 Peat Survey

Photograph	Comment
	Dense coniferous forestry present within the centre of the Site, west of the access track
	View looking south. Felled area present within the centre of the Site, east of the access track

There is evidence that historic heather burning has taken place across the site, with some areas now regenerating. There have also been other manmade alterations to the site over time, particularly with the installation of a cable route aligned approximately north to south in the west of the site. The Site drainage has also been modified over time, with a series of manmade ditches and grips identified in the west of the site draining towards a gully and Burn of Lythebauds.

A review of historical mapping between 1843 and 1930 shows no history of forestry on the site (National Library of Scotland, n.d.). There was evidence of rough pasture in 1888 and some marshy areas surrounding the Burn of Lythebauds in the north-east of the site. Peat cutting has historically been undertaken on the Site.

2.1.3 Geology

2.1.3.1 Bedrock Geology

BGS mapping (BGS, n.d.) shows that the bedrock geology underlying the majority of the Site is Hill of Fare Intrusion Leucogranite. Within the centre and west of the Site there are small areas underlain by Hill of Fare Microgranite. Bedrock geology is shown within **Figure 10.3** of **Chapter 10** of the EIAR.

2.1.3.2 Superficial Deposits

BGS mapping (BGS, n.d.) shows that peat deposits are present across the majority of the west of the Site with smaller areas in the centre. Banchory Till Formation deposits are present around the Burn of

Corrichie in the south of the Proposed Development and Landerberry Burn in the north-east. There are large areas in the east, west and centre of the Site, surrounding Burn of Lythebauds and at the base of the hillslopes where there are no records of superficial deposits. Superficial geology is shown in **Figure 10.4** of **Chapter 10** of the EIAR.

The Carbon and Peatland map identifies 5 classes of soil are present across the Site (SNH, 2016). Surrounding the Burn of Corrichie and Burn of Lythebauds class 0 soil is present which indicates the presence of mineral based soils. Within the west of Site on the slopes of Hill of Fare class 1 soil is present which is comprised of peat soil and peatland vegetation. In the west, north-west, south west and north-east of the site there are small patches of class 3 soil which indicates the presence of predominantly peaty soil with some peat soil, and peatland vegetation with some heath. Within the majority of the centre and east of the Site along the proposed access track, class 4 soil is present. This is comprised of predominantly mineral soil with some peat soil and heathland vegetation. Within the remainder of the west of the Site, around Landerberry Burn and small patches within the forestry in the south of the site class 5 soil is present which is comprised of peat soils with no peatland vegetation.

2.1.4 Peat Conditions

2.1.4.1 Peat Depth

The following peat depth surveys have been undertaken at the Proposed Development, with a total of 2,822 locations probed:

- *15th- 17th December 2021 and 19th - 20th January*: Initial investigative peat depth survey undertaken across the Phase 1 Peat Mapping Area on a 100 m grid. A total of 538 locations were probed;
- *9th-25th May 2023*: Targeted Phase 2 peat survey was undertaken in line with the proposed development layout (Chapter 3, Layout 7 -Infrastructure Layout Chill). Peat depths were recorded at 50 m intervals and 10 m offset along the proposed track, at the centre of each turbine with four points at 10 m and 20 m buffers and all other infrastructure probed on a 10 m grid. A total of 2,068 locations were probed. Six peat samples were also collected across the Site using a Russian Corer; and
- *29th -30th August 2023:* Additional surveying of the Proposed Development layout in response to the layout changes at the Site (Chapter 3, Layout 8 -Design Freeze Layout). Peat depths were recorded at the same spacing as the targeted phase 2 survey. A total of 216 additional locations were probed.

During each survey a high-accuracy handheld Trimble GPS device was used to navigate to the probe locations. At each location probed depths were obtained by manual insertion of a metal probe to a refusal depth (maximum depth of 5 m). At each probed location vegetation type and drainage characteristics were also noted.

