



Technical Appendix 8.2 Outline Peat Management Plan

Dalfad Wind Farm

Brockwell Energy Limited

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Basis of Report

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1.0 Introduction

SLR Consulting Ltd (SLR) were commissioned by Brockwell Energy Limited ('the Applicant') to undertake an Outline Peat Management Plan (PMP) at the proposed Dalfad Wind Farm ('the Proposed Development'), located approximately 4 km northeast of Cumnock, and 28 km east of Ayr, within East Ayrshire Council (EAC) administrative area, as shown on **Figure 1.1** of the Environmental Impact Assessment (EIA) Report.

The assessment has been prepared by a team of geotechnical engineers, geologists, peatland specialists and hydrogeologists / hydrologists with extensive experience undertaking surveys and assessments in peatland environments, specialising in the assessment of renewable power generation and grid projects across the UK and Ireland.

The team was led by a Chartered Hydrologist with over 30 years' experience.

This report has been developed alongside and should be read in conjunction with Chapter 8: Geology, Hydrology, Hydrogeology and Peat and the following Technical Appendices of the EIA Report:

- Technical Appendix 8.1: Peat Landslide Hazard and Risk Assessment (PLHRA) and
- Technical Appendix 8.3: Peatland Condition Assessment (PCA).
- Technical Appendix 6.6: Outline Biodiversity Enhancement Management Plan (OBEMP)

1.1 Proposed Development

The Proposed Development will comprise up to 14 wind turbines and associated infrastructure including a Battery Energy Storage System (BESS). In addition to the turbines and BESS, the Proposed Development will include the following ancillary infrastructure:

- turbine foundations;
- crane hardstands;
- a site entrance;
- internal and private access road network;
- watercourse crossings;
- transformers and underground cables; and
- an on-site substation / switchgear building.

Temporary infrastructure required for construction will include:

- two construction compounds;
- crane assist pads;
- blade laydown supports;
- boom supports;
- laydown areas;
- a concrete batching plant; and
- potential excavations/borrow pit workings.

Full details of the Proposed Development are provided in **Chapter 2: Project Description** and on **Figure 1.2**.



1.2 Methodology

The assessment has been prepared by a team of geotechnical engineers, geologists, peatland specialists and hydrogeologists / hydrologists experienced in undertaking surveys and assessments in peatland environments, specialising in the assessment of renewable power generation and grid projects across the UK and Ireland.

The team was led by a Chartered Hydrologist with over 30 years' experience. The assessment follows relevant currently available best practice guidance from the Scottish Government¹, SEPA^{2,3,4,5,6,7}, NatureScot^{8,9,10,11,12} and other industry research¹³, and outlines the overall approach of minimising disruption to peatland, and it aims to ensure that all further opportunities to minimise peat disturbance and extraction would be taken during detailed design and construction of the Proposed Development.

This report has been developed to demonstrate that peat has been afforded significant consideration during the design phase of the Proposed Development and would be afforded significant consideration should consent be granted. Specifically, it shows with the benefit of site-specific peat probing data, how areas of deeper peat have been avoided where technically feasible and how shallow deposits of peat and soils can be safeguarded and used to support the long-term habitat restoration and management proposals.

1.2.1 Role of the Peat Management Plan

The PMP is intended to be a working document to be used throughout the key stages of the design, construction, operation, decommissioning and re-instatement phases of the Proposed

¹ Scottish Government (April 2017) *Peat Landslide Hazard and Risk Assessments: Best Practice for Proposed Electricity Generation* (2nd Edition). Available at: [Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments](#)

² SEPA (2006) *Is it Waste? Understanding the Definition of Waste*. Available at: [Guidance](#)

³ Scottish Renewables, SEPA (January 2012). *Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste* Available at [Assessment of peat volumes, reuse of excavated peat and minimisation of waste: guidance - gov.scot](#)

⁴ Scottish Government, Scottish Natural Heritage, SEPA., (2017) Peatland Survey. Guidance on Developments on Peatland, on-line version only. Available at: [Guidance+on+developments+on+peatland+-+peatland+survey+-+2017.pdf](#)

⁵ SEPA (May 2017). SEPA Regulatory Position Statement – Developments on Peat and Off-site Uses of Waste Peat) SEPA Guidance., WST-G-052. Version 1.

⁶ SEPA (December 2025) *Standing Advice on Peaty Soil*. Available at: [sa-on-peaty-soil.docx](#)

⁷ SEPA (July 2026). Planning Advice Note *Assessing the impact of developments on peatland and carbon rich soils* (Version 2). Available at: [pan-on-peat-and-soils.docx](#)

⁸ Scottish Natural Heritage (NatureScot) and Forestry Civil Engineering (Forestry and Land Scotland) (August 2010) *Floating Roads on Peat*. Available at: [pyy06tp2ojbj8ds9.pdf](#)

⁹ NatureScot (November 2022) Peatland ACTION Technical Compendium. Available at: <https://www.nature.scot/doc/peatland-action-technical-compendium>

¹⁰ NatureScot (June 2023). *Advising on Peatland Habitats and Carbon-rich Soils in Development Management*. Revised March 2026. Available at: [Advising on peatland habitats and carbon-rich soils in development management | NatureScot](#)

¹¹ NatureScot (July 2024). *Good Practice During Wind Farm Construction*. (4th Edition). Available at: [Good practice during wind farm construction | NatureScot](#)

¹² Mills, A.J. and Rushton, D. (2023). *A Risk Based Approach to Peatland Restoration and Peat Instability*. NatureScot Research Report 1259. Available at: [NatureScot Research Report 1259 - A risk-based approach to peatland restoration and peat instability | NatureScot](#)

¹³ Crotty, F, Dowson, F, Schofield, K, Barker, M, Ginns, B, David, T and Herold, L (January 2025) *Reuse of Excavated Peat on Wind Farm Development Sites*. Climate Xchange, Edinburgh Research Archive, Available at: [Reuse of excavated peat on wind farm development sites](#)



Development as part of an overall Construction Environmental Management Plan (CEMP). These stages are outlined below.

Stage 1: Environmental Impact Assessment (EIA)

This report forms the Stage 1 (Outline) PMP and is submitted as part of the EIA Report. From this initial report the PMP will be developed further into a Stage 2 Pre-Construction PMP.

Stage 2: Post Consent / Pre-Construction

The peat mass balance calculations may be further developed prior to the works commencing, following detailed ground investigation or further survey works required to inform detailed design, or that may be required under planning consent conditions.

