Technical Appendix 8.1: Peat Depth Survey Results

Technical Appendix 8.1: Peat Depth Survey Results

1.1 Introduction

1.1.1 Ramboll was commissioned by the Applicant to undertake peat depth and coring survey to aid the design process and to an inform an assessment of the nature and condition of the peatland for the Proposed Development.

1.1.2 This Technical Appendix has been produced, in accordance with guidance published by the Scottish Environment Protection Agency (SEPA), NatureScot, and the Scottish Government, which is referenced in the following sections.

1.1.3 This Technical Appendix is supported by the following:

- Figure 8.1.1: Peat Depth;
- Figure 8.1.2: Solid Geology;
- Figure 8.1.3: Superficial Geology;
- Annex 8.1.1: Peat Coring Data; and
- Annex 8.1.2: Core Sample Photographs.

1.2 The Site and Study Area

1.2.1 The 'Site' (defined by the application boundary on **Figure 1.1 (EIAR Volume 3a)** covers an area of approximately 1,275 hectares (ha) and is located immediately northwest of Abington and approximately 4.5 km south east of Douglas, in South Lanarkshire, Scotland, UK.

1.2.2 The Site predominantly comprises open moorland, improved and semi-improved grassland, an area of forestry, and is intersected by the M74 motorway and B7078 local road. The landscape is typical of the wider location, with the Site positioned in the northern portion of the Southern Upland Hills, with Tinto Hill located approximately 8 km to the north. The Duneaton Water, a tributary of the River Clyde, passes through the eastern part of the Site and forms part of the northern and southern boundary. The A702 forms the eastern boundary.

1.2.3 According to the British Geological Survey's (BGS) 'Geology Viewer'[1] (1:625,000), the superficial deposits underlying the Site predominantly comprise Devensian Till (Diamicton) with alluvium, gravel, sands and silts mapped along the River Clyde and burns. Peat is shown mapped in the central part of the Site to the west of White Rig. Areas of glaciofluvial sands and gravels are also shown to the south of Mill Burn in the northern part of the Site, and in smaller areas across the Site. The higher parts of the Site are shown as unmapped indicating that there are potentially no superficial deposits present (see **Figure 8.1.3**).

1.2.4 The underlying bedrock across most of the western part of the Site is mapped as the Auchtitench Sandstone Formation, comprising volcaniclastic conglomerate. The central part of the Site is mapped as the Marchburn Formation, comprising wackes, and the eastern part of the Site is mapped as the Kirkcolm Formation, again comprising wackes (**Figure 8.1.2**).

1.2.5 There are extant and disused quarries present at the Site which are understood to have been used for sand and gravel extraction (central area between the B7078 and M74, and north of the M74) and rock extraction (north westernmost part of the Site, north of the M74).

1.2.6 A review of the SNH Carbon and Peatland Map (2016)[2], an extract of which is shown on **Figure 8.6: SNH Carbon and Peatland Map 2016 (EIAR Volume 3a**), confirms that areas of peat and organic material are present across the western parts of the Site. Most of the peat is shown as Class 3 or Class 5, however, there is a large area of Class 1 peat indicated to be located in the area to the south of the B7078 road ('nationally important carbon rich soils, deep peat and priority peatland habitat'). The majority of the western part of the Site is shown as comprising Class 3 peat with smaller areas of Class 5. The eastern part of the Site is shown as comprising mineral soils.

1.3 Methodology

1.3.1 Peat surveys were undertaken at the Site to understand the baseline peat conditions and potential constraints, and to inform the design of the Proposed Development to minimise, as far as practicable, the potential direct and indirect effects on peat and carbon rich soils.

1.3.2 The surveys were undertaken by Fluid Environmental Consultants and Ramboll on the following dates:

- Stage 1 peat probing was completed by Fluid Environmental Consultants in August 2023; and
- Stage 2 Peat probing was completed by Ramboll in April 2024.

1.3.3 Peat probing and coring followed relevant guidance on peatland survey[3,4] .The methods employed for peat depth probing and peat coring are detailed further below.

Stage 1 Peat Probing

1.3.4 The Stage 1 survey is a preliminary, low density survey and was carried out on a 100 m grid across the Site within areas of likely peatland and on a 200 m grid in areas likely to be absent of peat soils, with additional points taken where peat was encountered to delineate the areas of peat.. The probing was carried out using collapsible avalanche probes, allowing for probing in excess of 6 m. However, such depths were not reached. This peat depth data along with other environmental and engineering constraints were used to inform the layout of the Proposed Development.

1.3.5 The survey points and field data were collected using a handheld Trimble GPS unit. Peat depth data was modelled using Inversive Distance Weighted (IDW) interpolation in GIS software, and a depth model generated using incremented peat depth categories.

Stage 2 Peat Probing and Coring

1.3.6 The high-density probing during the Stage 2 survey was carried out along the access tracks, and in the planned turbine, crane pad, and compound locations, known at the time of the survey. This included a 50 m micrositing zone around each turbine location. The sampling pattern comprised:

- Proposed turbine locations: peat probing was undertaken at 10 m intervals along cardinal points from the central point of the infrastructure; and
- Proposed new tracks: the alignment was probed at 50 m intervals along the track and at points every 10 m perpendicular to the centreline on either side of the proposed track.

1.3.7 Again, this was carried out using collapsible avalanche probes, allowing for probing in excess of 6 m, and data collected using a handheld Trimble GPS unit.

1.3.8 The peat probe locations are shown in Figure 8.1.1 (of this Technical Appendix)

[1] British Geological Survey Online Viewer (https://mapapps.bgs.ac.uk/geologyofbritain/home.html).

[2] Scottish Natural Heritage. (2016). Carbon and Peatland 2016 Map (http://map.environment.gov.scot/soil_maps/)

[3] Scottish Government, Scottish Natural Heritage, SEPA. (2017). Peatland Survey. Guidance on Developments on Peatland, online version only.

[4] Scottish Renewables and SEPA (2012). Development on Peatlands. Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste.

1.3.9 Peat cores were taken using a Russian auger, with a sample volume of 0.5 l, and a number of field tests and observations were undertaken. The probing results are included in Annex 2.3.1 of this Technical Appendix, and records taken include:

- Depth of acrotelm;
- Degree of humification (using Hodgson, 1974), to establish amorphous, intermediate, fibrous and content;
- Degree of humification using the Von Post classification;
- Fine fibre content, based on scale of F0 (none) to F3 (very high);
- Coarse fibre content, based on scale of R0 (none) to R3 (very high);
- Water content, based on scale of B1 (dry) to B5 (very wet); and
- Substrate underlying the peat where this was possible.

1.3.10 A peat depth probe was taken adjacent to the core location, and cores were photographed (refer to Annex 8.1.1 of this Technical Appendix).

1.3.11 Samples of known volume were taken for laboratory analysis. During laboratory analysis, the samples were weighed, dried, and a subsample taken for loss on ignition testing. The total moisture content was determined from weight measurements. Peat pH was also determined.

1.4 Limitations

1.4.1 Peat probing and mapping has been used to inform the design process, at strategic points in the design evolution of the Proposed Development. However, there are some differences between the final design and the extent of the peat survey results based on design changes made through this process, as a result of micrositing etc.

1.4.2 However, the peat survey probing points do provide high resolution coverage of the Site, and these revealed the peatland to be typically shallow (less than 1.0 m) but with several pockets of deeper peat (up to 4.5 m). It is considered that the peat depth data collected, and interpolations derived from these data, are representative of the Site and have adequately informed the layout of the Proposed Development and are sufficient to inform a robust Peat Landslide Hazard Risk Assessment and outline Peat Management Plan.

1.4.3 Should turbines be microsited within a distance greater than 50 m, then further targeted peat probing would be undertaken post application.

1.4.4 Survey was limited in quarried areas due to potential health and safety risks to surveyors but is not considered to be a significant constraint as it is assumed that any peat has already been extracted in these areas.