The peat depth data from the site surveys is summarised in **Table 2-1**, and the interpolated peat depths across the Site and proposed access track are plotted in **Figure 10.5** of **Chapter 10** of the EIAR. Organic soils of less than 0.5 m depth are not classified as peat in current guidance. Soils of less than 0.5 m depth, which will comprise a mix of organic and mineral soils as outlined in **Section 2.1.3.2**, accounted for 74.7 % of the probed locations. Areas of deep peat (>1 m) were recorded at 8 % of the probed locations. Surveyed peat depth ranged from 0.5 m to 5.0 m across the Site.

Table 2-1: Peat Depth at Probing Locations

Peat Depth Range (m)	Peat Depth Categorisation	Number of Locations	% of Locations
< 0.5	Soils not classified as peat	2108	74.7
0.5 – 1.00	Shallow	473	16.8
1.01 – 1.50	Deep	117	4.1
1.51 – 2.00		73	2.6
2.01 – 3.00		39	1.3
3.01 – 4.00	Very deep	10	0.4
4.01 – 5.00		2	0.1
> 5.00		0	0
Total		**2822**	**100**

The proposed infrastructure layout has been designed to avoid areas of deep peat wherever possible, as described in **Chapter 3: Design Evolution and Alternatives** of the EIAR. The majority of the access track passes through soils, with some through shallow peat, and four sections of track traversing pockets of deeper peat (between turbines 2 and 3, 6 and 7, 6 and 8, and to turbine 11). It should be noted that all of these track sections are proposed to be floating track, with the exception of a small isolated pocket of peat on track to turbine 11.

Of the 16 proposed turbines and associated infrastructure (hardstanding):

- Turbines 10, 13, 14 and 16 are located in areas of soils;
- Turbines 2, 4, 5, 9, 12 and 15 are located in areas or soils and shallow peat (<1 m);
- Turbines 1, 3, 6, 8 and 11 are located in areas of soils or shallow peat (average <1 m) but also contains some areas of deeper peat (1-1.9 m); and
- Turbine 7 is located in areas of soils or shallow peat but also contains areas of deeper peat (1-2.5 m).

Of the remaining infrastructure:

- Batching Plant, Temporary Enabling Works Compound and Control Building and Substation are located within areas of soils;
- Six Borrow Pits and Temporary Construction Compound are located within areas of soils or shallow peat (average depth <1.0 m); and
- Battery Storage is located within areas of soils, shallow and deep peat (maximum depth of 1.2 m recorded).

2.1.5 Physical Characteristics

Peat samples for laboratory testing were obtained using a Russian corer from six locations across the Site. At least two samples were taken at each location, one from the more fibrous upper peat layer (<0.5 m depth) and at least one from the more decomposed lower layers (>0.5 m depth). The peat sampling locations were chosen to provide a representative coverage of the peat characteristics of the Site, taking into proposed infrastructure layout and various peat depths.

At each location in-situ shear vane testing was carried out at the top (surface layer - 0.1 m), middle and base depth. Stratigraphic logging using the Von Post Classification was also undertaken every 0.5 m depth increment to 1.0m at all sample locations (0 m to 0.5 m and 0.5 m to 1.0 m), with one classification in deeper peat where present. Samples were then analysed by an accredited laboratory for moisture content, organic matter, bulk density and Total Organic Content (TOC), A full summary of

the physical characteristics from both the field and laboratory results is provided in **Technical Appendix 10.1.**

The results of the Von Post classification suggest that peat at the Site is generally moderately highly or very highly decomposed, even within the first 0.5 m depth in five out of the six locations. This could affect the suitability of the peat for re-use at the Site and as outlined within **Section 3.2**, the supervising engineer will determine the suitability of excavated peat for reuse. It was noted that degree of humification was noted to be lower at Sample F in the south-west of the Proposed Development with slightly decomposed peat recorded.

Peat soils generally have very high moisture contents typically in the range of 600-1800 % in comparison to the mass of dry material of the same volume (Hobbs, 1986). Samples taken within the west of the site (Samples D and E) and the centre of the site (Sample C) fall within the range. Moisture content typically decreased with depth, with an average of 651% in the first 0.5 m depth of peat and 560 % at depths >0.5 m.