Stage 3: Construction Stage

Actual peat volumes excavated during construction will be recorded against the overall predicted volumes. Within micro-siting allowances, the alignment and design of tracks, turbines and infrastructure foundations and associated construction methods will be reviewed to avoid/minimise peat disturbance as much as possible considering the more detailed information available once construction commences. A regular review and update of the peat mass balance table will be undertaken by the appointed Principal Contractor (PC) and monitored by the Ecological Clerk of Works (ECOW) onsite and made available to regulators as required.

1.2.2 Legislation and Guidance

In addition to the guidance referenced in Section 1.2, the PMP has been compiled in accordance with the following legislation:

- The Waste Management Licensing (Scotland) Regulations 2011¹⁴
- National Planning Framework for Scotland 4 (NPF4) (Scottish Government, February 2023)¹⁵

1.2.2.1 Requirements of National Planning Framework 4

The intent of Policy 5 (Soils) of National Planning Framework 4 (NPF4)¹⁵ is “to protect carbon rich soils, restore peatlands and minimise the disturbance of soils from development”.

The Policy states [5(a)] that development proposals should only be supported if they are designed and constructed:

- *in accordance with the mitigation hierarchy by first avoiding and then minimising the amount of disturbance to soils on undeveloped land; and*
- *in a manner that protects soils from damage including from compaction and erosion, and that minimises soil sealing”.*

Further [5(c)] confirms “that development proposals on peatland, carbon rich soils, and priority peatland will only be supported if they are:

¹⁴ Scottish Government (2011) *The Waste Management Licensing (Scotland) Regulations 2011*. Available at: <https://www.legislation.gov.uk/sdsi/2011/9780111012147/contents>

¹⁵ Scottish Government (2023) National Planning Framework 4. Available at: <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2022/11/national-planning-framework-4-revised-draft/documents/national-planning-framework-4-revised-draft/national-planning-framework-4-revised-draft/govscot%3Adocument/national-planning-framework-4-revised-draft.pdf>



- *essential infrastructure and there is a specific locational need and no other suitable site;*
- *the generation of energy from renewable sources that optimises the contribution of the area to greenhouse gas emissions reduction targets;*
- *small-scale development directly linked to a rural business, farm or croft;*
- *supporting a fragile community in a rural or island area; or*
- *restoration of peatland habitats”.*

And [5(d)] confirms *“that where development on peatland, carbon-rich soils or priority peatland habitat is proposed, a detailed site specific assessment will be required to identify:*

- *the baseline depth, habitat condition quality and stability of carbon rich soils;*
- *the likely effects of the development on peatland, including on soil disturbance; and*
- *the likely net effects of the development on climate emissions and loss of carbon”.*

Policy 5 also confirms that the site specific (above) assessment [5(d)] *“should inform careful project design and ensure, in accordance with relevant guidance and the mitigation hierarchy, that adverse impacts are first avoided and then minimised through best practice. A peat management plan will be required to demonstrate that this approach has been followed, alongside other appropriate plans required for restoring and/ or enhancing the site into a functioning peatland system capable of achieving carbon sequestration”.*

This PMP considers the protection and safeguarding of peat and seeks to fulfil the requirements of Policy 5(d).

1.2.2.2 Mitigation Hierarchy

SEPA³ has published guidance regarding the mitigation hierarchy for developments on peat which is summarised below:

- Prevention – avoiding generating excess peat during construction (e.g. by avoiding peat areas or by using construction methods that do not require excavation such as floating tracks);
- Re-use – use of peat produced onsite in restoration, provided that its use is fully justified and suitable;
- Recycling / Recovery / Treatment – modify peat produced onsite for use as fuel, or as a compost / soil conditioner, or dewater peat to improve its mechanical properties in support of re-use; and
- Storage – applying the SEPA guidance, storage of peat up to a depth of 2m is not classified as a waste and, however clarification should be sought from the waste regulator prior to re-use and care must be taken to ensure that it does not cause environmental pollution.



2.0 Baseline Conditions

2.1.1 Definitions of Peat

Peat is defined as an organic soil comprising the partly decomposed plant remains that have accumulated in-situ, rather than being deposited by sedimentation. When peat forming plants die, they do not decay completely as their remains become waterlogged due to regular rainfall. The effect of waterlogging is to exclude air and hence limit the degree of decomposition. Consequently, instead of decaying to carbon dioxide and water, the partially decomposed material is incorporated into the underlying material, and the peat 'grows' in-situ.

Though different thresholds are used to define peat, SEPA uses the following Joint Nature Conservation Committee (JNCC) report 445 'Towards an Assessment of the State of UK Peatlands' (2011)¹⁶ definition for classification of carbon rich soil and peat deposits, which are utilised throughout this assessment:

- Peaty (or organo-mineral) 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 a surface organic layer greater than 1.0 m deep.

Peat is found in extensive areas in the upland and lowland regions of the UK and is defined as the partly decomposed plant remains that have accumulated in-situ, rather than being deposited by sedimentation. When peat forming plants die, they do not decay completely as their remains become waterlogged due to regular rainfall. The effect of waterlogging is to exclude air and hence limit the degree of decomposition. Consequently, instead of decaying to carbon dioxide and water, the partially decomposed material is incorporated into the underlying material, and the peat 'grows' in-situ.

Peat is characterised by low density, high moisture content, high compressibility and low shear strength, all of which are related to the degree of decomposition and hence residual plant fabric and structure. To some extent, it is this structure that affects the retention or expulsion of water in the system and differentiates one peat from another.

Lindsay¹⁷ defined two main types of peat bog, raised bog and blanket bog, which are prevalent on the west coast of Europe along the Atlantic seaboard. In Britain, the dominant peatland is blanket bog which occurs on the gentle slopes of upland plateaux, ridges and benches and is predominately supplied with water and nutrients via precipitation. Blanket peat is generally considered to be hydrologically disconnected from the underlying mineral layer.

There are two principal types of peat in a near natural peatland (see Plate 2-1):

- The upper (acrotelm) layer in which the water table fluctuates, which is fibrous and comprises plant roots etc. The acrotelm is relatively dry and has some tensile strength and its thickness typically ranges from 0.1 m to 0.6 m deep.
- The lower (catotelm) layer, which is saturated, sitting permanently below the water table. The catotelm layer is highly decomposed, generally becoming more amorphous/liquid in nature and losing structure with increasing depth. The structure of catotelmic peat tends to disrupt completely on excavation and handling.