1.5 Results

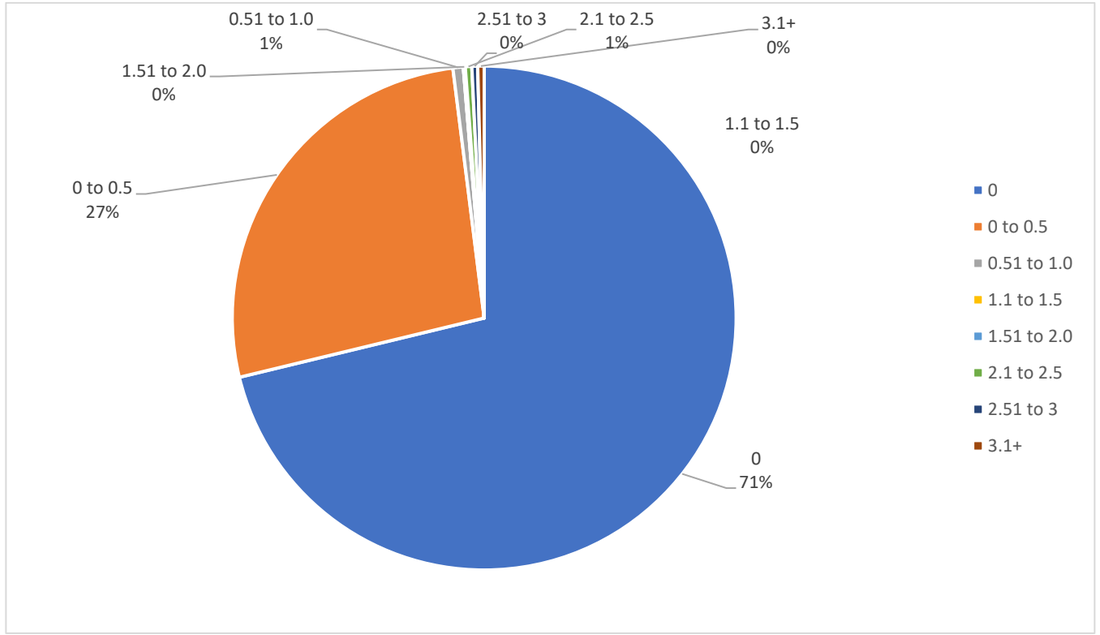
Peat Probing

1.5.1 A total of 900 peat depth probes were taken during the Stage 1 peat survey and 1,515 peat depth probes during Stage 2. Therefore there is a combined peat depth dataset of 2,415 probes, as shown in Figure 8.1.1 (of this Technical Appendix).

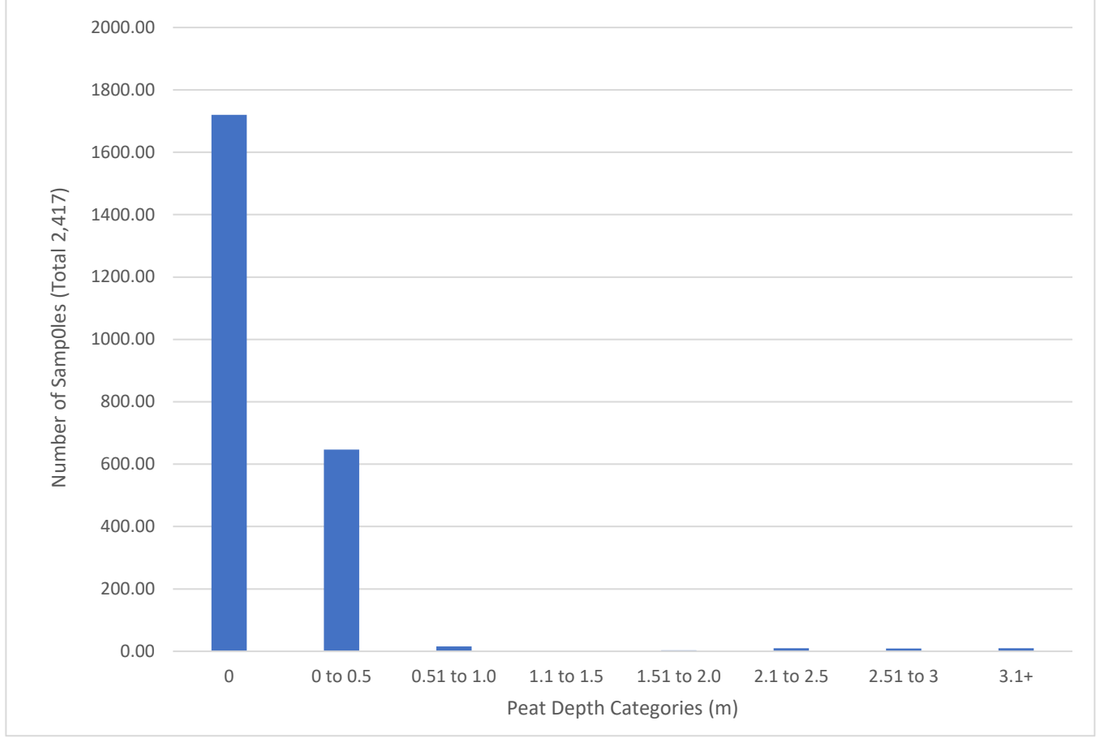
1.5.2 Graph 8.1.1 and Graph 8.1.2 below present the percentage and frequency of peat probe results within the specific peat depth categories recorded during the Stage 1 and Stage 2 surveys.

1.5.3 Figure 8.1.1 (of this Technical Appendix) shows the results of the peat depth survey at the Site, as well as the specific depth class at each sample location. Figure 8.1.1 (of this Technical Appendix) is based on IDW data interpolation and consequently the peat depth contours and boundaries are to a degree indicative.

Graph 8.1.1 Percentage Peat Depth Categories (All Surveys Combined)



Graph 8.1.2 Peat Depth Frequency Distribution



1.5.4 As shown on Graph 8.1.1 and Graph 8.1.2, most of the Site has either no peat present or has a shallow depth of peat present (approximately 98% were <0.5 m in depth). These areas of shallow peat can be considered as organo-mineral soils, and therefore not considered as deep peat. These are summarised as follows:

- 1,720 no. samples (71.2%) located on land with no peat/ absent;
- 647 no. samples (26.8%) located on land with less than or equal to 0.5 m depth of peat
- 16 no. samples (0.7%) fell on land with between 0.51 m and 1.0 m depth of peat
- 3 no. samples (0.1%) located on land with between 1.51 m to 2.0 m depth of peat
- 10 no. samples (0.4%) located on land with between 2.1 m to 2.5 m depth of peat
- 9 no. samples (0.4%) located on land with between 2.51 m to 3 m depth of peat and;
- 10 no. samples (0.4%) located on land with 3.1+ m

1.5.5 The maximum depth of peat recorded at the Site during the Stage 1 survey was 4.4 m, located in the western area of the Site, south of the B7078. Smaller pockets of deeper peat were recorded in the central part of the Site, immediately south of the M74. The maximum depth of peat taken from samples dispersed across the Site during the Stage 2 peat probe survey was 2.3 m. The mean probe depth recorded was 0.1 m.

1.5.6 Land where peat depth is greater than 0.5 m is classified as 'blanket bog' by NatureScot (MacDonald et al., 1998) [5]and JNCC (JNCC, 2010)[6]; however, some areas with a peat depth of less than 0.5 m can still form part of the wider hydrologically connected mire, or macrotope. As per above, much of the peatland or organo-mineral soil habitats within the Site have less than 0.5 m of peat/ soil present.

Accuracy of Peat Depth Probes

1.5.7 At each core sample location, a peat depth probe was taken adjacent to the core sample to compare the probed depth against the true depth determined by measuring the depth of material retained in the core sample.

1.5.8 To ensure the full depth of peat is sampled, a core is extracted that confirms the peat/ substratum boundary has been reached. This approach allows a relative assessment of the accuracy of the peat depth probing. Peat or organo-mineral soil was present at all sample locations. The results are presented in Annex 8.1.2.