The Total Organic Content of the peat ranged between 23.6 % and 48.1 % in the first 0.5 m depth of peat and 42.6 % to 70.7 % at deeper peat layers, with an overall average of 46 %. The dry bulk density ranged from 0.08 g/cm^3 to 0.22 g/cm^3, with an overall average of 0.15 g/cm^3 and bulk density ranged from 0.98 g/cm^3 to 1.05 g/cm^3 with an overall average of 0.99 g/cm^3.

A more complete summary of the physical characteristics from both the field and laboratory results is provided in **Appendix 10.1 Peat Landslide Risk Assessment** of **Chapter 10: Geology, Hydrology and Hydrogeological Assessment** of the EIAR.

3 GENERAL PEAT MANAGEMENT PRINCIPLES

3.1 Prevention

During the pre-planning stage of the Proposed Development, the layout has gone through a series of iterations to ensure that key infrastructure is not within areas of peat depths greater than 1 m where practically possible, as detailed in **Chapter 3** of the EIAR. Where infrastructure is within areas of deep peat additional mitigation to minimise impacts on both surface and sub-surface hydrology, is outlined in the **Chapter 10: Geology, Hydrology and Hydrogeological Assessment** of the EIAR.

During the construction of the Proposed Development, all reasonable measures will be taken to avoid or minimise excavations and minimise disturbance to peat and peatland habitats, including:

- Ground disturbance around excavations will be kept to a minimum and working areas will be clearly defined on site;
- Access to working areas during construction will be restricted to specified routes, comprising constructed tracks; and
- Soils excavated may be used within bund construction and in the dressing of bund slopes.

Appropriate plant such as low ground pressure models would be used to avoid unnecessary disturbance to the ground surface. Bog mats should also be used if required.

3.2 Re-use

The Proposed Development has been designed to re-use any excavated peat and soils in line with the aforementioned guidance. This includes dressing and reinstating peat on the slopes and edges of access tracks, within cable trenches, turbine foundations, within turbine foundation voids, around crane hardstandings, substation platforms and turning heads. Additionally, soils will be used for borrow pit restoration.

The characteristics of the excavated peat will determine how suitable it is for reuse, for example unconsolidated and saturated peat will have limited use for reinstatement works. Suitability for use will be determined by the supervising engineer.

The acrotelm is the upper layer of peat consisting of living and partially decayed material with a higher hydraulic conductivity and variable water table. It contains viable plant parts to assist in the regeneration or restoration of peatland vegetation and is responsible peatland processes such as carbon sequestration. The catotelm layer consists of more highly decayed material with lower hydraulic conductivity and anaerobic conditions. It tends to be less stable and cohesive than acrotelmic peat. The full establishment of a suitable acrotelm is required to stabilise the peat mass and its hydrological conditions (e.g. control of erosion and evaporation during dry periods). For the purposes of this management plan, it is assumed the top 0.5m of peat will be stripped as the acrotelm layer to ensure that its structure is retained.

It is recommended that the top 0.5 m of peat and associated vegetation is excavated as a single unit to help preserve the integrity of the peat and reduce the risk of the peat drying out. The use of a thicker layer of peat during reinstatement is also considered to be preferable in terms of restoration of peat hydrology. This approach is used as the definition of the acrotelm layer in the peat volume calculations. In practice it can be difficult to accurately define the base of the acrotelm in the field and this practical approach also provides consistency between the definitions of peaty soils (<0.5 m) and

the split between acrotelmic and catotelmic peat. The suitability of this approach will depend upon conditions encountered during construction and advice will be provided on site by the Environmental Clerk of Works (EnvCoW).

The following assumptions are made regarding the characteristics of the peat in relation to the intended reuses at the site:

- Acrotelmic peat, including vegetated turves, will be suitable for the dressing off of the top layer of all reinstatement.
- More fibrous catotelmic peat will be suitable for reinstatement below the surface layer wherever possible and may need additional management or mitigation if used for the top layer of reinstatement.
- Highly humified catotelmic peat is less suitable for reinstatement purposes. However, it is not expected that there will be significant volumes of this on site due to the relatively shallow peat profile in the vicinity of the infrastructure.