¹⁶ Joint Nature Conservation Committee (JNCC), 2011. *Towards an assessment of the state of UK peatlands*. JNCC Report No. 445. JNCC, Peterborough.

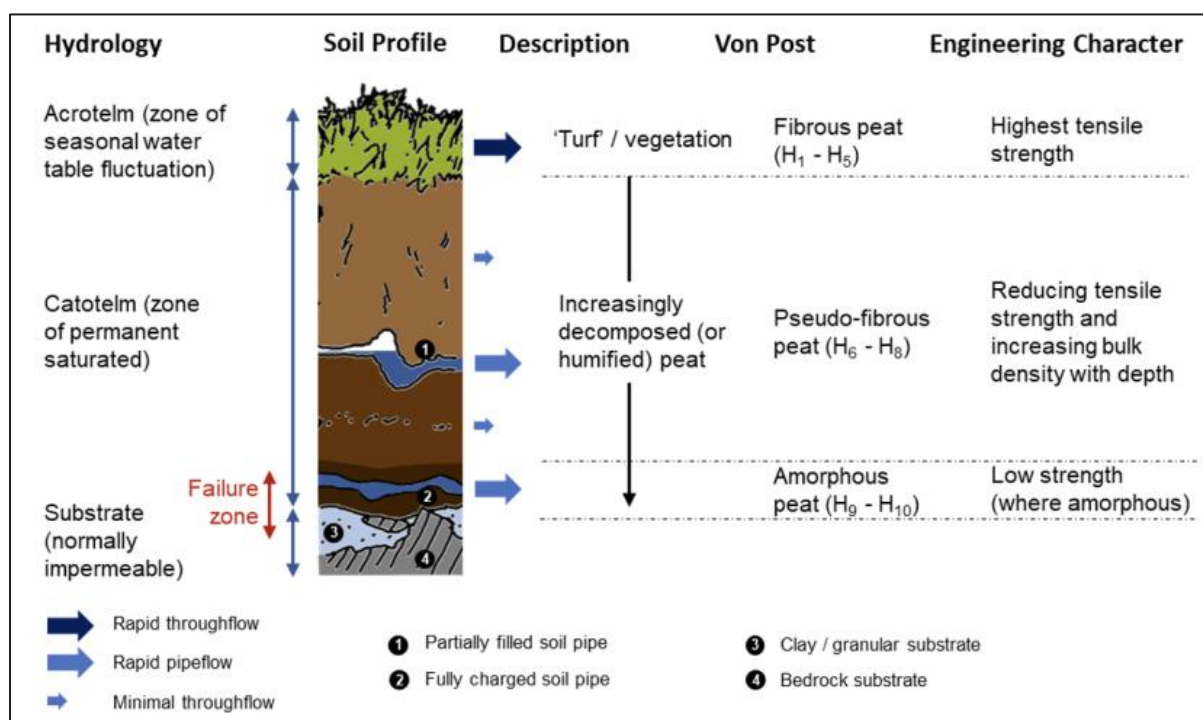
¹⁷ Lindsay, R.A, (1995), *Bogs: The ecology, classification and conservation of ombrotrophic mires*. Scottish Natural Heritage. Perth.



The acrotelm is the fibrous surface to the peat bog¹⁸ which exists between the growing bog surface and the lowest position of the water table in dry summers. The relative position of the water table within the peat controls the balance between accumulation and decomposition, and therefore its stability, hence artificial adjustment of the water table by drainage can have significant impacts.

For geotechnical purposes the degree of decomposition (humification) can be estimated in the field by applying the 'squeezing test' proposed by von Post and Grunland (1926)¹⁹ and as shown in Plate 2-1. The humification value ranges from H1 (no decomposition) to H10 (highly decomposed). The extended system set out by Hobbs²⁰ provides a means of correlating the types of peat with their physical, chemical and structural properties.

Plate 2-1 Typical Peat Profile⁴



¹⁸ Ingram, H.A.P., (1978), 'Soil layers in mires: function and terminology'. Journal of Soil Science, 29, 224-227.

¹⁹ Von Post, L and Grunland, E., (1926) Sodra Sveriges torvillganger 1, Sverges Geol. Unders. Avh., C335, 1-127.

²⁰ Hobbs, N.B. (1986) *Mire morphology and the properties and behaviour of some British and foreign peats*. Quarterly Journal of Engineering Geology, London, 19, 7-80).



2.2 Desk Based Review

To determine baseline conditions, a desk-based review of geological, hydrological and topographical information has been undertaken, including:

- Previous site information, including technical reports, feasibility reports, previous ground investigation, and data from adjacent developments or planning applications, where relevant;
- British Geological Survey (BGS) data, maps and memoirs available through the BGS Information Hub²¹ and Onshore GeoIndex²²;
- NatureScot Carbon and Peatland (2016) map²³ and National Soil Map of Scotland (James Hutton Institute)²⁴;
- Current and historical Ordnance Survey mapping;
- Ordnance Survey Terrain 5 Digital Terrain Model (DTM), publicly available LiDAR or InSAR data;
- Local or site knowledge relayed by landowners / users.

2.2.1 Geological Setting

2.2.1.1 Artificial Ground

BGS mapping indicates two areas of made ground deposits present across the north of the Site. Artificial ground is indicated at T3 and the proposed construction compound to its west, and to the west of T1, associated with historical mining features.

2.2.1.2 Soils

The National Soil Map for Scotland (1:250 k scale) indicates that the Site is primarily underlain by mineral gleys, with an area of peat indicated in the northeastern extent of the site.

2.2.1.3 Peatland Classification

NatureScot's Carbon and Peatland map⁸ indicates that the Site is predominantly located on mineral soil and class 5 peatland. Class 5 peatlands are not identified as priority peatland habitats; however, soils may be carbon-rich and deep peat may be present. An area of class 1 peatland is indicated in the southwest of the Site. Class 1 peatland is considered nationally important priority peatland with carbon rich soils and areas of deep peat which are likely to be considered of high conservation value. There is no proposed infrastructure located within the area of Class 1 peatland.

The Carbon and Peatland Map provides an indication of the likely presence of peatland and should not be used in development management decision making with on-site specific detailed peat surveying and assessment required to determine the presence of peat, which is detailed in later sections.