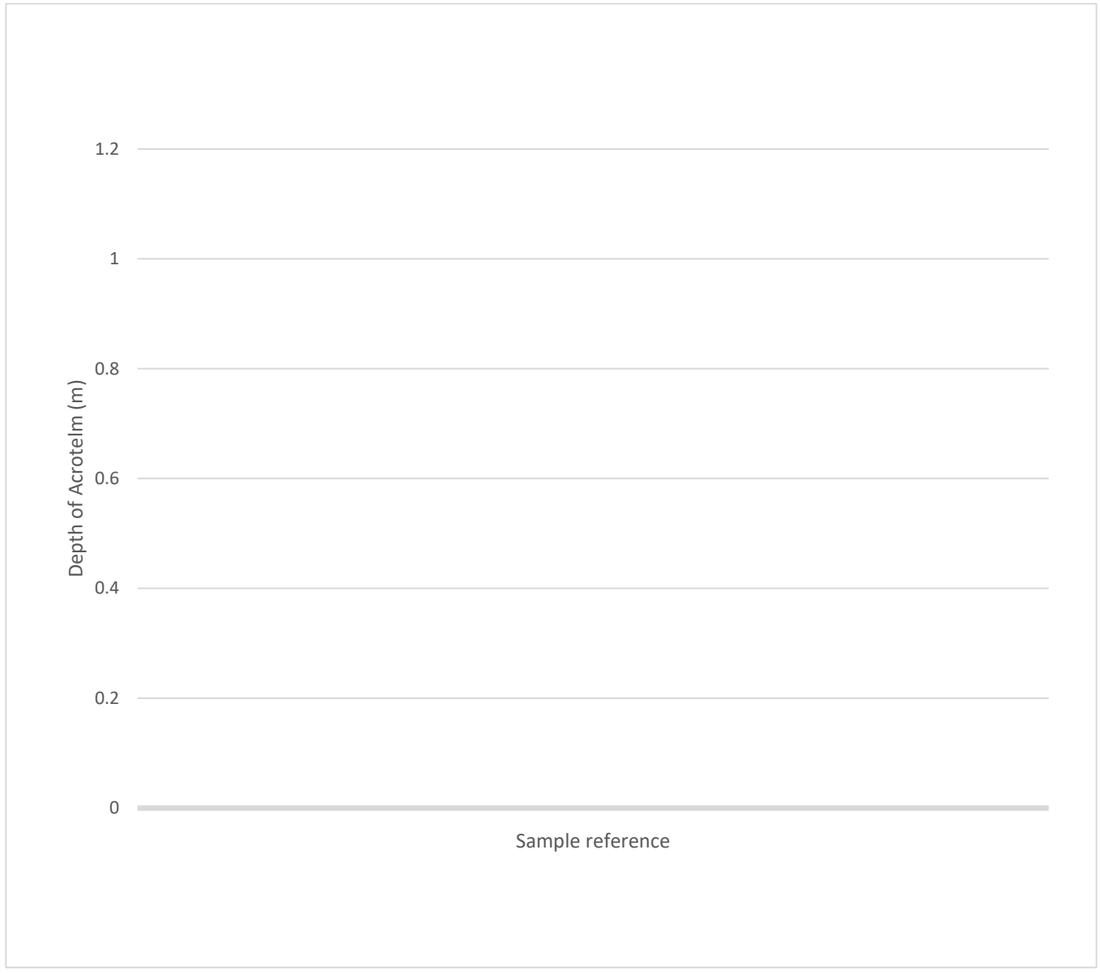
Depth of Acrotelm

1.5.9 The acrotelm and catotelm represent two distinct layers within undisturbed peat that control the hydrological regime. The catotelm is the bottom layer of peat that is mostly below the water table. The acrotelm overlies the catotelm and is the 'living' layer in which most water table fluctuations occur. The thickness of the acrotelm usually varies up to around 0.5 m, but it largely depends upon the habitat. Anaerobic and aerobic conditions alternate periodically with the fluctuation of the water table, favouring more rapid microbial activity than in the catotelm. The acrotelm consists of the living parts of mosses and dead and poorly decomposed plant material. It has a very loose structure that can contain and release large quantities of water in a manner that limits variations of the water table in peat bogs.

1.5.10 Graph 8.1.3 shows that acrotelm was recorded at (4) four sample locations, with a mean depth of 0.05 m. The other sample locations indicated no discernible acrotelm.

1.5.11 In the context of any development, it is recommended[4] that for the purposes of construction and subsequent reinstatement, where a sufficient peat depth exists, the top 0.5 m of material should be treated as acrotelm. This approach will allow excavation of intact turves for reinstatement purposes where they are present, which will in turn facilitates quicker regeneration of disturbed areas. Even if little vegetation is present within this top layer it should still be treated as acrotelmic material as it may contain a seedbank, particularly in open habitats, which will aid re-vegetation of reinstated areas.

Graph 8.1.3: Depth of Acrotelm



Degree of Humification

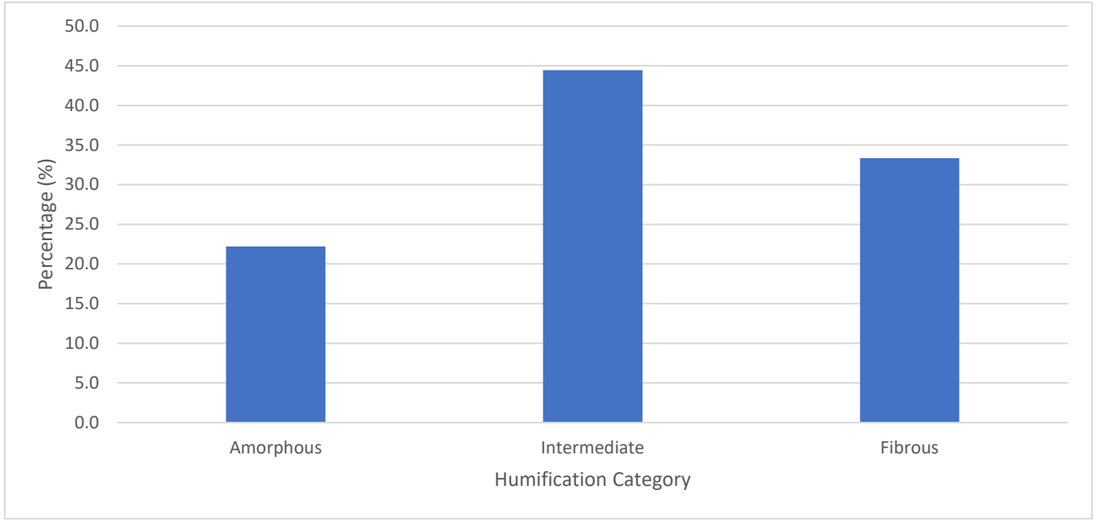
1.5.12 The degree of humification was recorded in the field, in accordance with the methods discussed in the methodology section, with each 0.5 m sub-sample being categorised as either fibrous, intermediate, or amorphous peat.

1.5.13 Graph 8.1.4 summarises the degree of humification, which indicates that most of the samples are classed as either intermediate or fibrous. This is suggestive that there is a degree of humification present with some areas being subject to increased humification, with more decomposed peat present.

[5] MacDonald, A. Stevens, P., Armstrong, H., Immirzi, P. and Reynolds, P. (1998). A Guide to Upland Habitats: Surveying Land Management Impacts (Volume 1). NatureScot/Scottish Natural Heritage, Edinburgh

[6] JNCC (2010) Handbook for Phase 1 Habitat Survey, Joint Nature Conservation Committee, Peterborough.

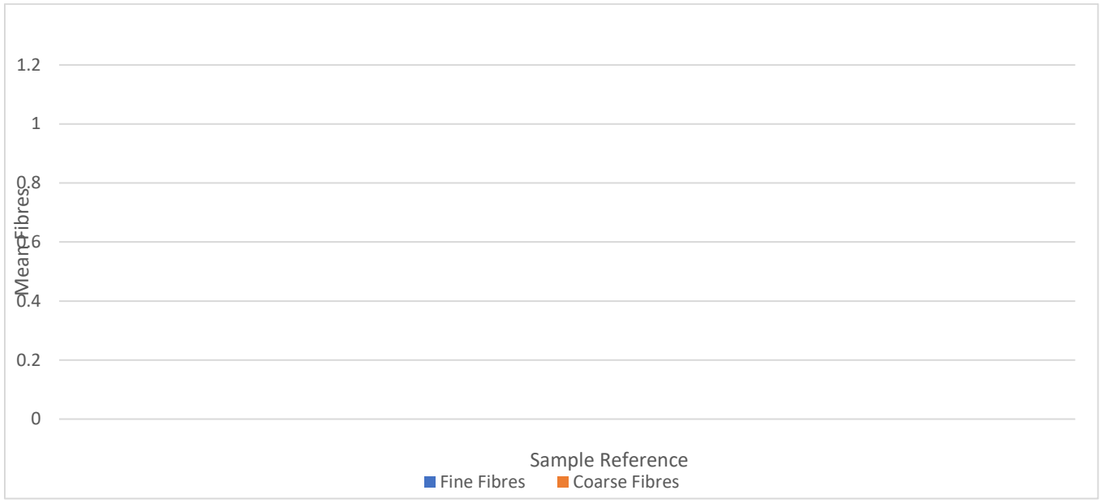
Graph 8.1.4: Degree of Humification



Fibrous Content

1.5.14 The proportions of coarse and fine fibres within the peat samples were derived in the field according to the Hobbs scale[7], where F0/R0 indicate no fine/ coarse fibre content to F3/R3 which are indicative of high fine/ coarse fibre respectively. This indicates that the majority of the samples were assessed as having moderate fine fibre content (F2). Three samples were assessed as having a high fine fibre content (F3).