4 ESTIMATION OF EXCAVATION AND RE-INSTATEMENT PEAT VOLUMES

The volume of excavated peat and soils associated with each construction element within the Site has been calculated based on the following general assumptions:

- Peat is defined as having a depth ≥0.5 m, in line with the definitions in **Section 1.1**;
- Where peat is present, excavated volumes are calculated for the acrotelmic (<0.5 m) and catotelmic (≥0.5 m) layer;
- Peaty soils are defined as organic soils with a depth of <0.5 m. All soils, organic and mineral, have been incorporated into the volume calculations for completeness, in line with current guidelines;
- Excavation or reuses associated with drainage ditches have not been calculated as the dimensions of these construction activities will not be available until the detailed design phase (post-consent);
- Cable trenches have not been considered as part of these calculations as it is assumed that, where these are not within the footprint of tracks, all excavated soils will be backfilled at the same location, resulting in no net change in soils taking place;
- Borrow pit excavation volumes assume soils stripped across the whole borrow pit search area. It is noted that borrow pit design will be developed following ground investigations at detailed design stage, and the likely footprints will be significantly smaller than those used in the calculations. These values therefore represent an overestimate of excavation, and will be revised pre-construction.
- It is assumed that all soils excavated from borrow pits will be reinstated on completion of borrow pit use. There will likely be additional capacity within borrow pit voids to accommodate additional soils. This will be determined following ground investigation at the detailed design stage; and
- The volumes calculated below use the average peat/soils depth within each infrastructure element. The average peat/soils depth for each infrastructure element has been calculated using GIS spatial analysis techniques from the interpolated peat depth layer.

More detailed calculation data for individual infrastructure elements is provided in **Tables A.1** and **A.2** (**Appendix A**) along with more detailed assumptions for the dimensions of the elements and reinstatement parameters. **Table 4-1** summarises the estimated volumes of excavated peat. **Table 4-2** identifies the reinstatement and reuse requirements for the Project and the total volume of peat to meet these requirements. **Table 4-3** summarises the net balance of volumes of excavated peat and organic soils by element of infrastructure. **Table 4-4** presents the overall peat balance of the site.

Table 4-1: Excavated Volumes (m^3)

Infrastructure component	Soils	Acrotelm	Catotelm
Turbines	3,668	1,527	186
Crane Hardstandings, Battery Storage and Substation	12,828	3,307	1,751
Construction Compounds and Batching Plant	849	679	307
Excavated tracks and Turning Heads	3,178	8,694	320
Floating tracks	-	-	-
Borrow Pits	7,756	602	222
Total	**28,279**	**14,809**	**2,786**

Table 4-2: Reinstated Volumes (m^3)

Infrastructure component	Soils	Acrotelm	Catotelm
Turbines	3,668	1,056	3,202
Crane Hardstandings, Battery Storage and Substation	2,120	90	-
Construction Compound and Batching Plant	707	679	307
Excavated tracks and Turning Heads	6,525	12,704	-
Floating tracks	-	-	-
Borrow Pits	7,756	602	222
Total	**20,776**	**15,131**	**3,731**

Table 4-3 Peat Balance by Infrastructure Element (m^3)

Infrastructure component	Soils	Acrotelm	Catotelm
Turbines	-	471	-3,016
Crane Hardstandings, Battery Storage and Substation	10,708	3,217	1,751
Construction compounds and Batching Plant	142	-	-
Excavated tracks	-3,347	-4,010	320
Floating tracks	-	-	-
Borrow Pits	-	-	-
Total	**7,503**	**-322**	**-945**

Table 4-4 Summary of Peat Balance (m^3)

	Excavated	Reuse	Surplus
Soils	28,279	20,776	7,503
Acrotelm	14,809	15,131	-322
Catotelm	2,786	3,731	-945
Total	**45,874**	**39,638**	**6,236**

The calculations assume that the top layer of soil (soils or acrotelmic peat) will be stripped with the vegetation and reused as the top layer of reinstated soil/peat at the same location across the majority of the Site, to minimise transport and handling of the peat.

Table 4-3 and **Table 4-4** show that there is a small deficit of catotelmic and acrotelmic peat, and a surplus of soils. It is therefore proposed to use the surplus of soils to meet the small deficit of acrotelmic and catotelmic peat.