²¹ British Geological Survey (BGS) (2026) *Information Hub* Available at: [Information hub - British Geological Survey](#) (Accessed June 2026)

²² British Geological Survey (BGS) (2026). *GeoIndex Onshore*. Available at: <https://mapapps.bgs.ac.uk/geoindex/home.html> (Accessed June 2026)

²³ NatureScot (2016) *Carbon and Peatland Map*. Available at: [Carbon and peatland 2016 map | Scotland's soils](#)

²⁴ Scotland's Environment Website. *Scotland's Soils Interactive Map*. Available at [Scotland's Soils - soil maps](#) (Accessed June 2026)



2.2.1.4 Peatland Restoration

A review of the Peatland ACTION Open Data²⁵ portal indicated that there are no recorded peatland restoration works, peat depth surveys, or peat condition data within the Site. However, a desk-based assessment of aerial imagery identified evidence of drain-blocking activities at Low Moss, located in the western part of the Site. Peatland ACTION Open Data records show that a peat condition survey was undertaken at Dornal Moss, approximately 400 m east of the Site. The survey results indicate that the majority of the peat within the surveyed area is classified as being in a drained condition.

2.2.1.5 Superficial Geology

BGS 1:50 k scale mapping indicates that the majority of the Site is underlain by till deposits. Peat is also identified across the Site, located on the western edges but most prominent in the centre, in the east and in the northeast of the Site. Alluvial deposits are mapped along the riverbanks of the Glenmuir Water in the south of the Site and the Gass Water in the north of the Site. Glacifluvial deposits are mapped in the north of the Site.

Figure 8.1.4 shows the superficial geology BGS mapping and the Proposed Development.

2.2.2 Land Use and Topography

A five metre DTM has been used to generate a map of the slope gradient across the Site and is presented on **Figure 8.1.1**.

From a review of OS mapping, the Site can be characterised by a gentle sloping topography that generally slopes southwest. The elevation varies from 285 m Above Ordnance Datum (AOD) in the north to 192 m AOD in the south. The Site contains several independent hills including, Peat Hill (244 m AOD) in the north and Hawk Hill (264 m AOD) in the centre of the Site.

The coal mining legacy dominates much of the north and west of the Site, with large voids, ponds, areas of restored opencast and a network of tracks.

Small areas of conifer forestry plantation, partly felled in places are present in the east of the Site, with much of the central portion of the Site bound by an extensive area of forestry plantation to the east, outside of the Site.

The south of the Site generally comprises areas of open, improved grassland utilised for livestock grazing.

2.2.3 Hydrology and Climate

2.2.3.1 Hydrology

A review of the Scotland's Environment map shows that the Site is drained primarily by the Glenmuir Water, located to the south of the Site, which flows east to west and subsequently joins the Lugar Water to the southwest.

Surface water within the Site is drained by a network of tributaries, including the Glenmuir Burn and Duncanzemere Burn, which generally follow the topographic gradient and drain towards the southwest into the Glenmuir Water.

²⁵ NatureScot (2026) Peatland ACTION – Open Data. Available at: <https://www.nature.scot/climate-change/nature-based-solutions/nature-based-solutions-practice/peatland-action/peatland-action-data-research-and-monitoring/peatland-action> (Accessed: 27 July 2026)



The Gass Water drains the northern extent of the Site, flowing east to west before joining the Lugar Water. Several unnamed tributaries within the north of the Site contribute to the Gass Water.

In addition, there are several anthropogenic drainage channels across the Site, associated with historic mining activity. These drainage channels flow to the subsequent tributaries and streams.

2.2.3.2 Hydrogeology

BGS online data indicates that the Site is predominantly underlain by Carboniferous sedimentary rocks as part of the Clackmannan Group and the Strathclyde Group. These deposits are characterised as a moderately productive aquifer where flow is virtually all through fractures and other discontinuities within a multi layered aquifer.

The Scottish Coal Measures Group is also classified as a moderately productive cyclic multi layered aquifer.

An unnamed igneous intrusion located on the western extent of the Site is classed as a low productivity aquifer whereby flow is virtually all through fractures and other discontinuities. Small amounts of groundwater would be expected in near surface weathered zones.

The SEPA Water Classification Hub identifies the Proposed Development to be underlain by the Cumnock waterbody (ID:150646) with an overall classification of “poor”.

2.2.4 Environmental Designations

A review of NatureScot SiteLink map²⁶ confirms that the Muirkirk and North Lowther Uplands, designated as a Special Protection Area (SPA), Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC), borders the west of the Site, and extends north of the Site.

This area has been designated for blanket bog, breeding bird assemblages as well as many non-breeding birds. Additional information regarding this designation is outlined in Chapter 8.

2.3 Site Work

2.3.1 Peat Depth and Coring Survey

Peat depth surveys were undertaken by MacArthur Green (now part of SLR) and SLR across several phases between November 2024 and April 2026.

2.3.1.1 Methodology

Peat depth surveys were carried out in accordance with best practice guidance for developments on peatland³.

Phase I (low resolution) probing was conducted on a 100 m grid across the Site, to identify the extent and depth of peat and inform preliminary site layout designs. Peat probing was not undertaken in areas of made ground, where natural ground conditions have been disturbed, and peat has (where present) been removed.

Phase II (detailed) probing focussed on infrastructure on undisturbed ground and was typically undertaken on tracks at 50 m spacings with offset probing 10 m either side. At other infrastructure locations (turbines, hardstands, compounds, borrow pits etc.) at approximately

²⁶ NatureScot Data, available at <https://sitelink.nature.scot/map>



10 m spacings, with microsites areas probed at approximately 25 m spacings along a 25 m and 50 m buffer.

Where minor changes to the Proposed Development infrastructure have occurred following phase II probing, the extent of peat has been informed by inferring conditions by review of interpolation, habitat data and satellite imagery.

The thickness of peat and soft sediment was assessed using a graduated fibre glass peat probe, approximately 12 mm diameter and capable of probing depths of up to 10 m. This was pushed vertically into the ground to refusal and the depth recorded, together with a unique location number and the co-ordinates from a handheld Global Positioning System (GPS) instrument.

The accuracy of the GPS was quoted as ± 2 m under open-sky conditions, with slightly reduced accuracy in areas of poor satellite visibility e.g. within dense forestry.

Depths were recorded at 0.1 m intervals. Where refusal was met at surface and shallow soil / vegetation was present a depth of 0.1 m was recorded, distinguishing it from areas of outcropping rock, where a depth of zero is recorded.