Graph 8.1.5: Fibrous Content



1.5.15 The majority of the sample locations were assessed as having a low coarse fibre content (R1), with three locations having a moderate coarse fibre content (R2). No samples were assessed as having a high coarse fibre content (R3). These results are summarised in Graph 8.1.5.

Water Content

1.5.16 The water content of the samples was determined in the field using the Hobbs scale, where B1 is dry and B5 is very wet. The results are summarised in Graph 8.1.6.

Graph 8.1.6 Water Content

1.5.17 The results indicate that most of the of the samples recorded are indicative of dry peat (B1) or moderate wet peat (B2). Two samples were recorded as wet peat (B3).

Von Post (Degree of Humification)

1.5.18 An estimate of the degree of humification according to the Von Post scale was carried out on samples at all core locations. The criteria associated with the Von Post scale is included in Table 8.3.1.

Table 8.3.1: Von Post Scale of Humification

Von Post Scale	Humification Description (Decomposition, Plant Material Present, Water Content, Character)
H1	Completely undecomposed peat free of amorphous material. On squeezing, clear colourless water is pressed out.
H2	Nearly undecomposed peat, free of amorphous material, yielding only yellowish brown water on pressing.
H3	Very slightly decomposed peat, containing a little amorphous material. On squeezing, muddy brown water but no peat passes between the fingers. Residue is not pasty.
H4	Slightly decomposed peat containing some amorphous material. Strongly muddy brown water but no peat passes between the fingers. Residue is somewhat pasty.
H5	Moderately decomposed peat containing a fair amount of amorphous material. Plant structure recognisable though somewhat vague. On squeezing, some peat but mainly muddy water issues. Residue is strongly pasty.
H6	Moderately decomposed peat with a fair amount of amorphous material and indistinct plant structure. On pressing, about one third of the peat passes between the fingers. Residue is strongly pasty, but shows the plant structure more distinctly than in unsqueezed peat.
H7	Strongly decomposed peat with much amorphous material and faintly recognisable plant structure. On squeezing, about one half of the peat is extruded. The water is very dark in colour.

[7] Hobbs, N.B. (1986).Mire morphology and the properties and behaviour of some British and foreign peats. QJEG, London

Table 8.3.1: Von Post Scale of Humification	
H8	Strongly decomposed peat with much amorphous material and very indistinct plant structure. On squeezing, two thirds of the peat and some water passes between the fingers. Residue consists of plant tissues capable of resisting decomposition (roots, fibres, wood, etc.).
H9	Practically fully decomposed peat with almost no recognisable plant structure. Nearly all the peat squeezed between the fingers as a uniform paste.
H10	Completely decomposed peat with no discernible plant structure. On squeezing, all the peat, without water, passes between the fingers.

1.5.19 The results are shown in Graph 8.1.7, where the vertical axis refers to the Von Post scale of peat decomposition (on a scale of H1 to H10).

1.5.20 The results indicate that most of the samples were found to be scored relatively high on the Von Post scale (>H4) indicating a stronger rate of decomposition (between H5 and H7).

Graph 8.1.7 Mean Von Post

pH of Samples

1.5.21 The pH values of the core samples were analysed in a laboratory, and the results provided in Graph 8.1.8 below.

Graph 8.1.8: Mean pH

1.5.22 The mean pH value was 3.9, with a range between 3.3 and 5.4, which indicates that all samples are acidic in nature. This result is typical of peat and carbon rich soils.

Total Carbon (%)

1.5.23 The total carbon context was derived by laboratory analysis for each sample and is summarised in Graph 8.1.9. This indicates a consistent high carbon content with a mean of 92.1%. One sample recorded a significantly lower carbon content.

Graph 8.1.9: Total Carbon Percentage (%)

1.6 Summary

1.6.1 The results of the Stage 1 and Stage 2 surveys undertaken for the Proposed Development are as follows:

1.6.2 Overall, the findings of the peat depth survey found that peat deposits are limited across the Site with either no peat or relatively shallow peat being recorded in 98% of samples. The mean probe depth recorded across the Site is 0.1 m. The deepest areas of peat, up to 4.4 m, were noted to be in the western area of the Site south of the B7078. Other smaller pockets of deeper peat were noted in the central part of the Site south of the M74. These are shown on **Figure 8.1.1** (of this Technical Appendix). The Proposed Development has been located away from these areas of deeper peat . No turbines are located on deep peat (>0.5 depth).

1.6.3 The peat across the Site is generally intermediate or fibrous in nature, with the majority of the samples assessed as having moderate fine fibre content (F2), with three samples having a high fine fibre content (F3). The majority of the sample locations were assessed as having a low coarse fibre content (R1), with three locations having a high coarse fibre content (R3)

1.6.4 The results of the Von Post indicate that the majority of the samples tested scored between H5 and H7, indicating moderate to strong rates of decomposition.

1.6.5 The mean water content of the peat at all sample locations was dry or semi-dry, which is consistent with the high degree of modification to the peatland integrity and composition, e.g. through artificial drainage and overplanting with coniferous plantation forest. The drainage of the Site for the purposes of plantation forestry has caused drying, oxidation, and erosion of peat and carbon-rich soils, which have likely increased carbon release.

1.6.6 The peat was found to be acidic with a mean pH value of 4.2, and a range between 3.3 and 5.4, indicative of peat and carbon rich soils.

1.6.7 Laboratory analysis of samples indicates that the peat has a high total carbon content.

Figures

Peat Depth (m)

Sample Location	Interpolated
No Peat	No Peat
0.01 - 0.50	0.02 - 0.5
0.50 - 1.0	0.51 - 1
1.0 - 1.5	1.01 - 1.5
1.5 - 2.0	1.51 - 2
2.0 - 2.5	2.01 - 2.5
2.5 - 3.0	2.51 - 3
3.0 - 3.5	3.01 - 3.5
3.5 - 4.0	3.51 - 4
4.0 - 4.5	4.01 - 4.5

Legend

- Site Boundary
- Turbines
- Solar PV Modules
- Inverter
- Substation
- Construction Compound
- Battery Site
- Borrow Pit Location
- Turbine Hardstanding Concrete
- Access Track, Junction & Turning Heads

0 1 2 Kilometres

Figure Title	Peat Depth
Project Name	M74 West Renewable Energy Park
Project Number	1620015684
Figure No.	8.1.1
Date	August 2024
Prepared By	BE
Scale	1:22,500 @A3
Issue	1
Client	**M74 West Ltd**

RAMBOLL

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.
1620015684-RAM-MA-IA-00050_Fig8.1.1PeatDepth_04.pagx

BGS Bedrock Geology (625 k)

CLACKMANNAN GROUP - SEDIMENTARY ROCK CYCLES, CLACKMANNAN GROUP TYPE	*Ckn-cycc*	KIRKCOLM FORMATION - WACKE	*Kkf-wacke*
STRATHCLYDE GROUP - SEDIMENTARY ROCK CYCLES, STRATHCLYDE GROUP TYPE	*Syg-cycs*	TAPPINS GROUP - WACKE	*Tap-wacke*
LANARK GROUP - SANDSTONE AND CONGLOMERATE, INTERBEDDED	*Lnk-scon*	CRAWFORD GROUP AND MOFFAT SHALE GROUP (UNDIFFERENTIATED) - MUDSTONE, CHERT AND SMECTITE-CLAYSTONE	*Crmf-mdcb*
UNNAMED EXTRUSIVE ROCKS, SILURIAN TO DEVONIAN - MAFIC LAVA AND MAFIC TUFF	*Uexsd-latm*	**Dykes**	
		UNNAMED IGNEOUS INTRUSION, PALAEOGENE - MAFIC IGNEOUS-ROCK	*Uig-mfir*
		Fault Lines	
		Fault at rockhead	

Legend

- Site Boundary
- Turbines
- Solar PV Modules
- Inverter
- Substation
- Construction Compound
- Battery Site
- Borrow Pit Location
- Turbine Hardstanding Concrete
- Access Track, Junction & Turning Heads