Taking reinstatement proposals into account, the calculations demonstrate that a balance can be achieved between the requirements for the excavation of peat and site reinstatement requirements, with a surplus of soils 6,236m^3 (13.6 %). It is proposed that this surplus of soils can be reused throughout the site for a range of purposes including reinstatement and landscaping, including for example the formation of low screening bunds on the downgradient side of cross-gradient tracks, and further reinstatement of borrow pits. These reuses will be investigated further following ground investigation at the detailed design stage, and this management plan updated as required.

5 HANDLING AND TEMPORARY STORAGE OF PEAT

5.1 Handling of Peat

Handling of peat will be carried out as follows to ensure that the existing structure and integrity of the excavated peat is retained, its reuse potential is maximised and effects on other environmental receptors are minimised:

- The vegetation and surface layer of peat (i.e. the acrotelm) will be stripped separately;
- Peat will be stored separately from any other soil, drift deposit or rock material. Mixing during excavation and transport will be avoided;
- Where possible, immediate reuse would be preferred to temporary storage; and
- Turves should be stripped and handled with care and kept vegetation side up such that damage to the living vegetation mat would be prevented or minimised as far as possible.

It should also be noted that peat will not be used to form bunds around infrastructure.

5.2 Temporary Storage of Peat

Temporary storage could be required where material is not required for immediate reinstatement. To minimise handling and haulage distances, where possible excavated material would be stored local to the Site of excavation and/or local to the end–use site.

The exact storage location(s) would be agreed with the Ecological Clerk of Works (ECoW) prior to commencement of main phase of works and provided on a plan to accompany the PMP and relevant Method Statements.

Storage will be carried out as follows to maintain the integrity of peat and turves and minimise any effect on other environmental receptors:

- Temporary storage locations will be appropriately located and designed to minimise impact to sensitive habitats and species, prevent risks from material instability (particularly in peatland areas) and runoff into watercourses.;
- Stripped materials will be carefully separated to keep peat and other soils apart, and stored in appropriately designed and clearly defined separate piles. Excavated peat will be excavated as turves which will be as large as possible and kept wet in order to minimise desiccation during storage;
- Stockpiles will be isolated from any surface drains and a minimum of 50 m away from watercourses, unless otherwise agreed with the ECoW;
- Runoff from stockpiled peat will be caught by silt fencing, in swales or blind ditches. Where large areas of peat storage are required, these may require further SuDS measures in place. Clean surface water runoff will be diverted around stockpiles;
- Excavated topsoil will be stored on geotextile matting to a maximum of 1 m thickness.
- Peat will not be stockpiled or deposited permanently higher than 1 m, and turf will be stockpiled separately; and
- Temporary storage time of excavated peat will be minimised with reinstatement carried out as soon as practicable. Peat will not be stockpiled for more than 6 months, unless otherwise agreed with SEPA. Turves will be stored turf side up and will not be allowed to dry out. The condition of stored turves will be monitored by the Contractor and the ECoW.

6 PEAT REINSTATEMENT

Reinstatement of peat will be undertaken as follows:

- Areas of peat restoration will be considered as potential pollution sources until fully restored. Sustainable Drainage System (SuDS) principles will be used to minimise pollution risk. Runoff from reinstated peat will be caught by silt fencing, swales, blind ditches or other suitable construction SuDS measures until fully reinstated. Clean surface water runoff may have to be diverted around reinstated areas;
- A continuous layer of acrotelm/peaty soils and vegetated turves will be used for surface reinstatement;
- Where regeneration of vegetation cover is required (e.g. seeding, heather shoots & seeds, natural regeneration) this will be carried out in accordance with NatureScot guidance (SNH, 2005);
- Fencing of seeded areas to keep herbivores out of the restoration site will be carried out if considered appropriate;
- Depending on the time of year when reinstatement is carried out, erosion control matting may be required to stabilise bare peat prior to seeding in spring; and
- Reinstated areas will be monitored to ensure that environmental/ecological objectives are realised, including ecological surveys. The monitoring period may extend beyond completion of the construction works.