Where appropriate, conditions have also been assessed using visual interpretation e.g.:

- on steep slopes not conducive to peat formation;
- areas of outcropping bedrock, or where conditions indicate a clear absence of peat e.g. glacial hummocks;
- artificial or made ground deposits;
- areas where probing is prohibited but conditions can be interpreted based on clear evidence at surface e.g. scheduled monuments.
- Areas where cuttings expose the underlying substrate;
- Assessment of surface vegetation / habitat.

Where probing met refusal on hard substrate, the 'feel' of the refusal can provide an insight into the nature of the substrate. The following criteria were used to assess material:

- Solid and abrupt refusal – rock;
- Solid but less abrupt refusal with grinding or crunching sound – sand/gravel or weathered rock;
- Rapid and firm refusal – silt/clay; or
- Gradual refusal – dense peat or soft clay.

The relative stiffness of the peat was also assessed from the resistance to penetration of the probe and to the effort required to extract probes. In all instances refusal was met on obstruction allowing for an interpretation of subsurface geology.

Given the potential for the probe to advance through soft mineral soils, or silt/clay layers beneath the peat, it is likely that probe depths are in some instances an over-estimate of the true peat depths, or represent soft, non-peat soils. In areas where there was uncertainty, some limited hand pits were excavated to inspect underlying soils and assess the potential presence of peat.

To determine the underlying condition of peat on the Site, and help identify the depth to acrotelm, several peat cores and hand pits were extracted at targeted locations across the Site, representative of local conditions.



Cores were extracted using a ‘Russian auger’. The Russian Auger allows for the collection of an undisturbed sample. Cores were photographed and logged in line with the Von Post scale of humification.

2.3.1.2 Survey Results

Peat Depth Analysis

Peat is generally defined as a soil with a surface organic layer >0.5 m, therefore where probing recorded depths outside of this range, it has been assumed to be a peaty or mineral (non-peat) soil. Soils with a peaty, organic horizon over mineral soil are often referred to as ‘peaty’ or carbon-rich soils. These organo-mineral soils are extensive across the UK uplands, but do not meet recognised definitions of peat as they are either shallower than true peat or have a lower carbon density.

A total of 2,620 probe or survey points were undertaken across the survey phases, with the results summarised in **Table 2-1**.

The average thickness of probes across the Site is 0.4 m, with the thickest deposits being 6.3 m.

Probe points ≤0.5 m account for 78% of the Site, with the remaining 22 % accounting for probe points >0.5 m. It should be noted that soft mineral soil was present throughout the Site and will account for some of the probe depths > 0.5 m rather than peat.

Peat is generally absent across the Site, with some localised deposits as seen on **Figure TA8.2.1**.

Table 2-1 Probing Results

Description	Probe Thickness (m)	No. of Probes	Percentage (of all probes undertaken)
No peat	0	254	9.7
Peaty or Mineral Soils	0.1 – 0.5	1796	68.5
Peat	0.5 – 1.0	465	17.7
Deep Peat	1.01 - 1.5	37	1.4
	1.51 – 2.0	23	0.9
	2.01 – 3.0	19	0.7
	3.01 – 4.0	11	0.4
	4.01 – 5.0	7	0.3
	5.01 – 6.0	7	0.3
	>6	1	<0

2.3.2 Coring

Four peat cores and five hand pits were completed alongside Phase II surveys, using a Russian auger and a shovel. Ground sampling was used to inform interpretations of the underlying physical peat condition and underlying substrate. Peat samples were undertaken to depths of between 0.5 and 1.0 m bgl and hand pits between 0.3 and 0.5 m bgl. The peat cores recorded pseudo-fibrous conditions when peat was present, with mineral soils also present as sand and as clay at the base of the cores. Hand pitting further identified sand and



clay conditions on the Site, with soft mineral soils identified in every hand pit. Ground intrusive sampling found that conditions were predominantly that of soft mineral soil rather than that of peat.

As a result, probe points classified as peat (>0.5 m) may be misidentified and could be subject to the soft mineral soil conditions identified during sampling.

Underlying soils and peat are described using British Standard (BS) 5930²⁷ and the modified Von Post Classification¹⁹. Details are presented in Annex 1 Logs and Photographs.

Table 2-2 Peat Coring / Hand Pitting Results

Location	Depth (m)	Von Post Classification	Description
PC01:	GL-0.30 0.30-0.50	N/A	Dark brown organic rich clayey SAND. Sand is fine to medium Soft grey sandy CLAY. Sand is fine to medium.
PC02:	GL-0.20 0.20-0.70 0.7-1.00	H4, B3 H6, B3	Dark brown fibrous PEAT Dark brown pseudo-fibrous PEAT. Occasional wood chunks at 0.4m Soft mottled light grey and brown slightly sandy CLAY. Sand is fine.
PC03:	GL-0.50 0.50-0.80	H5, B2	Dark brown pseudo-fibrous PEAT Soft bluish grey sandy CLAY
PC04:	GL-0.50 0.50-0.60	H5, B2	Dark brown clayey PEAT becoming mottled at 0.45m Soft grey sandy CLAY. Sand is fine to medium.
HP01	GL-0.15 0.15-0.40	N/A	Soft brown slightly silty SAND. Sand is fine to medium. Soft mottled orangish grey slightly sandy CLAY. Sand is fine to medium
HP02	GL-0.5	N/A	Brown slightly clayey PEAT. Possibly reworked.
HP03	GL-0.10 0.10-0.30	N/A	Light brown slightly clayey SAND. Sand is fine to medium. Stiff mottled grey and orange slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is fine to medium subangular of coal.
HP04	GL-0.25 0.25-0.30	N/A	Brown slightly silty SAND Soft grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium subangular and subrounded of siltstone and mudstone. Occasional cobbles of sandstone.
HP05	GL-0.10 0.10-0.30	N/A	Light brown slightly clayey SAND. Sand is fine to medium. Soft mottled orange grey sandy CLAY. Sand is fine to medium.

²⁷ BS 5930:2015+A1:2020, Code of practice for ground investigations



2.3.3 Peatland Condition

Peatland condition across the Site is assessed within the PCA, presented in Technical Appendix 8.3.



3.0 Potential Impacts on Peat During Construction

The initial construction phase for the Proposed Development will include soil and peat stripping and excavation activities associated with construction of the Proposed Development.