0 1 2 Kilometres

Figure Title
Solid Geology

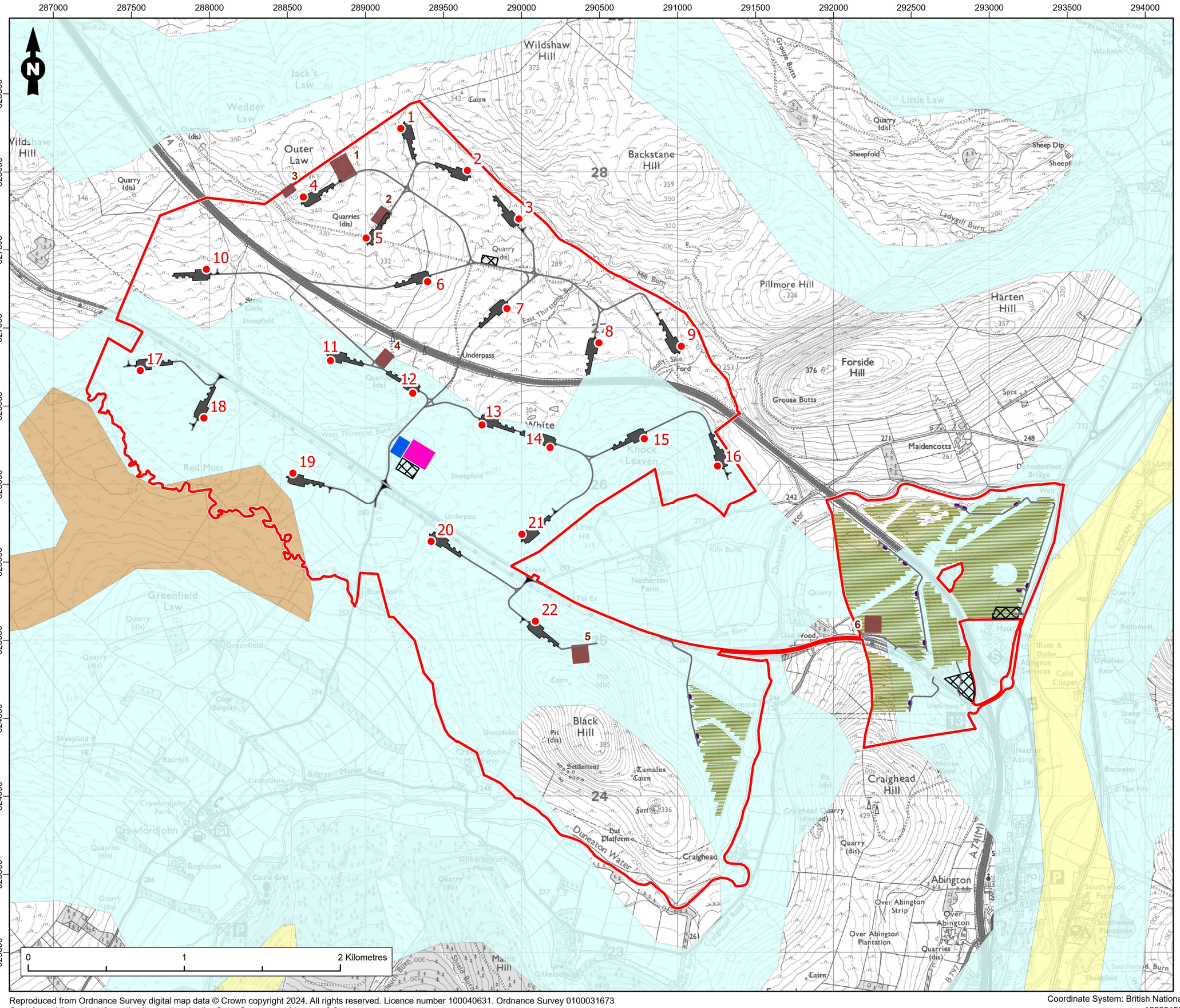
Project Name
M74 West Renewable Energy Park

Project Number	Figure No.
1620015684	8.1.2
Date: August 2024	Prepared By: BE
Scale: 1:25,000 @A3	Issue: 1

Client
M74 West Ltd

RAMBOLL

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.
1620015684-RAM-MA-IA-00047_Fig8.1.2SolidGeology_04.pagx



Legend

- Site Boundary
- Turbines
- Solar PV Modules
- Inverter
- Substation
- Construction Compound
- Battery Site
- Borrow Pit Location
- Turbine Hardstanding Concrete
- Access Track, Junction & Turning Heads

Superficial Geology (BGS 625k)

- Alluvium - Clay, Silt and Sand
- Peat-Peat
- Till - Diamicton

Figure Title
Superficial Geology

Project Name
M74 West Renewable Energy Park

Project Number	Figure No.
1620015684	8.1.3
Date	**Prepared By**
August 2024	BE
Scale	**Issue**
1:22,500 @A3	1

Client
M74 West Ltd

RAMBOLL

Coordinate System: British National Grid. Projection: Transverse Mercator. Datum: OSGB 1936.
1620015684-RAM-MA-IA-00048_Fig8.1.3SuperficialGeology_04.pagx

Annex 8.1.1: Core Sample Photographs

	
RAM-PC04 0.5-1.0m	RAM-PC04 1.0-1.5
	
RAM-PC03 0-0.5	RAM-PC04 1.5-2.0

	
RAM-PC02 0-0.5	RAM-PC01 0-0.5m

Annex 8.1.2: Peat Coring Data

Cored sample ref	Surface	Substrate	Peat Depth (m)	Fibrous	Pseudofibrous	Amorphous	Samp probed depth (m)	Samp cored depth (m)	Acrotelm depth (m)	Colour	Amorphous percent	Intermediate percent	Fibrous percent
RAM-PC04	Peat Core	Rock	2.3	40	40	20	2.3	1	0	dark brown	30	40	30
RAM-PC04	Peat Core	Rock	2.3	40	40	20	2.3	1.5	0	dark brown to black	40	40	20
RAM-PC03	Peat Core	Rock	2.3	40	40	20	2.3	0.5	0.1	dark brown	20	40	40
RAM-PC04	Peat Core	Rock	2.3	40	40	20	2.3	2	0	dark brown to black	40	40	30
RAM-PC02	Peat Core	Rock	0.8	30	40	30	0.7	0.5	0.05	dark brown	20	30	50
RAM-PC01	Peat Core	Rock	0.7	20	30	50	0.7	0.5	0.05	dark brown	20	30	50

Technical Appendix 8.2: Outline Peat Management Plan

Technical Appendix 8.2: Outline Peat Management Plan

1.1 Introduction

1.1.1 The Outline Peat Management Plan (PMP) has been prepared in accordance with appropriate guidance and best practice[1,2].

1.1.2 This Outline PMP should be read in conjunction with the Outline Construction Environmental Management Plan (CEMP) (**Technical Appendix 2.1, EIAR Volume 4**) and the various other reports that contribute to it, including the Peat Depth Survey Report (**Technical Appendix 8.1, EIAR Volume 4**) and Peat Landslide Hazard Risk Assessment (PLHRA) (**Technical Appendix 8.3, EIAR Volume 4**).

1.1.3 The Outline PMP describes principles and methods to be used by the Applicant when excavating, moving and reinstating peat. It includes a volumetric peat balance and contains requirements for the final PMP, that will be developed by the Contractor post consent, prior to construction. A final PMP will be produced by the Applicant's infrastructure Contractor.

1.1.4 The overarching aim of the PMP is to provide guidance and a framework for the Contractor to effectively reuse peat excavated during construction in order to maintain and improve peatland habitats, minimise the risks to water quality and volumes, and retaining and using peat as close as possible to the point of extraction. The main requirement for the Contractor is to plan peat management in detail and incorporate its progressive reinstatement and restoration of adjacent peatland areas into the construction programme so that they take place concurrently, minimising time the peat is in temporary storage and avoiding double-handling of peat.

1.2 Summary of Peat Depth

1.2.1 Most of the developable area of the Site has either no peat present or has a shallow depth of peat soil present (~98% <0.5 m in depth). Whilst the majority of the coverage is relatively shallow, the maximum depth of peat recorded at the Site was 4.4 m, located in the western area of the Site, south of the B7078 and in the central part of the Site, immediately south of the M74. The mean peat depth recorded was 0.1 m. The design of the Proposed Development has taken into consideration peat depths, along with other technical and environmental constraints, and the Proposed Development's infrastructure has been sited away from these areas, where possible.

1.3 Limitations

1.3.1 Peat probing and mapping have been used to inform the design process, at strategic points in the design evolution of the Proposed Development. However, there are some differences between the final design and the extent of the peat survey results based on design changes made through this process, as a result of micrositing etc.

1.3.2 However, the peat survey probing points do provide high resolution coverage of the Site, and these revealed the peatland to be typically shallow (>1.0 m) but with pockets of deeper peat, particularly in the western and central parts of the Site. It is considered that the peat depths collected, and interpolations derived from these data, are representative of the Site and have adequately informed the layout of the Proposed Development.

1.3.3 The peat excavation and reuse volumes included in this outline PMP are intended as an initial indication. The total peat volumes are based on a series of design assumptions and estimates for the Proposed Development layout and peat depth sample data interpolated across discrete areas of the Site. Such parameters can still vary over a small scale and therefore local topographic changes in the geological profile may impact the total accuracy of the volume calculations.