As peat is to be used for reinstatement around the Proposed Development, turves will be placed as close as possible together (to minimise later water loss), tapered into the adjacent ground surface and compressed at the edges of the peat reinstatement areas. Excavated peat will not be deposited on top of good condition existing peatland vegetation.

Peat will be reinstated appropriately, with catotelmic peat placed below acrotelmic peat, with turves placed upon this. The peat reinstatement areas will be suitable graded.

Additionally, some soils and turves generated from excavations will be used for dressing the soils at the sides of the access track to assist with regeneration of these areas, where they are altered during construction. These areas are to be suitably graded.

7 CONCLUSIONS & RECOMMENDATIONS

The infrastructure layout of the Proposed Development has been designed to minimise the volume of excavated peat by siting infrastructure out with areas of deeper peat where possible and through the engineering design, for example through the use of floating roads where tracks are required to cross deeper peat.

Volume calculations have shown that a balance between excavated and reused peat can be achieved at the Site. The volume of excavated peat associated with the Proposed Development has been calculated as 17,595 m^3 based on the average peat depth at each construction element, informed by peat depth surveys. Additionally, a volume of excavated soils associated with the Proposed Development has been calculated as 28,279 m^3. Therefore, the total calculated excavation volume of soils and peat is 45,874 m^3.

Proposed reuses of the excavated peat and soils are in line with best practice guidance and include reinstatement of infrastructure verges, track verges, turbine voids, cable trenches and temporary compounds. It is also proposed to restore borrow pits.

Methods of handling and storing excavated peat have been outlined to ensure its reuse potential is maximised and any carbon losses are minimised. Monitoring of the reinstated areas will be carried out to ensure that the environmental objectives are realised.

This PMP will be updated prior to and during construction to incorporate detailed site investigation and design information when available and detailed method statements.

REFERENCES

BGS (n.d.). GeoIndex Onshore Viewer. British Geological Society. Retrieved from http://mapapps2.bgs.ac.uk/geoindex/home.html?layer=BGSHydroMap

FCE, & SNH (2010). *Floating Roads on Peat*. Scotland: Scottish Natural Hertiage and Forestry Commission Scotland.

Lilly, A., Baggaley, N. & Donnelly, D. (2012). Map of soil organic carbon in top soils of Scotland. Retrieved from http://www.soils-scotland.gov.uk/data/toc

Lindsay, R., & Bragg, O. (2004). *Wind Farms and Blanket Peat: A Report on the Derrybrien Bogslide*. Derrybrien Development Cooperative Ltd.

National Library of Scotland (n.d.). Georefernced Maps. Retrieved from https://maps.nls.uk/

Scottish Government (2014). *Scottish Planning Policy*. Edinburgh: Scottish Government.

Scottish Government (2017, April). Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments. Scottish Government Energy Consents Unit. Retrieved from http://www.gov.scot/Resource/0051/00517176.pdf

Scottish Government (n.d.). Scotland's soils. Scottish Government. Retrieved from http://soils.environment.gov.scot/

Scottish Government., SNH. SEPA. (2017). *Peatland Survey (2017): Guidance on Developments on Peatland*.

Scottish Renewables, & SEPA (2012). *Developments on peatland; Guidance on the assessment of peat volumes, reuse of excavated peat and the minimisation of waste*.

Scottish Renewables, SNH, SEPA, Forestry Commision Scotland & Historic Scotland (2015). *Good Practice during Wind Farm Construction* (No. 3). Scotland: Scottish Renewables et al.

SEPA (2010). *Regulatory position statement; Developments on peat*. Stirling: Scottish Environment Protection Agency.

SEPA (2017). *WST-G-052: Developments on Peat and Off-Site Uses of Waste Peat*. SEPA.

SNH (2005). *Constructed Tracks in the Scottish Uplands*. Scottish Natural Heritage.