There are four main types of impact on peat which can occur during construction. These are:

- loss of structural integrity and peat strength, due to stripping off or damaging the surface vegetation turf, excavation, handling and transporting peat (particularly wet, subsurface peat);
- erosion and gullyng, caused by exposure and desiccation of bare peat surfaces primarily caused by water erosion, due to surface runoff after rainfall;
- contamination, caused by leaks, spillages or inappropriate laydown of materials; and
- peat slide, caused by laying wet peat on top of wet peat, laying other heavy materials (including excavated mineral soil or other construction materials) on top of wet peat or by inappropriate stockpiling, such as attempting to create stockpiles of peat that are too high, without bunding, engineering or geotechnical support.

A range of methods and control measures are described below which are designed to prevent these impacts from occurring.



4.0 Peat Management and Mitigation

The Proposed Development design took account of a number of environmental and technical constraints. The design sought to avoid areas of thick peat where technically feasible, whilst taking into account other environmental and technical factors such as mining, ecology, ornithology, archaeology, hydrology, topography and existing infrastructure. The Proposed Development design evolution has largely avoided areas where peat (>0.5 m) is present.

Where peat and peaty soils are to be excavated, re-used or reinstated, the following good practice applies to protect carbon rich soils and mitigate impacts to peat.

4.1 Excavation

Excavated peat should be excavated as turves, including the acrotelm (surface vegetation) and a layer of adjoining catotelm (more humified peat) typically up to 0.5 m thick in total, or as blocks of catotelm; the acrotelm should not be separated from its underlying peat;

- the turves should be as large as possible to minimise desiccation during storage, though the practicalities of handling should be considered;
- the mixing of excavated peat with substrate materials to be avoided at all times; and
- consider timing of excavation activities to avoid very wet weather and avoid multiple handling to minimise the likelihood of excavated peat losing structural integrity.

If possible, extract intact full depth acrotelm layers from the top surface of the peat deposit. This technique will maintain connectivity between the surface vegetation and the partially decomposed upper layers of the catotelm.

4.2 Re-use

It is anticipated that the volume of material excavated for the construction of the Proposed Development can be entirely reused for a variety of restoration purposes, including around constructed structures, restoration of temporary hardstanding areas, and road verges. There is also potential for excavated peat and/or carbon-rich soils to be used for habitat restoration within the Site. This potential re-use option has not been quantified but will provide an additional method to retain and beneficially re-use material. Further details are provided in Section 6.0.

4.3 Storage

The following good practice applies to the storage of peaty soils/peat:

- stripped materials should be carefully separated to keep peat and other type of soils apart;
- to minimise handling and haulage distances, excavated material should be stored local to the site of excavation or end point of restoration;
- peat turves should be stored in wet conditions or irrigated in order to prevent desiccation (once dried, peat will not rewet);
- stockpiling of peat should be in large volumes to minimise exposure to wind and sun (and desiccation), but with due consideration for slope stability, but should not exceed 1 m in height to maintain stability of stockpile;
- stockpiles should be isolated from watercourses or drains with appropriate bunding to minimise pollution risks;
- to be stored a minimum of 10 m from any watercourse;



- stores of non-turf (catotelm) peat should be bladed off to reduce the surface area and desiccation of the stored peat; and
- peat storage areas should be monitored during periods of very wet weather, or during snowmelt, to identify early signs of peat instability.

Any peaty soils/peat to be removed during construction would require a temporary storage area near to the construction works/area of re-use. Where peat cannot be transferred immediately to an appropriate restoration area, short term storage will be required. In this case, the following good practice applies:

- peat should be stored around the excavation perimeter at sufficient distance from the cut face to prevent overburden induced failure;
- local gullies, diffuse drainage lines (or very wet ground) and locally steep slopes should be avoided for peat storage;
- drying of stored peat should be avoided by irrigation or by seeding (although this is unlikely to be significant for peat materials stored for less than two months);
- peat generated from permanent excavations should be transported directly to its allocated restoration location, to minimise the volume being stockpiled with the possibility of drying out;
- stores of catotelm peat should be bladed off to reduce their surface area and minimise desiccation;
- where transport cannot be undertaken immediately, stored peat should be irrigated to limit drying and stored on a geotextile mat to promote stability; and
- monitoring of large areas of peat storage during wet weather or snowmelt should be undertaken to identify any early signs of peat instability.

4.4 Transport

The following good practice applies to transport:

- movement of turves should be kept to a minimum once excavated, and therefore it is preferable to transport peat planned for translocation and reinstatement to its destination at the time of excavation; and
- if heavy goods vehicles (HGVs)/dump trucks that are used for transporting non-peat material are also to be used for peat materials, measures should be taken to minimise cross-contamination of peat soils with other materials.

4.5 Handling

Following refinement of the peat model, a detailed storage and handling plan should be prepared forming part of the detailed CEMP, including details of:

- best estimate excavation volume at each infrastructure location (including peat volumes split into area/volume of 'acrotelm' or 'turf', and volume of catotelm) which would be achieved by undertaking additional probing in line with current guidance;
- volume to be stored locally and volume to be transferred directly on excavation to restoration areas elsewhere (e.g. peat storage areas) in order to minimise handling;
- location and size of storage area relative to turbine foundations and infrastructure locations and natural peat morphology / drainage features; and
- irrigation requirements and methods to minimise desiccation of excavated peat during short term storage.



These parameters are best determined post-consent, informed by detailed ground investigation with the micro-siting areas for each element of infrastructure.

4.6 Access Tracks

There is guidance⁸ available to support access track design in peatlands. Guidance is generally focused on floating tracks and excavated tracks and is summarised below.

Based on the avoidance of significant areas of thick peat with tracks typically avoiding peat, with only limited sections of track on localised areas of peat, then the use of excavated tracks is unlikely to be required. Floating tracks may be considered on suitable length sections of access track where peat depths are >1.0 m, where detailed ground investigation confirms suitability.

Excavated tracks require complete excavation of soil/peat to a competent substrate. Excavated tracks will generally be undertaken where peat depths are less than 0.5 m. This peat/soil would require storage ahead of re-use elsewhere within the Proposed Development. Good practice guidance relates mainly to drainage in association with excavated tracks:

- trackside ditches should capture surface water (within the acrotelm) before it reaches the road;
- interceptor drains should be shallow and flat bottomed (and preferably entirely within the acrotelm to limit drawdown of the water table);
- any stripped peat turves should be placed back in the invert and sides of the ditch to assist regeneration and prevent erosion to the peat and wash out that could occur; and
- culverts and cross drains should be installed under excavated tracks to maintain subsurface drainage pathways (such as natural soil pipes or flushes). Discharge from constructed drainage should allow for as much diffuse dispersion of clean (silt free) water as possible while minimising disturbance to existing peatland as far as possible. Silt mitigation measures will be incorporated into all constructed drainage as per the requirements of the CEMP.