1.3.4 The PMP is a 'live' document and would be developed into a final PMP post-consent and in advance of construction commencing when the Contractor has been appointed. It is anticipated that additional data would be collected during pre-construction ground investigation work and would be used to aid the detailed design of civil engineering work (including micrositing to optimise the layout in response to localise pockets of deeper peat) thereby minimising impacts on peatland within the micrositing tolerances, and to gather further information on the characteristics of the peat deposits present. A finalised post-consent layout would be completed once detailed ground investigations have been undertaken and before construction works commence. This would demonstrate how any newly collected information has been used to inform the proposed layout and minimise impacts on features such as deep peat.

1.4 Peatland Condition

1.4.1 Two peat depth probing surveys were undertaken at the Site, with a combined total of 2,415 peat probes taken. This comprised 900 peat depth probes during the Phase 1 survey, as part of a low resolution survey across the developable area of the Site, and a further 1,515 probes during Phase 2 survey based on a more mature development layout. The results of the surveys were used to inform the design layout of the Proposed Development.

1.4.2 Most of the developable area of the Site has either no peat present or has a shallow depth of peat present (~90% <0.5 m in depth) these areas of shallow peat can be considered as organo-mineral soils. These are further summarised as follows:

- 1,720 no. samples (71.2%) located on land with no peat/ absent;
- 647 no. samples (26.8%) located on land with less than or equal to 0.5 m depth of peat
- 16 no. samples (0.7%) fell on land with between 0.51 m and 1.0 m depth of peat
- 3 no. samples (0.1%) located on land with between 1.51 m to 2.0 m depth of peat
- 10 no. samples (0.4%) located on land with between 2.1 m to 2.5 m depth of peat
- 9 no. samples (0.4%) located on land with between 2.51 m to 3 m depth of peat and;
- 10 no. samples (0.4%) located on land with 3.1+ m

1.4.3 The maximum depth of peat recorded at the Site during the Stage 1 survey was 4.4 m , located in the western area of the Site south of the B7078 and in the central part of the Site immediately south of the M74. The maximum depth of peat taken from samples dispersed across the Site during the Stage 2 peat probe survey was 2.3 m. The mean peat depth recorded was 0.1 m.

1.4.4 The peat depth data was interpolated in GIS using an inverse distance weighting approach, the results of which are shown on **Figure 8.1.1 in Technical Appendix 8.1, EIAR Volume 4**.

1.4.5 The Proposed Development has been located away from these deeper peat locations where practicable, taking into account other environmental and technical constraints, or microsited to minimise potential adverse effects. No turbines are located on deep peat.

1.4.6 Further details of the peatland condition and findings from the peat surveys are included in the Peat Depth Survey Report (**Technical Appendix 8.1, EIAR Volume 4**).

[1] Scottish Renewables and SEPA, (2012). Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste.

[2] SEPA, (2011).Restoration Techniques Using Peat Spoil from Construction Works.

1.5 Estimated Peat Balance

1.5.1 The volume of peat excavated and to be reinstated has been estimated based on the following data and assumptions:

- review of interpolated peat model generated using Ordnance Survey 5 m Digital Terrain Model;
- peat depth survey data from probing during the Phase 1 and 2 surveys;
- excavations would take place only within the footprint of the Proposed Development;
- peat would shrink on replacement due to some inevitable dewatering during handling and compaction at placement;
- improvement to areas of degraded or existing peatland would be undertaken as part of habitat management and restoration proposals (as laid out in the outline Habitat Management Plan, **Technical Appendix 6.7, EIAR Volume 4**). These would be confirmed and developed further as part of the detailed PMP and habitat management plans prior to construction;
- assumed that temporary peat excavated from temporary infrastructure such as the construction compound and cable runs could be reinstated, and therefore not considered as part of the permanent excavation volumes;
- assumed that a worst case estimate of 0.5 m peat depth in areas of shallow peat (
- assumed that no peat is present at the proposed substation and battery energy storage site as it is currently in use as a quarry;
- assumed worst case of 0.5 m peat depth in areas of shallow peat (<0.5 m depth);
- up to six (6) borrow pits are proposed as part of the Proposed Development; and
- a proportion of acrotelm peat would become unsuitable for reuse as the top layer due to unavoidable damage to vegetation during the excavations.

1.5.2 Specific design assumptions used to estimate the peat volumes to be excavated and reinstated are:

- the area for construction of the wind turbine foundations has been estimated to be a maximum diameter excavation to allow for an excavated working area around the concrete foundation (refer to Chapter 2: Development Description). A concrete foundation slab of approximately 22 m diameter would sit on the underlying rock or suitable substratum with a founding depth of between 3 m to 5 m. With regard to backfilling at these foundations, it has been assumed that an area of the 'compacted backfill between foundation and excavation face', would partially comprise peat. Peat would not be used to backfill the excavation void over the 22 m diameter plan footprint of the foundation due to its potential low strength; instead, rockfill, sands, or gravel would be required to backfill, but could be used outside of this area. The area of potential peat backfill equates to 540 m² per wind turbine. As above, the founding depth would be up to 5.0 m, however for the majority of the Site it has been assumed a depth of up to 2.0 m can be used as an approximation to backfill excavations to ground level;
- it has been assumed a restoration area of 650 m² per turbine could be used for surface reinstatement of peat around each turbine (based on a thickness of 0.2 m)
- a crane hardstanding would be required at each wind turbine location, these would be maintained during the operational phase of the Proposed Development. It has been assumed that one length and one width of each hardstanding would be available for reinstatement during construction, with verges 3 m in width;
- it has been assumed that it is not possible to provide reinstatement opportunities around the proposed substation and battery energy storage site based on its current land use;
- it is assumed that the construction of the solar PV would not require peat excavation with footings constructed on top of the existing soil level or use of ground screw piles; and
- new access tracks would be flanked by low angle landscaped verges that would seek to provide visual continuity and topographical tie-in between the access tracks and the surrounding peatland. The verges used for finishing and landscaping of the new access tracks would be extended to 2.5 m either side of the full track width (e.g. running width and track shoulders).

1.5.3 Table 8.2.1 provides estimates of the volumetric peat balance for the Proposed Development. These volumes would be subject to review and updated following ground investigation, detailed design and micrositing as part of the post-consent process, prior to construction.

Table 8.2.1: Estimated Peat Volume to be Excavated

Element	Estimated Peat Volume to be Excavated (m^3)	Peat Depth Assumed (m)	Estimated Acrotelmic Peat Volume to be Excavated	Estimated Catotelmic Peat Volume to be Excavated
Turbine 1 – foundation and excavation area	512	0.5	512	0
Turbine 2 – foundation and excavation area	512	0.5	512	0
Turbine 3 – foundation and excavation area	512	0.5	512	0
Turbine 4 – foundation and excavation area	0	0	0	0
Turbine 5 – foundation and excavation area	0	0	0	0
Turbine 6 – foundation and excavation area	0	0	0	0
Turbine 7 – foundation and excavation area	0	0	0	0
Turbine 8 – foundation and excavation area	512	0.5	512	0
Turbine 9 – foundation and excavation area	512	0.5	512	0
Turbine 10 – foundation and excavation area	512	0.5	512	0
Turbine 11 – foundation and excavation area	512	0.5	512	0
Turbine 12 – foundation and excavation area	512	0.5	512	0
Turbine 13 – foundation and excavation area	512	0.5	512	0
Turbine 14 – foundation and excavation area	512	0.5	512	0
Turbine 15 – foundation and excavation area	0	0	0	0
Turbine 16 – foundation and excavation area	512	0.5	512	0
Turbine 17 – foundation and excavation area	512	0.5	512	0
Turbine 18 – foundation and excavation area	512	0.5	512	0
Turbine 19 – foundation and excavation area	512	0.5	512	0
Turbine 20 – foundation and excavation area	512	0.5	512	0
Turbine 21 – foundation and excavation area	512	0.5	512	0
Turbine 22 – foundation and excavation area	0	0	0	0
New cut tracks, turbine hardstandings	35,671	0-1.0 (max.)	34,930	741
Permanent substation compound	0	0	0	0
Borrow pit search area	13,067	0.5 (max.)	13,067	0
Battery energy storage site	0	0	0	0
TOTAL	**54,370.5**	**N/A**	**53,629.5**	**741**

1.5.4 Table 8.2.2 provides an estimate of the potential reinstatement opportunities for the Proposed Development.

Table 8.2.2: Estimated Opportunity for Peat Volume to be Reinstated

Element	Potential Area to be Restored (m^2)	Average Depth of Restoration Area (m)	Total Reinstatement Opportunities (m^3)
Turbine foundation - surface	14,300	0.2	2,860
Turbine foundations - backfill	11,880	2.0	23,760
Hardstanding verges	5,610	0.5	2,805
Access track verges	105,000	0.4	42,000
Borrow pit restoration	57,769	0.6	34,661.4
Total	194,559	N/A	106,693.9

1.6 Classification of Peat

1.6.1 Peat was characterised as part of the Phase 2 peat survey which considered the physical properties of peat cores taken across the Site. The key measures of peat condition, which are important to establishing the appropriate type of reuse, are noted in Table 8.2.3. Overall, the sample results suggest that the acrotelm layer is variable in depth and it is recommended that the upper 0.5 m should be reused as part of the reinstatement programme, where this depth of material is available. Excavation of 0.5 m ensures that the acrotelm remains as intact as possible and captures much of the underlying seed bank material which would aid vegetation regeneration. With regards to the catotelm material within the Site, the results indicate that all material is mostly intermediate and fibrous in nature.