SNH (2016). Carbon and Peatland Map. Retrieved from http://www.snh.gov.uk/planning-and-development/advice-for-planners-and-developers/soils-and-development/cpp/

APPENDICES

A EXCAVATION AND REINSTATEMENT VOLUMES

Table A.1: Estimated Excavation Volumes

Infrastructure component		Average Peat Depth (m)	Excavation Volume			Assumptions
			Organic soils (m^3)	Acrotelm (m^3)	Catotelm (m^3)	
Turbines	T1	0.43	438			Turbines: 20m diameter base with a 1.5m working space and 1:2 side slopes; typical 3.5m depth foundation, resulting in a 37m diameter area at surface.
	T2	0.31	324			
	T3	0.57		509	65	
	T4	0.20	206			
	T5	0.42	430			
	T6	0.37	384			
	T7	0.57		509	63	
	T8	0.37	382			
	T9	0.17	177			
	T10	0.21	221			
	T11	0.56		509	58	
	T12	0.41	423			
	T13	0.26	270			
	T14	0.13	138			
	T15	0.12	127			
	T16	0.14	147			
Crane hardstandings	T1	0.45	1182			Crane hardstanding area determined in GIS to account for the turbine excavation footprint. Approx. total footprint area of 41,755 m^2.
	T2	0.30	782			
	T3	0.41	1087			
	T4	0.27	711			
	T5	0.25	665			
	T6	0.33	867			
	T7	0.66		1305	406	
	T8	0.42	1086			
	T9	0.19	480			
	T10	0.16	421			
	T11	0.40	1033			
	T12	0.23	598			
	T13	0.25	654			
	T14	0.16	423			
	T15	0.13	340			
	T16	0.16	407			
Battery Storage		0.31	1304	2002	1345	Approx. area of 15,000 m^2
Substation and Control Building		0.19	790			Approx. area of 4,050 m^2

Infrastructure component	Average Peat Depth (m)	Excavation Volume			Assumptions
		Organic soils (m^3)	Acrotelm (m^3)	Catotelm (m^3)	
Construction Compound	0.45	395	679	307	Approx. area of 3,040 m^2
Temporary Enabling Works Compound	0.15	142			Approx. area of 945 m^2
Batching Plant	0.08	312			Approx. area of 4,100 m^2
Excavated tracks and Turning Heads		3,178	8,694	320	Approx. area of 91,830 m^2
Borrow Pits		7756	602	222	Total borrow pit search area of approx. 41,866 m^2. Areas to be refined following ground investigation. Soils removed and stored for reuse
Total		**28,280**	**14,809**	**2,786**	

Table A.2: Estimated Reinstatement Volumes

Infrastructure component		Reuse Requirement (m^3)			Assumptions
		Organic soils	Acrotelm	Catotelm	
Turbines	T1	438			Reinstatement of excavation, minus the area occupied by the turbine base and hardstanding. Catotelmic peat to be used within foundation void only.
	T2	324			
	T3		352	1,067	
	T4	206			
	T5	430			
	T6	384			
	T7		352	1,067	
	T8	382			
	T9	177			
	T10	221			
	T11		352	1,067	
	T12	423			
	T13	270			
	T14	138			
	T15	127			
	T16	147			
Crane hardstandings	T1	90			The open edges of the crane hardstandings are to be reinstated to provide a suitable visual tie-in with the
	T2	90			
	T3	90			
	T4	90			

Infrastructure component		Reuse Requirement (m^3)			Assumptions
		Organic soils	**Acrotelm**	**Catotelm**	
	T5	90			surrounding ground.
	T6	90			
	T7		90		
	T8	90			
	T9	90			
	T10	90			
	T11	90			
	T12	90			
	T13	90			
	T14	90			
	T16	90			
	T16	90			
Battery Storage		500			Open edges are to be reinstated to provide a suitable visual tie-in with the surrounding ground.
Substation and Control Building		270			Open edges are to be reinstated to provide a suitable visual tie-in with the surrounding ground.
Construction Compound and Batching Plant		707	679	307	Soils and peat fully reinstated following completion of construction
Temporary Enabling Works Compound		-	-	-	Converted to car park
Excavated tracks and Turning Heads		6,525	12,704		Borrow pits fully reinstated following completion of construction, catotelmic peat reused within suitable area of void and monitored by onsite EnvCoW.
Borrow Pits		7,756	602	222	Soils and peat fully reinstated following completion of construction
Total		**20,775**	**15,131**	**3,731**	