Although excavation is normally undertaken in peat of minor thickness (< 1.0 m), there is a possibility of minor slippage from the cut face of the peat mass. Accordingly:

- free faces should be inspected for evidence of instability (cracking, bulging, excessive discharge of water or sudden cessation in discharge); and
- where significant depths of peat are to be stored adjacent to an excavation, stability analysis should be conducted to determine Factor of Safety (FoS) and an acceptable FoS adopted for loaded areas.

Regular routine monitoring should be scheduled post-construction to ensure that hydrological pathways and track integrity have been suitably maintained.

4.7 Monitoring and Inspection

There would be frequent, routine and regular inspections of peat in all stockpiles and temporary storage areas as part of the PMP audit process. Inspections would assess in situ peat physical conditions, integrity of containment and temporary drainage conditions, and they would seek to confirm that stockpile design and management was adequate to prevent erosion and peat slide. These inspections would take place weekly during stockpile creation and storage.

Should any problems be observed during regular visual inspections of peat stockpiles, this would invoke implementation of an appropriate corrective action which would be recorded and monitored for effectiveness. Types of corrective actions would include, but would not



necessarily be limited to; modification of temporary drainage, additional or modified bunding, incorporation of sediment fencing if required, light re-grading to correct any areas of surface erosion, etc.

Regular, frequent inspections of peat conditions during construction and restoration phases of work would be carried out by the Engineer and ECoW as follows:

- peat surface, peat profile and peat consistency conditions would be carried out as part of ground investigations prior to the start of construction. This information would provide detailed information on the baseline conditions for each part of the infrastructure footprint;
- restored peat conditions would be inspected immediately after restoration to ensure that the methods detailed in the PMP had been correctly implemented and to inform any corrective actions should they be required;
- further monitoring to be undertaken where required to ensure restoration works have been correctly implemented; and
- the physical condition of peat would be retained as carefully as possible both at the peat storage and the peat restoration stages. This is particularly important for vegetation establishment.



5.0 Peat Balance Assessment

The assessment only includes infrastructure located on peat and carbon rich soils. **Table 5-2** lists the infrastructure assessed and outlines the criteria used to determine the inclusion or exclusion of individual infrastructure elements.

Table 5-2: Peat Balance Assessment presents estimated volumes of peat and peaty soils to be excavated and re-used during construction of the Proposed Development. The peat and peaty soil excavation and re-use volumes are also detailed for infrastructure elements located on peat in Annex 2.

5.1 Excavated Volumes

Peat excavation volumes associated with the construction of the Proposed Development have been calculated using the results from the peat depth surveys and interpolation using the GIS package ArcGIS. Peat excavation volumes are detailed in **Table 5-2** and **Annex 2** and based on the following assumptions:

- interpolation of peat depth was undertaken using the Spline interpolation method.
- an estimated acrotelm depth of 0.5 m across all infrastructure based on peat depth survey results.
- the acrotelm volumes have been calculated based on the average peat depth across each item of infrastructure and linear infrastructure based on peat depth survey results.
- an assumption that the peat probe depths are representative of the actual depth of peat (validated by the peat coring/hand pitting).
- Areas where probe depth exceeds 0.5 m but investigation confirms the absence of peat have been excluded from the assessment.
- the excavated volumes will comprise primarily acrotelmic peat and soils.

Table 5-1 Soils at Infrastructure Locations

Infrastructure Element	Average Probe Depth (m)	Peatland Indicators	Ground Investigation	Located on Carbon Rich Soils	Included in Assessment?
T1 to T3	N/A	None, located on mining disturbed ground.	N/A	No	No
T4	0.86	NVC survey indicates peatland species are present. E.g. Purple moor grass	Hand pit (HP05) confirmed no peat.	No	No
T4 Hardstand	0.66	NVC survey indicates peatland species are present. E.g. Purple moor grass, cotton grass	Auger (PC02) south of hardstand showed 0.7m of peat with 0.3m of clay substrate.	Yes	Yes



Infrastructure Element	Average Probe Depth (m)	Peatland Indicators	Ground Investigation	Located on Carbon Rich Soils	Included in Assessment?
T5	0.39	NVC survey indicates peatland species are present. E.g. Purple moor grass, rush	Auger (PC01) located south of turbine confirmed no peat.	No	Yes
T5 Hardstand	0.43	NVC survey indicates peatland species are present. E.g. Purple moor grass, rush	Auger (PC01) located south of turbine confirmed mineral soils i.e. no peat.	No	No
T6	N/A	None, located on mining disturbed ground.	N/A	No	No
T6 Hardstand	N/A	None, located on mining disturbed ground.	N/A	No	No
T7	N/A	None, located on mining disturbed ground.	Hand pit (HP04) located north of hardstand confirmed no peat present.	No	No
T7 Hardstand	N/A	None, located on mining disturbed ground.	Hand pit (HP04) located north of hardstand confirmed no peat present.	No	No
T8	0.90	None. Located on young plantation forestry.	Clay/silt substrate encountered during peat depth probing. No visual evidence of peat was observed at the ground surface.	No	No
T8 Hardstand	0.62	None. Located on young plantation forestry.	Clay/Silty substrate indicated on probe when extracted from ground during	No	No



Infrastructure Element	Average Probe Depth (m)	Peatland Indicators	Ground Investigation	Located on Carbon Rich Soils	Included in Assessment?
			peat depth surveys.		
T9	0.20	None. NVC indicates pasture	Hand pit (HP03) confirmed no peat present.	No	No
T9 Hardstand	0.36	None. NVC indicates pasture	Hand pit (HP03) confirmed no peat present.	No	No
T10	0.70	NVC survey indicates peatland species are present. E.g. Purple moor grass, soft rush	Auger (PC03, PC04) confirmed 0.5m peat present over clay substrate.	Yes	Yes
T10 Hardstand	0.64	NVC survey indicates peatland species are present. E.g. Purple moor grass, soft rush	Auger (PC03, PC04) confirmed 0.5m peat present over clay substrate.	Yes	Yes
T11	0.20	None. NVC indicates pasture	N/A	No	No
T11 Hardstand	0.25	None. NVC indicates pasture	N/A	No	No
T12	0.40	NVC survey indicates peatland species are present. E.g. Purple moor grass, soft rush	Hand pit (HP02) confirms peaty soils.	Yes	Yes
T12 Hardstand	0.54	NVC survey indicates peatland species are present. E.g. Purple moor grass, soft rush	Hand pit (HP02) confirms peaty soils.	Yes	Yes
T13	0.39	None. NVC indicates pasture	N/A	No	No