Table 8.2.3: Peat Classification

Peat Type	Key Measure and Survey Summary – Survey Results
Acrotelm	Depth – the depth of acrotelm ranged from 0 m to 0.1 m, with a mean depth of 0.05 m. Due to the difficulties of excavating a thin layer of acrotelm without causing significant damage to it, it is recommended that 0.5 m of surface peat is excavated (where possible) for reuse as acrotelm material and this assumption has been used for the purpose of the assessment. On this basis, it is estimated there is 53,629.5 m of acrotelmic peat to be excavated as part of the Proposed Development.
Acrotelm /catotelm	Depth – it is estimated that the volume of catotelmic peat to be excavated as part of the Proposed Development is 741 m^3.
	Degree of humification – the sub-samples were mostly intermediate or fibrous.
	Fibrous content – the majority of the sample locations were assessed as having a low coarse fibre content (R1), with three locations having a moderate coarse fibre content (R2). No samples were assessed as having a high coarse fibre content (R3). Three samples were assessed as having a high fine fibre content (F3) with the remainder having a moderate fine fibre content (F2).
	Water content – the results indicate that the sub-samples were dry to semi-dry with some moisture (B1 to B3) indicating that these are likely to be impacted by drainage at the Site.
	Von Post – the results indicate that the sub-samples were assessed as having moderate to strong rates of decomposition (between H5 and H7).

1.6.2 The assessment indicates that the potential opportunities for re-use of peat on the Proposed Development exceeds the potential peat excavation estimate. In addition to this, most of the peat to be excavated is <0.5 m depth and areas of shallow peat can be considered as organo-mineral soils.

1.7 Requirements for the Detailed Peat Management Plan

1.7.1 The Contractor would be required to update the outline PMP prior to the construction phase commencing, based on additional information such as the results of ground investigation and detailed design. As part of this update, the Contractor would be required to ensure excavated peat and other soils are reused on-site, subject to the conditions and methods of reinstatement described in the outline PMP.

1.7.2 The final PMP would detail the following:

- a construction timetable and highlight any seasonal considerations;
- comply with SEPA construction site licence, as required;
- include measures to be put in place to deal with weather related events (flash floods, peat slide, snow melt, dust);
- appropriate use of track and road material, and other hard-standing material to minimise pollution;
- detail measures to enable sediment management in emergency situations, to cope with high rainfall and runoff;
- detail how construction would be scheduled around key Site constraints (such as the breeding or migration seasons for bird and fish). Where scheduling is not practical it would state what other mitigation could be put in place; and
- detail how construction would be scheduled to benefit Site restoration.

1.8 Project Phasing

1.8.1 There are three distinct project phases, construction, operation, and decommissioning. Key activities for each phase are described in the following sections.

Construction

1.8.2 The key activities to be undertaken during the construction phase include:

- prepare the final PMP referring to the detailed design and additional Site information (such as ground investigation);
- set-out peat stripping areas;
- set-out temporary peat and no peat soil storage areas;
- set-out receptor areas for direct translocation of peat as per detailed peat translocation plan;
- strip peat in pre-defined phases;
- put peat and other soils into temporary storage;
- translocate peat where pre-planned;
- reinstate the peat and other soils that have been in temporary storage; and
- monitor vegetation and stability of reinstated soil around the infrastructure, restored peatland areas, and soils to be stored for the duration of the construction period.

Operation

1.8.3 During this phase no peat excavation is anticipated.

Decommissioning

1.8.4 The peat management during decommissioning would follow the same principles as during the construction. It is not expected that disturbance of adjacent peat would be required upon the removal of turbine hardstandings. Restoration of turbine hardstandings would be restored using suitable soils or peat available, but would be confirmed as part of the wider decommissioning restoration plan.

1.8.5 The main mitigation measure relating to decommissioning would be blocking of any artificial ditches (that were created during construction and were required during the operation of the Proposed Development) to facilitate rewetting of adjacent peatland. It is likely that the main tracks would remain in place to facilitate ongoing access to the Site, depending on the arrangements with the landowner and other users of the Site.

1.9 Monitoring and Record Keeping

1.9.1 An Ecological Clerk of Works (ECoW) would be appointed by the Contractor prior to commencement of the construction phase. They would be responsible for monitoring compliance against the final PMP and other relevant documents such as the final CEMP. They would also be responsible for ensuring the legislative requirements would be complied with.

1.9.2 The Contractor and the ECoW would be responsible for maintaining clear records during the construction phase such as depths and types of peat excavated, plans showing peat storage areas and locations of reinstated peat.

1.10 Peat and Mineral Soil Handling Methods

1.10.1 This section provides guidance to help the Contractor in both planning and executing the construction works at the Proposed Development. Working in peat cannot be avoided because the Site is underlain by peat of variable depth and thickness (refer to Figure 8.1.1 in Technical Appendix 8.1). Peat would be excavated and could be stored temporarily in an appropriate location as set out previously where temporary storage is necessary. Careful handling of the peat would also be required to ensure its suitability for reuse.

1.10.2 The Contractor would provide a detailed method statement for works in peat habitats, including but not limited to:

- how to minimise the area of impact;
- how to avoid areas of higher quality bog vegetation (with the assistance of the ECoW);
- means of access to areas of work and to areas where peat would be reused;
- methods of peat removal;
- managing water in the peat and pollution prevention;
- where to avoid unnecessary intrusive work wherever possible;
- drainage measures and design and use of appropriate techniques to maintain local hydrology; and
- plans for the deposition of peat on Site to be agreed with the Applicant and the ECoW.

1.10.3 It would be necessary for the final PMP to detail the methods and timing involved in handling, storing and using peat for reinstatement, all of which would be dependent on the equipment adopted for the construction activities. The final method statement for this should be based on the following principles:

- the surface layer of peat and vegetation (acrotelm) would be stripped separately from the catotelmic peat. Where possible this would involve an excavation depth of 0.5 m and the creation of turves;
- the turves should be as large as practicably possible to minimise desiccation effects during storage;
- the turves should be kept wet but not saturated, and not allowed to dry out when in temporary storage;
- contamination of excavated peat with other substrate materials (e.g. gravels, clays or silts) should be avoided and these materials stored separately where excavated;
- acrotelmic material would be stored separately from catotelmic material even if some of this layer appears to be lacking vegetation, since it may contain a seedbank that is useful for re-establishing vegetation;
- any risk of peat slide must be considered by a suitably qualified engineer and where risk is identified protective measures developed and agreed with the Applicant before further construction works take place;
- careful handling would be essential to retain any existing structure and integrity of the excavated materials and thereby maximise the potential for excavated material to be reused;
- plan all works to reduce the need for double handling the peat;
- movement of excavated turves and peat should be kept to a minimum and it is preferable to transport peat intended for translocation to its final destination at the time of excavation;
- less humified catotelmic peat (consolidated peat), which maintains its structure upon excavation, should be kept separate from any highly humified amorphous peat;
- consider the timing of excavation activities to avoid very wet weather periods in order to reduce the risk of peat becoming wet and unconsolidated, thereby reducing pollution or peat slide risk;
- acrotelmic material would be replaced as intact as possible once construction is complete; and
- to minimise handling and transportation of peat, acrotelmic and catotelmic materials would be replaced, as far as is reasonably practicable, in the location from which it was removed. Acrotelmic material must be placed on the surface.

1.10.4 The handling of peat should be monitored by the ECoW and the Applicant to ensure the above principles are adopted and implemented during construction of the Proposed Development.

Minimising Damage to existing vegetation

1.10.5 To minimise damage to the existing vegetation, construction plant required for reinstatement and landscaping works would be positioned on constructed access tracks, hardstanding areas or existing disturbed areas wherever possible. Areas to be excavated would be clearly marked on the plans and then on the ground to ensure that no work is undertaken outside the construction footprint.

1.10.6 Tracked, low ground-pressure, long reach excavators would be used for peat handling and reinstatement works. A low ground-pressure excavator would be used if the extent of the long reach arm is insufficient. Other machinery, such as tippers, would also be tracked and low-ground pressure type when required to travel on soft ground and the use of ground protection mats could be required.

1.10.7 Reinstatement of vegetation would be focused on natural regeneration utilising peat vegetated turves (acrotelm). In the unlikely event that the quantity of excavated acrotelm turves is not sufficient, a nurse moorland grass seed mix would be used. The species mixture would be specified in the final PMP and could include lowland species to encourage early establishment.

Planning of Peat Reinstatement

1.10.8 Peat reinstatement would be undertaken using methods to minimise double handling of peat and the distances between source and receptor areas. Peat translocation, reinstatement and restoration would be carried out concurrently with other elements of the Proposed Development's construction. To achieve this, a detailed peat translocation plan would be included in the final PMP. The final PMP would include peat management recommendations as per SEPA guidance.

1.10.9 When peat is disturbed or translocated artificially it is prone to drying because fragmentation lets the water drain away and prevents it from accumulating. To create conditions suitable for wet bog restoration, the reinstated peat needs to be kept wet, otherwise, the vegetation would dry out, the peat would shrink and crack, and would ultimately be eroded by water and wind, which would make the restoration unsuccessful and is likely to create problems such as peat floods, water pollution, and peat landslides.

1.10.10 The main principle of keeping the water close to the reinstated surface (maintenance of high-water table) is to use natural and artificial enclosures to slow down the horizontal flow of water. For the enclosure to work, the peat surface needs to be flush with or only slightly (<0.3 m) above the level of adjacent land (to allow for settlement). If the level of translocated peat is substantially higher, then it would be at high risk of drying out and being easily eroded as the water would not be held effectively by the peat alone, it would naturally flow sideways.

Temporary Peat Storage

1.10.11 It is anticipated that during construction, on most occasions, peat and peaty soil would only be handled once and would be placed at its end use locations. However, during construction a degree of temporary peat storage would be required before the excavated material could be re-used in restoration and placed in its end use location.

1.10.12 It would be necessary for the final PMP to detail the methods and timing involved in temporary storage, where this is required. It is likely that a degree of temporary peat storage would be required, for instance in association with stripping areas of any area used for temporary land take; this material would then be used in the subsequent restoration of this temporary construction area.

1.10.13 The final method statement for this temporary storage of peat would be based on the following guiding principles:

- temporary storage of peat should be minimised. Where required it should be temporarily stored in stockpiles/ bunds adjacent to and surrounding each infrastructure Site;
- acrotelm, catotelm, and any clay/ glacial till or other substrata should be stored separately and appropriately to ensure no mixing of materials and to prevent cross-contamination;
- suitable storage areas should be sited in areas with lower ecological value, low stability risk areas and at a minimum distance of 50 m from watercourses. Identified suitable areas would form part of the final PMP and would be agreed in advance with the ECoW;
- peat turves should be stored in wet conditions where possible (e.g. within waterlogged former excavations) or irrigated in order to prevent desiccation;
- larger stockpiles are preferable to numerous small stockpiles, which minimises exposure to sun and wind, which could lead to desiccation. Stockpiles would not exceed 2 m in height and would be sited with due consideration for slope stability. Benching of stored peat could be necessary to provide stability;
- stores of non-turf, i.e., catotelm, should be bladed off to reduce surface area and desiccation of the stored peat;
- stores of peat, particularly catotelmic material, should be inspected regularly (at least weekly) and following heavy rainfall or thaw conditions to check for any evidence of movement, tension cracks or instability in the stored peat. If there is any evidence of instability, appropriate remedial measures should be taken as necessary on the advice from a suitably qualified engineer;
- in dry weather periods, consideration should be given to watering stored turves and peat to prevent drying out, wastage and erosion;
- pollution prevention measures should be installed around peat storage areas; • reinstatement would, in all instances, be undertaken at the earliest opportunity to minimise storage of turves and other materials;
- timing the construction work, as much as possible, to avoid periods when peat materials are likely to be wetter; and
- where practical, transportation of peat on-site, from excavation to temporary storage and restoration locations, should be minimised.

Reinstatement of Peat

Access Tracks

1.10.14 The reinstatement would be carried out progressively with peat excavated from other areas placed directly on the sides of the tracks. This would take place everywhere where the cut tracks pass through peat. The surplus peat, not reinstated along the verges, would be either directly translocated to the receptor areas or stored temporarily in designated areas.

1.10.15 The construction of the track involves the excavation of the acrotelm and catotelm, or top, organic layer of peaty soils, and some mineral subsoil. These would be separated on excavation, ensuring no mixing of the different peat layers, and different soil types. Once all the soil has been excavated and the higher bearing underlying subsoil has been reached, good quality aggregate should then be placed. Up to 0.5 m of acrotelm would be used to reinstate the track verges.

1.10.16 Following construction of the section of access track, turves would be replaced along the road edges to allow quicker re-vegetation and soften visual landscaping of the road edges. Acrotelm turves would be used for this purpose, this would be done in a manner to ensure works tie in with the surrounding topography, landscape and ground conditions, and only where this is required and would not result in adverse environmental effects.

Turbine Foundations and Hardstanding

1.10.17 Once the wind turbine foundation has been constructed, depending on the target depth of reinstated peat, some catotelmic peat could be replaced around the turbine base excavations (subject to detailed foundation construction requirements), and re-turfed with acrotelm. Peat would be placed into any areas disturbed by the construction activities, around the crane hardstandings, rotor assembly hardstandings and other areas used in the construction phase. Other hardstanding areas, such as around the substation compound would also include areas for re-use of acrotelm.

Temporary Compounds and Cable Runs

1.10.18 The temporary construction compounds would be restored following removal of the stone hardstanding. The peat would be reinstated to be flush with the adjacent ground. Similarly, cable runs would be reinstated using peat as excavated, to ensure that the soil horizons would be replaced as removed.

Borrow Pit Restoration

1.10.19 As part of the borrow pit restoration, it is assumed that a thickness of 0.6 m of peat can be reused provided that it presents no residual pollution risks or harm to human health (an increased thickness of peat can be used if located within a deeper thickness of peat). The excavated peat would need to be suitable for restoration purposes to achieve the establishment of peatland habitats and a functional hydrological regime would need to be established in the borrow pit restoration to prevent desiccation of peat. This would include the reuse of both acrotelmic and catotelmic peat.

Ditch Backfilling and Habitat Restoration

1.10.20 Where possible, ditches and other cut areas, should be considered for reinstatement. This would be explored further as part of the final PMP but it is assumed that there is potential to reinstate peat excavated in these areas. This would also include the consideration of other areas of the Site that could be used for the suitable reuse of peat as part of habitat and peatland improvements.

1.10.21 Proposed habitat management proposals for peatland restoration are included in **Technical Appendix 6.6 Outline Biodiversity Enhancement Management Plan (BEMP)**.

1.10.22 This outlines a management area split over two sub-units, comprising an area of predominantly blanket bog and wet modified bog habitats. The aim will be to enhance the existing and degraded peatland habitats and create favourable conditions for the re-establishment of peatland vegetation.

1.10.23 The area has been selected as a suitable candidate area for peatland restoration and enhancement due to the presence of peat hagging and drainage.

1.10.24 Enhancement is proposed to be fulfilled through:

- peat hagg reprofiling;
- livestock exclusion/management; and

- removal of non-native self-seeding trees.

1.10.25 Although it appears that some drains are present, the implementation of peat damming is not proposed in the OBEMP.

1.10.26 It is considered that peat damming of drainage ditches in the management area could reduce water flow to the Red Moss SAC and which could have an adverse effect of the integrity of SAC, affecting the recovery of the designations blanket bog qualifying interests to a favourable conservation status (currently unfavourable recovering).

1.10.27 Peat damming in other parts of the management area would also impede the continuation of livestock grazing and livestock welfare.

1.10.28 The removal of coniferous plantations and reduction of water retention there-in, may result in previously retained water being available to the SAC (rather than previously being removed by the plantation habitat).

1.10.29 Through the removal of the coniferous plantation and through leaving drains open (i.e. no peat damming) will contribute to the improvement in the condition of the SAC.