Infrastructure Element	Average Probe Depth (m)	Peatland Indicators	Ground Investigation	Located on Carbon Rich Soils	Included in Assessment?
T13 Hardstand	0.30	None. NVC indicates pasture	N/A	No	No
T14	0.11	None. NVC indicates pasture	N/A	No	No
T14 Hardstand	0.15	None. NVC indicates pasture	N/A	No	No
BESS	0.26	None. NVC indicates pasture	N/A	No	No
Compound Mid	0.22	None. NVC indicates pasture	N/A	No	No
Compound North	0.19	None. NVC indicates pasture	N/A	No	No
Compound South	0.29	None. NVC indicates pasture	N/A	No	No
Substation	0.28	None. NVC indicates pasture	N/A	No	No
New track T04 - T05	0.97	N/A	N/A	Yes	Yes
New track T07 - T11	0.54	N/A	N/A	Yes	Yes

5.2 Reuse Volumes

The volume of peat and carbon-rich soils to be reused around the Proposed Development is detailed in **Table 5-2** and **Annex 2** and based on the following assumptions:

- reuse would be undertaken in appropriate locations around the infrastructure perimeter such as track verges, the edges of permanent structures up to a 2 m wide strip either side of the track at an average thickness of up to 0.5 m (turves, acrotelmic peat and carbon-rich soils).
- reuse would be undertaken in appropriate locations around the perimeter of turbine hardstandings within a 2 m wide strip and with an average peat depth of 0.5 m.
- reuse would be undertaken in such a manner as to ensure integration with the adjacent habitat areas where possible.
- for temporary infrastructure including temporary hardstandings and compounds – full re-instatement of excavated peat would be undertaken at each location back to original depth.



- Mining-disturbed areas associated with infrastructure are currently characterised by exposed, sparsely vegetated ground and may be suitable for dressing with turves and peaty soils to facilitate land restoration and promote vegetation establishment.

5.3 Net Peat Balance

Table 5-2 provides an estimate of peat volumes to be excavated and reused during the construction of the infrastructure.

Table 5-2: Peat Balance Assessment

Infrastructure	Volume of Peat and Carbon-Rich Soils Excavated (m ³)*	Potential Volume of Peat Reused and Reinstated (m ³)*
New track on peat	3498	1790
Track to be upgraded	0	15,897
Turbine Bases	990	377
Hardstanding	13,859	450
BESS, Compounds and Substation	0	0
Total	18,347	18,514

*Rounded to nearest whole number

The total volume of peat and carbon-rich soils predicted to be excavated is expected to be approximately **18,347 m³**. Through reinstatement and reuse of peat at infrastructure locations and onsite restoration, all excavated peat and carbon-rich soils can be reused. Therefore, no excess peat is required to be disposed of off-site as a consequence of the Proposed Development.



6.0 Waste Classification

This section of the Stage 1 PMP includes the method for dealing with peat which could potentially be classified as waste (only if the above volumes estimate significant quantities of catotelm peat, which cannot be re-used).

Table 6-1 outlines where those materials that are likely to be generated onsite, fall within the Waste Management Licensing (Scotland) Regulations 2011.

Based on the results presented in this document, it has been concluded that all of the materials to be excavated onsite would fall within the non-waste classification and would be re-used onsite. Based on a detailed probing exercise and visual inspection of the peat, it is predominantly fibrous peat which would be suitable to be re-used onsite.



Table 6-1: Excavated Materials – Assessment of Suitability

Excavated Material	Indicative Volume % of total excavated soils	Is there a suitable use for material	Is the Material required for use on Site	Material Classified as Waste	Re-use Potential	Re-use on Site
Turf and Acrotelmic Peat	90	Yes	Yes	Not classified as waste	Yes	Will be re-used in reinstatement of access track verges, cut and fill verges, road verges, side slopes and check drains. Peripheral embankments of turbine bases, and crane hardstandings. May also be suitable to restore mining disturbed areas.
Upper catotelm Peat	10	Yes	Yes	Not classified as waste	Yes	Will be re-used in reinstatement of access track verges, cut and fill verges, road verges, side slopes and check drains. Peripheral embankments of turbine bases, and crane hardstandings.
Amorphous Catotelm Peat (amorphous material unable to stand unsupported when stockpiled >1m)	0	Potentially	Potentially	Potentially if not required as justifiable restoration of habitat management works	Limited	If peat does not require treatment prior to re-use, it can be used onsite providing adequate justification and method statements are provided and approved by SEPA. If it is unsuitable for use without treatment, then it may be regarded as a waste. However, every attempt to avoid this type of peat has been incorporated into the design.



7.0 Conclusion

This Outline PMP presents a pre-construction assessment of the expected peat extraction and reuse volumes associated with the works phase of the construction of the Proposed Development.

Through a process of continued design refinement (focused on minimising peat excavation volumes) and adoption of best practice working method, the Proposed Development is expected to achieve an overall peat balance, i.e. the volume (and character) of excavated peat complements requirements for re-use and reinstatement. Thus, all excavated material will be required for reuse as part of the works and no surplus peat is anticipated.

The Proposed Development supports moderately decomposed peat with a very distinct plant structure that is considered suitable for re-use during reinstatement work, e.g. dressing of infrastructure edges, reinstatement and restoration. Good practice standards, which will be outlined in the updated CEMP, relating to excavation, handling and storage of peat, shall ensure against any compromise to the structural integrity of the peat and its associated suitability for reuse.

Avoidance of localised pockets of deep peat that would otherwise require excavation will continue to be a key design refinement objective. Furthermore, it is expected that such micro-siting onto land supporting shallower peat deposits shall be possible during the construction of the Proposed Development.



Figures

Figure TA8.2.1 Probe Depth Plan

Annex 1 Logs and Photographs



Annex 2 Excavated Materials Calculation





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